Strategy Formulation in an Uncertain and Rapidly Changing Environment:  
A Review of the Strategy Formulation Approach Adopted by  
South African ICT Companies

A Research Report  
presented to

in partial fulfilment  
of the requirements for the  
Masters of Business Administration Degree

by  
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November 2004

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This report is not confidential and may be used freely by the Graduate School of Business.

During any exercise of this nature there are usually many people who in some way or form provide the support and guidance required to complete a dissertation. In no particular order we wish to thanks the following people:

First, to Professor Paul Sulcas, our research supervisor, your wisdom and guidance during this process is much appreciated.

Second, to Professor Trevor Wegner, of the UCT statistics department, for providing much needed assistance with our statistics.

Third, a special thanks to the Roger Dawes, CEO of the Computing Society of South Africa, for agreeing to distribute our questionnaire to their membership database.

And last but not least, to our respective families, thank you for supporting us during this period. We realise that we were not there for you during this time and are grateful for your understanding.

Finally, we certify that except as noted above this report is our own work and all references used are accurately reported in bibliography.

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ABSTRACT

There is a raging debate within the strategy literature as to how companies facing conditions of uncertainty and rapid change formulate strategy. The trend of recent international research suggests that the formal approaches to strategy are not suitable within this context. Within the context of South Africa there has been little research conducted as to how firms formulate strategy.

This paper seeks to understand, through exploratory research, using factor analysis, how South African companies facing these conditions, and in particular ICT companies, formulate strategy.

The findings suggest that although there is a strong trend towards the new approaches to strategy there is evidence that some aspects of the formal approaches to strategy formulation remain in use.

KEYWORDS: Strategy, uncertainty, turbulence, rapid change, modernist approach, traditional approach
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1. INTRODUCTION

1.1. Background

There is little argument that the world has changed, and continues to change. In today’s world, a war on the other side of the globe can be viewed, in real-time, on television from the comfort and safety of your living room. A world where an event in one part of the world is almost instantaneously known about across the globe, a world in which it is becoming increasingly more difficult to keep a secret, where new innovations can be copied and made widely available in an instant.

This is the new world, where industry boundaries are becoming blurred, where tomorrow’s markets could be, and often are, drastically different from today’s, and where information is disseminated around the globe instantly. Where unique market positions are difficult to maintain for any length of time, where first mover advantage is becoming less valuable, and where competitor’s strategies are converging.

In an article written for the Harvard Business Review, Brain Author (1996:100) noted that “Our understanding of how markets and businesses operate was passed down to us more than a century ago by a handful of European economists … It is an understanding based squarely upon the assumption of diminishing returns …”.

In challenging the fundamental economic models and assumptions, what Author is asserting is that we have moved from a world of diminishing returns to one of increasing returns, a view that is supported by Hamel (1997:25), “we have reached the end of incrementalism in the quest to create new wealth. Quality, cost, time-to-market, process improvement – these are important, but we are hitting the point of diminishing returns.”

In Arthur’s opinion, while the Alfred Marshal world is one that favours planning and control, the new world of increasing returns is more like gambling and requires companies to be flexible and adaptive. As Arthur (1996:104) so eloquently puts it, “in the increasing returns world, especially high tech, re-everything has become necessary because every time the quest changes the company needs to change. It needs to reinvent its purpose, its goals, its way of doing things. In short, it needs to adapt.”
And thus begins the debate. Are the traditional approaches to strategy formulation and implementation – those that encompass formal planning processes and that are premised on predicting the future through rigorous and careful analysis - applicable for today’s world?

Recent research (for example, Eisenhardt & Brown, 1999; Eisenhardt & Sull, 2001; Bryan, 2002) into a number of companies suggests that companies facing these new world conditions of turbulence and uncertainty follow a different approach to strategy than that articulated by the traditional approaches. But what does this mean for South African companies, which one could argue are facing even greater uncertainty? How do they approach strategy formulation and implementation?

1.2. Purpose
The debate as to which approach to strategy is best for the new world has been going on for almost a decade. Over the years a great deal of research has been performed by proponents of each approach to strategy, with each showing convincing evidence favouring their approach.

Of late there has been a growing body of international research and theories on strategy by leading academics and consulting firms alike that suggest the traditional approaches to strategy are not effective in turbulent and uncertain conditions. Within the context of South Africa, however, few studies have been conducted into how companies facing these conditions formulate and implement strategy.

The purpose of this research is therefore to determine the approach taken by South African companies facing turbulent and uncertain conditions when formulating and implementing strategy. More specifically, South African information and communication technology (ICT) companies have been selected.

1.3. Why South African ICT Companies?
Worldwide the technology industry is experiencing great uncertainty and change. The technology bubble that burst in late 2000 resulted in a significant decrease in
technology spending, with the timing of an upturn in spending uncertain. Furthermore, not only are technology product lifecycles getting shorter, but companies in this industry also face a continuous influx of new technologies and standards that threaten to replace existing ones. In addition, ICT companies face the same uncertain market and economic conditions that non-ICT companies face thus creating even further uncertainty.

The incentives for companies operating in this industry to be first to market are great, however, the costs of selecting the wrong technology or mistiming the market are even greater. This paradox creates further uncertainty and risk for these companies.

It could be argued that South African ICT companies face even greater uncertainty. For one thing, the country is considered an emerging market within the global context and therefore faces the growing threat of globalisation. Related to this, the volatility of the Rand creates a booming export industry in one-year, which is soon followed by a booming import industry the next, making budgeting and planning difficult. Another area of uncertainty is the lack of diversity within management and ownership given the BEE charter and more importantly the impending ICT charter. The growing threat of HIV/AIDS, which makes it difficult to predict the size of future markets as well as threatens the pool of available skilled resources is also a concern.

It is therefore clear that the South African ICT sector certainly qualifies as one that is facing great turbulence and uncertainty and is thus suitable for this research.

1.4. Constraints
The following constraints have limited this research:

Research Period
The research undertaken and presented herein was undertaken over a period of two months thus limiting its scope. Furthermore, the authors would have liked to perform face-to-face follow-up interviews with respondents who indicated their willingness to partake in such interviews, but were prevented from doing so due to the time constraints.
Low Response Rate

This research was initially targeted at listed South African ICT companies. However, due to the lack of responses, the authors were forced to widen the sample population surveyed.

Having widened the sample, only fifty responses were received, of which twenty-six responses were removed due to the companies, represented by the respondents, not falling within the definition of the ICT sector used (see Appendix F: ICT Sector Defined for this definition). There were therefore insufficient data to provide any findings of statistical significance, and the researchers were thus forced to use exploratory techniques, for which the data proved meaningful.

1.5. Document Overview

It is important for research to have a clear and well-defined problem that it seeks to understand. The problem that this research is concerned about is presented in chapter two. Once the problem has been defined, it is important to identify and understand what has already been researched and argued in the literature regarding this problem, and this will be presented in chapter three. The methodology and approach that was followed for the purposes of this research will be described in chapter four. Following this, chapter five will present the research findings, analysis, and a discussion of these. Finally, concluding remarks will be made in chapter six.
2. DEFINITION OF PROBLEM

Companies operating in the ICT sector are constantly faced with new technologies and standards. In addition, when choosing a particular technology or standard, these firms typically face a significant time lag in getting employees skilled-up, and implementing the chosen plan. A sudden change or selecting the wrong direction could cause major problems for a company competing in this industry, particularly one that is not prepared or rigid. Furthermore, the costs of selecting the wrong direction or being caught off guard could prove to be fatal.

The following figure and subsequent description is a useful example in further illustrating this problem:

Imagine an ICT company faced with task of formulating a strategy today (T₀). At time period T₀ this company is faced with a number of uncertainties. For one thing, there is the decision as to which technology to invest in and the direction to follow. Another uncertainty that would be faced is when existing and new customers will demand this
new capability i.e. \( T_1 \). Yet another uncertainty would be the unknown lead-time that it will take to build the new capability i.e. \( T_1 - T_0 \).

If the strategy for this company involves selecting a single technology to invest in and following a particular direction, which turns out to be wrong i.e. not what the customer demands at time \( T_1 \), then this company will need to suddenly re-invest and quickly change direction. While a slow response will certainly result in the company missing the market opportunity and losing market share to competitors, a flexible company that is capable of quickly changing or one that has hedged its investments may stand a chance of preventing large-scale losses.

So the question remains: how do companies facing these conditions formulate strategy in such a way as to mitigate – to some extent – the potentially fatal problems that could occur at time \( T_1 \)?

The objective of this research is therefore to perform exploratory research into how South African ICT companies approach strategy formulation and using these observations to test the following hypothesis:

*South African ICT companies adopt a modernist approach to strategy formulation and implementation.*
3. LITERATURE REVIEW

This literature review will first seek to categorise the strategy literature into two groups and position these at opposite ends of a continuum. Next the argument that is raging in the literature between the proponents of these two groups will be presented. Following this, the main approaches to strategy that form part of each of these groups will be described. Lastly, a brief summary of the primary themes expressed and patterns observed in each of these two groups will conclude the literature review.

3.1. Two Opposite Ends of a Continuum

F. Scott Fitzgerald (in Mintzberg, Ahlstrand, & Lampel, 1998:20) said “The test of a first-rate intelligence is the ability to hold two opposing ideas in the mind at the same time and still maintain the ability to function.” Not surprisingly, a review of the literature highlights two distinct differences of opinions - two diametrically opposed views that sit at opposite ends of a continuum.

On the one end of the continuum, there is the group of primarily academics including the so-called fathers of modern strategy, with for example Chandler, Christensen, and Ansoff forming part of this group. These strategists argue for and favour the formal planning approach to strategy, which is premised on the principle that by careful and rigorous analysis of the industry and market in which you complete, a firm can predict and plan for the future. As Ansoff (1965:43) puts it, strategy is “a process whereby an external analysis is performed on the market, forecasts are prepared and plans are made.” We will call this approach to strategy, which is positioned at the rightmost end of the continuum, the traditional approach to strategy.

On the other end of the continuum, there is a growing group of academics and large international consultancies that articulate a very different approach to strategy. These strategists argue for an approach that is more flexible, dynamic, and emergent than that favoured by the advocates of the traditional approach. This approach to strategy is premised on the future being far too uncertain to predict with any degree of accuracy that would make planning practical or feasible. Instead, this group believes that a firm’s ability to change and adapt is its strategy. We will call this approach to strategy, which is positioned at the leftmost end of our continuum, the modernist
approach to strategy. Hamel and Prahalad (1994) best describe the view expressed by the proponents of this approach to strategy:

> If senior executives don’t have reasonably detailed answers to the “future” questions, and if the answers they have are not significantly different from the “today” answers, there is little chance that their companies will remain market leaders. The market a company dominates today is likely to change substantially over the next 10 years. There’s no such thing as “sustaining” leadership; it must be regenerated again and again. (127)

### 3.2. Left or Right?

Strategy theory can be traced as far back as the fourth century to the writings of Sun Tzu and his *Art of War*. Embedded in this writing of military strategy were philosophies that seem to hold true for modern strategic theory and thought. Tzu (Tzu in Griffith, 1971:ix, quoted in Wilmer, 1980:63) believed, “The winning general makes many calculations before the battle starts; the general who looses makes few calculations.” As to the nature of these calculations Napoleon wrote, “The first task of any general is to work out what has to be done. The next is to determine whether he has the resources to overcome any obstacles the enemy can put in his way”

Clausewitz (in Ghycyz, Oetinger, & Bassford, 2001) further argued that a general cannot see everything in the war and therefore strategic choices and decisions are based on the level of information and quality of information that the general receives. This information is in the form of intelligence about the environment, the enemy and details of his own troops, which forms the basis for his actions. From this process, the general reaches a decision, creates a plan and launches its execution.

The principles of this premeditated military view of strategy can still be found in modern corporate strategic theory today, which in earnest can be traced to the late 1950’s with contributions from Selznick (1957), Chandler (1962), Ansoff (1965), and Christensen (1965).

This traditional and predominate view of strategy, is that of formal strategic planning, and found prominence in 1965 with the publication of H. Igor Ansoff’s book *Corporate Strategy*. This approach to strategy associates strategy with formal
procedures and analysis, with Ansoff (1965:43) suggesting that strategy is “a process whereby an external analysis is performed on the market, forecasts are prepared and plans are made.”

The traditional approach as articulated by these academics received strong support at the time from the influential Harvard Business School and as a result found its way throughout the business community, gaining widespread acceptance. As Mintzberg et al. (1998:9) note, “Ask someone to define strategy and you will most likely be told that strategy is a plan, or something equivalent – a direction, a guide or course of action into the future, a path to get from here to there.”

But this traditional approach of strategic planning, which entails careful analysis, predicting the future, budgeting, and the creation of plans is arguably unsuitable for industries experiencing great uncertainty and rapid change – the technology industry for example. In today’s world where information flows freely and instantly, where globalisation is prevalent, and where as Author (1996) puts it we have moved from an economy of “processing of resources to processing of information, from application of raw energy to application of ideas” (1), a new approach to strategy is demanded.

Day and Schoemaker (2000:9), two fierce critics of the traditional approach to strategy, certainly do not believe that the traditional approaches to strategy are suitable for today’s fast paced and turbulent world, as they point out: “This different game – with its high uncertainty and rapid, competence-destroying change - undermines the old rules used in managing established technologies.” A view that is further supported with authors suggesting that, “the accelerating pace of emerging technologies is shrinking the window in which any given strategy, however well thought out, remains viable. For this reason, an elaborate but mechanical attempt to plan or a three-day retreat in the woods may no longer qualify as strategy making.” (Szulanski & Amin, 2000:189)

Porter (1996), however, disagrees and heavily criticises the opinion that formal approaches have passed their prime and are no longer valid. His view, which is deeply rooted in the planning approach, is that “Competitive strategy is about being different. It means deliberately choosing a different set of activities to deliver a unique mix of
value.” (64). He further argues that selecting a position will require the firm to make tradeoffs that will purposely limit what the company offers therefore differentiating them in the market resulting a one unique position.

But advocates of emergent approach to strategy are not convinced and propose instead that strategy is a “science of muddling through”, involving cautious comparison of successive options and careful maintenance of consensus (Lindblom, 1965, quoted in Mintzberg et al., 1998:196). Authors such as Mintzberg went further by suggesting “Smart strategies appreciate that they cannot always be smart enough to think through everything in advance.” (1987:69), and Hamel (1996:70) suggesting that “What is required is not a little tweak to the traditional planning process but a new philosophical foundation: strategy is revolution; everything else is tactics.”

Porter (2001), however, continues to questions whether the fundamentals of strategy have actually changed and argues that companies are still driven by the market and consumer. Furthermore, he not only questions whether the “new economy” has arrived, but also challenges the underlying assumption that technological advancements and the new economy will change business as we know it. Instead, he suggests that these changes are enablers of the business strategy and must be seen within the context of the industry structure and the ability to deliver sustainable competitive advantage.

However, as Eisenhardt (2002) points out in an article aptly titled “Has Strategy Changed?” technology isn’t the new economy, globalisation is, a view which is shared by Bryan (2002:18) who notes that, “Globalisation and technology are sweeping away the market and industry structures that have historically defined the nature of competition.”

And so the argument rages on, with valid and compelling arguments being made by both sides of the spectrum. The following sections will seek to describe in more detail the approaches to strategy as advocated by the proponents of each approach.
3.3. The “Traditional” Approaches to Strategy

The traditional approaches to strategy are about control. Strategy is a top-down process in which senior management performs rigorous analysis, plans extensively, and prescribes a single strategy to the organisation.

This is a consistent theme that emerges from the writings and theories, which make up the traditional approach to strategy. In simple terms this is, that the market is the driving force of business strategy. These authors suggest that in order to formulate successful strategies, analysis of the market must be performed so that the context of the firm within that market can be understood. Following on from this, a careful planning exercise is undertaken from which a strategy, based on the information on hand, is selected.

The traditional approach to strategy is therefore about formalised processes, careful analysis, planning, budgeting, and the job of senior management, the board, and the CEO. Moreover, it involves continuous analysis and information gathering that the proponent of this approach argue prepare and equip an organisation for making decision in a turbulent world.

Strategy as a plan

Chandler (1962) believed strategy to be “the determination of basic long term goals and objectives of an enterprise, and the adoption of courses of action and allocation of resources necessary for carrying out these goals.” (46). He postulates that there exists a dynamic and sequential relationship between the environment in which a firm operates, the firms’ strategic choices within that environment, and the organisational structure in order to meet the company’s objectives (see the Figure 2 below). Chandler argues that the market will drive changes within the internal configuration of the organisation in order to meet market needs, but that this is dependent on the decisions and choices that senior management make in meetings the changes of the needs of the market.
In his book, *Strategy and Structure*, Chandler (1962) argues that an organisation’s structure will follow the growth of the firm. Furthermore, this will evolve through a stepwise developmental sequence, and that firms only alter their structure when inefficiencies arise. Moreover, he argues that administrative innovation is at the heart of business strategy and that business strategy determines the organisational structure, specifically the level of centralisation and decentralisation.

The view that the market drives strategy and therefore that market changes can be predicted through analysing and projecting the future, is supported by Ansoff. In his view, strategy is “A process whereby an external analysis is performed on the market, forecasts are prepared and plans based on the logical assumption is that industries have a ‘logical’ incremental nature, which makes forecasting and planning possible.” (1965:43)

Ansoff (1975) in addressing the criticisms and shortcomings of strategic planning in conditions of turbulence suggests that firms wishing to prepare for strategic surprises have two responses. Firstly, a firm can develop a capability in effective crisis management, which is to become fast and efficient in responding to the situation. Ansoff argues that having a deep understanding of the various situations, through analysis of the current situation and repetition of dealing with crises, firms are able to effectively deal with any situation. The second alternative suggested by Ansoff is to treat the problem by preparing for possible strategic surprise through a careful external analysis of the threats facing an organisation. Simply put, Ansoff suggests...
that, “Strategic issue management overcomes a basic shortcoming which has become increasingly evident in practice – the inability of strategic planning to handle quickly and efficiently the fast developing threats and opportunities.” (1975:32)

In developing a strategic success hypothesis, Ansoff (1979) proposes that an organisation will optimise its success when the aggressiveness of its strategic behaviour in the environment and its openness to the external environment are both aligned with the turbulence level of the organisation’s external environment. Within this he contextualised the levels of turbulence into two broad categories: incremental turbulence and discontinuous turbulence. Ansoff suggests that the incremental turbulence is predictable, fairly logical in its development, and therefore can be forecasted and planned for. On the other hand, Ansoff suggests that discontinuous turbulence is an event that an organisation cannot possibly be prepared for, and therefore should be viewed within the context of and dealt through strategic issue management. Moreover, Ansoff argues that there are very few instances of radical discontinuous change that cannot be predict, and that if such an event were to occur, all organisation will be equally affected by it.

This approach to strategy articulates that firms’ need to create a sense of anticipation and deep understanding of the market and consumers within the market. Furthermore, it is argued that in turbulent conditions, success is achieved through a process whereby clarity is gained from careful analysis of the market and the consumer’s needs within those markets, as well as a thorough analysis of possible future threats.

**Strategy as positioning**

Porter (1979) contends that the essence of strategy formulation is coping with competition, and that the state of competition in an industry depends on five basic forces. More importantly is that the strength (or weakness) of these forces determines the profitability as well as the opportunities in that industry. According to Porter, the knowledge of these underlying forces provides the groundwork for a strategic agenda. In this approach, strategy is formulated by first assessing the forces affecting competition in an industry and their underlying causes; second, by identifying a company’s strengths and weaknesses within this context; and third, by devising a plan of action. As Porter (1979:138) notes,
Every industry has an underlying structure, or a set of fundamental economic and technical characteristics, that gives rise to these competitive forces. The strategist, wanting to position his or her company to cope best with its industry environment or to influence that environment in the company’s favour, must learn what makes the environment tick.

But later Porter (1996) argued that in order to achieve and maintain a sustainable competitive advantage a firm required more than just a unique position, and that in order to achieve a sustainable advantage a firm also needs to make tradeoffs. He suggests that if companies only select a unique position, competitors will be attracted. Put differently, a firm must make choices and select a specific set of activities, and by doing so, will help defend a firm’s position from competitors. As Porter notes, “a strategic position is not sustainable unless there are trade-offs with other positions.” (68)

More recently, Porter (2001) suggests that technologies are enablers of business and should be seen in the context of their impact on the industry structure. Here he maintains that the underlying objectives of strategy have not changed in this new world and that the goal is still superior long-term investments. Furthermore, he continues to argue, that a company must deliver a unique value proposition by defining the way in which it delivers unique value to the customer, and that robust strategies must involve tradeoffs thus forcing companies to choose one position over another. Moreover, Porter argues that there must be continuity in direction thus developing the skills and competencies and therefore building reputations with customers for a particular value proposition.

*Strategy as positioning* is best summed-up by Porter himself, “The key to growth – even survival – is to stake out a position that is less vulnerable to attack from head-to-head opponents, whether established or new, and less vulnerable to erosion from the direction of buyers, suppliers, and substitute goods.” (1979:145)
3.4. The “Modernist” Approaches to Strategy

The traditional approach to strategy formulation depends on a predictable view of the future and a relatively stable and steady environment – a set of assumptions that advocates of the modernist approach to strategy argue are certainly not true of firms competing in fast paced industries with great uncertainty. In contrast, the modernist approach is based on the understanding that the future is far too uncertain to predict thus rendering any effort to meticulously plan futile.

This approach suggests that a firm’s strategy is its ability to change and adapt, that a firm’s strategy is not about pursuing a single sustainable competitive advantage, but rather to seek a continuous flow of competitive advantages, and that rather than assume away risk as the traditional approach to strategy does, embrace it.

The modernist approach to strategy is therefore about accepting change as given and inevitable, about managing this change, and about a firm’s processes. It’s about setting a general direction, challenging the firm, and allowing the firm the freedom to self-organise and a strategy to emerge. It’s also about hedging bets, keeping options open, and simultaneously following many strategies.

Strategic Intent

Hamel and Prahalad (1989), two fierce opponents of the traditional approaches to strategy, argue that these approaches focus far too much on the constraints of the organisation, and that the well-known and widely used concepts of “strategic fit”, “generic strategies”, and the “strategy hierarchy” actually aid competitive decline.

Instead, the authors suggest that companies that have become globally successful over the last 20 years started out with ambitions far greater than their resources could support. These companies set stretch goals and then created an obsession for their quest to achieve these goals – what the authors call “strategic intent”. But strategic intent is more that just ambition - it is about capturing the essence of winning, it’s about motivating people, and most importantly, it’s about leaving room for people and teams to contribute.
While traditional approach to strategy is about creating a fit between a companies resources and opportunities, strategic intent is about creating an extreme misfit between these, creating a gap, and then challenging the organisation to close this gap. The principle of strategic intent is thus not so much about achieving a competitive advantage – since few competitive advantages are long lasting, but more about continuously seeking new competitive advantages by setting ambitious goals that are out of reach and challenging the organisation, as Hamel and Prahalad (1989:69) put it, “Keeping score of existing advantages is not the same as building new advantages. The essence of strategy lies in creating tomorrow’s competitive advantages faster than competitors mimic the ones you possess today.”

Furthermore, the authors point out, the all too familiar positioning exercise reflects the strengths of the industry leader, and that playing by the leaders rules is like committing suicide. In other words, the strategists goal should not be to select a unique position or niche within the existing industry space, but to create a position that is off the industry map that is best suited to the firm’s strengths.

Hamel (1997) reiterates this point in a cover storey for Fortune Magazine in which he points out that between 1986 and 1996 only 17 fortune 1000 companies grew total shareholder value by more than 35% per year. These companies, he argues, managed to grow shareholder value to such an extent by drastically changing the basis of competition in their industries. To support this assertion Hamel cites Starbucks as an example, noting that the company took a simple commodity – coffee – and by selling it in many varieties in trendy stores, created and entire new industry.

Hamel and Prahalad (1989) point to another problem with the traditional approaches to strategy. Most of the traditional approaches to strategy are top down, where corporate goals guide business strategy, which in turn guide functional tactics. This, the authors argue, creates an elitist view of management and makes it difficult to produce truly creative strategies. It is best summed up by the authors, “For one thing, there are not enough heads and points of view in divisional or corporate planning departments to challenge conventional wisdom. For another, creative strategies seldom emerge from the annual planning ritual.” (Hamel & Prahalad, 1989:75)
Inherent in strategic intent is the concept of core competencies. Core competencies are best defined by describing their characteristics. Firstly, a core competency potentially provides a company access to many markets. The second characteristic is that a core competency should add significant value through the end product to the customer. The last characteristic of a core competence is that it should be difficult to imitate. 

Prahalad and Hamel (1990) argue that the traditional measures of competitiveness, those of price/performance attributes, quality, and cost, are becoming the minimum entry requirements and therefore less and less important in developing a competitive advantage. Instead the authors suggest that in the long run, competitive advantage is derived from the ability to build at a lower cost and more quickly than your competition. Core competencies, the authors assert, are what is needed to give the corporation this ability.

For Hamel and Prahalad strategy is about creating the strategic intent – a stretch goal, providing the skills and ability, and allowing the corporation, as a whole, to produce the strategy and allow it to emerge.

**Strategy as process**

Between 1998 and 2001 many articles arguing for a new approach to strategy that focuses more on the strategic processes and change than on strategic positioning have been written by Eisenhardt and her colleagues (Eisenhardt & Brown, 1998; Brown & Eisenhardt, 1998; Eisenhardt & Brown, 1999, and Eisenhardt & Sull, 2001).

These authors turn to a definition of strategy as articulated by the Economist magazine (1997:65): “Strategy is about two things: deciding where you want your business to go and figuring out how to get there”, and argue that firms facing conditions of uncertainty and rapid change should focus more on the latter question. In other words, firm’s competing in uncertain and rapidly changing environments should focus more on the process than on the a specific position in a market or industry.

In their book *Competing on The Edge: Strategy as Structure Chaos*, Brown and Eisenhardt (1998) propose an approach to strategy called competing on the edge, which they argue is fundamentally different from what is traditionally called strategy.
This approach, in answering the “where do you want to go?” question, is unpredictable, uncontrolled, inefficient, proactive, continuous, and diverse.

It is unpredictable in that it is about surprise and is not planned. It is about making moves, observing what happens, and continuing with those that seem to work. It is uncontrolled because there is too much going on for any one group to orchestrated every move, and it is inefficient because its about making mistakes, duplication, and error. It’s about using change to reinvent the business by discovering opportunities, about being early – proactive – trying to anticipate, and where possible, to lead change. It’s about a rhythm of moves over time, not a set of disjointed actions. And finally, its not about one grand generic strategy, but rather about making lots of moves - some of which will be brilliant, most will be good, and few will be failures – its about creating robust and diverse strategy.

But competing on the edge is about more than merely answering the “where do you want to go?” question. It is also about answering the “how are you going to get there?” question. Moreover, it is about intimately tying the two together.

Brown and Eisenhardt assert that the answer to the second question of “how are you going to get there?” lies in creating an organisation that can continuously change thus allowing a flow of competitive advantages to emerge and form a semi coherent direction. In their view, firms that are capable of continuous change have three characteristics in common. First, these firms are sufficiently rigid so that change can be organized, but not so rigid that change cannot occur. The second characteristic of these firms is that they are capable of thinking simultaneously about multiple time horizons and maintaining a balance between past experience, current activities, and future opportunities. The final characteristic of these firms is that they create an internal rhythm that drives momentum for change and that change is triggered by the passage of time and not by the occurrence of events.

Later Eisenhardt and Brown (1999) suggested another characteristic of strategies of successful firms that compete in uncertain and rapidly changing markets. This characteristic is what the authors call Patching, and is defined as a strategic process in which an organisation’s business units are constantly re-mapped to changing market
opportunities. Instead of developing strategy first, firms that patch rather focus the organisation on the right business opportunities and let strategy emerge.

As Eisenhardt & Brown (1999:76) put it in one *Harvard Business Review* article, “in volatile markets, corporate strategy should center on *strategic processes* more than on *strategic positioning*. In these markets, it is impossible to predict which competencies or strategies will be successful and for how long.” The intention is thus not to create detailed routines but rather simple rules that guide the organization providing just enough structure to allow it to capture the best opportunities as Eisenhardt and Sull (2001:110) note, “they poise the company on what’s termed in complexity theory ‘the edge of chaos’”.

**A portfolio approach to strategy**

More recently there has been a growing voice from the consulting companies arguing for a new approach to strategy. These approaches centre on the theme that selecting and pursuing a single strategic position under the current conditions of uncertainty and rapid change is exposing a firm to great risk. Instead, these approaches draw from finance theory and suggest following a portfolio approach to strategy while at the same time leveraging real options.

One such proponent of this approach is Beinhocker, a principal at Mckinsey & Company, and co-leader of its Strategy Theory Initiative. Beinhocker (1999) turns to complexity science and suggests that we should look at nature and leverage the power of evolution rather than our ability to make accurate predictions, and suggests that, businesses should not have singular focused strategies, but instead cultivate and manage *populations of multiple strategies that evolve over time.*

By harnessing the forces of evolution acting on a population of strategies, those strategies will be more robust and more adaptive than a traditional singular, focused strategy. A *robust* population of strategies will produce positive results under a wide variety of circumstances, even though it may not be optimal in some scenarios. An adaptive population of strategies keeps an array of options open over time, minimizing long-term and irreversible commitments. (1999:97)
Using Microsoft as an example, Beinhocker (1999) points out that if one were to look at its strategy in 1988 and ask, “What is Microsoft’s strategy?” it would look confusing at best. However, it would make a lot more sense if one were to ask, “What are Microsoft’s strategies?”

These approaches, which admittedly look like a hybrid between the two ends of our continuum, have seen the popularisation of real options in recent years. Real options emerged from capital budgeting and portfolio investment theory specifically to deal with the inability of the traditional discounted cash flow (DCF) and net present value (NPV) models being able to capture the value of the options to delay, expand, or abandon a project.

Real options within the context of strategy allow companies to diversify strategies by purchasing options in various technologies, investments or partnerships to mitigate uncertainties. This is achieved by reducing the risk of making certain tradeoffs or choosing certain strategies in uncertainties with a known set of alternatives. As Luehrman (1998) points out in an article that appeared in the *Harvard Business Review*,

> As soon as we start down the path, we begin learning – about business conditions, competitors’ actions, the quality of our preparations, and so forth – and we need to respond flexibly to what we learn. Unfortunately, the financial tool most widely relied on to estimate the value of strategy – discounted-cash-flow (DCF) valuation – assumes that we will follow a predictable plan, regardless of how events unfold. A better approach to valuation would incorporate both the uncertainty inherent in business and the active decision making required for a strategy to succeed. (89)

A real option involves a firm taking small bets in many investments with an option to increase, reduce, or abandon their exposure to that investment depending on the conditions.

Hamilton (2000) points out that real options are particularly appropriate to emerging technology investments where the traditional DCF approaches value these technologies as negatives rather than positively. Moreover, the traditional DCF approach actually prejudices emerging technology investments since they are seen as
uncertain and in these circumstances it is typical for managers to use higher discount rates.

Real options are often used in conjunction with scenario planning. Scenario planning is advocated by many of the portfolio approaches to strategy to assist in identifying these options, and is gaining widespread acceptance and used by some of the largest companies in the word. The value of creating multiple futures or realities that could exist as apposed to a single “truth” emphasises flexible strategy practices.

While scenario planning is a process whereby possible future alternatives are identified and options created, it has been argued that the real value of scenario planning is not so much in the plans that are produced as a result of the exercise, but the strategic conversation. Arie De Geus, former head of planning for Royal Dutch Schell, summed it up when he commented that, “the real purpose of effective planning is not to make plans but to change the mental models that decision makers carry in their heads” (1988:73). A view that is shared by Schoemaker and Mavaddat (2000:210) who comment that, “Scenario planning helps prepare the corporate mind so that it will recognize opportunities faster that rivals, and can move more quickly, with more resolve.” The intention of this conversation is therefore to align the thinking of the different stakeholders and to break the traditional paradigms supported by management. It forces those involved to think outside their normal viewpoints and look at the future with a different lens.

3.5. Literature Conclusion
Looking at the literature we can clearly identify two distinct and diametrically opposed approaches to strategy.

The first of these approaches can be traced as far back as the fourth century and has its roots in the military. This approach is about control, planning, and analysis, and is premised on the future being predictable. Moreover, the basis for the analysis is predominately market driven aligning products to meet the market needs, with organisational structures evolving as inefficiencies arise. Changing strategy will mean fundamentally changing which customers are being served.
Strategy formulation in organisations that follow this approach is performed by senior management and execute by the rest of the organisation. These strategies involve selecting single unique positions and are thus highly efficient. They are carefully articulated and explicitly designed.

Selecting the wrong markets or encountering discontinuous change, however, could prove to be fatal for companies following this approach. Simply put, this approach to strategy entails taking one or two big bets, trading these off against other options, carefully mapping the future, and following the plan.

The second approach to strategy is diametrically opposite. It is an approach where organisations set general directions by formulating a vision or strategic intent, achieving this vision or strategic intent by creating simple processes that allow the corporation the flexibility to adjust, adapt, and emerge, and preparing the organisation to cope with dramatic and continuous change. In preparing the organisation to cope with this rapid change, firms create a rhythm of continuous change and align this rhythm with market change. Furthermore, these firms constantly change their organisational structure to meet business opportunities within the market.

Organisations that follow this approach to strategy are not efficient in formulating and executing strategy, often simultaneously following many different paths to achieving their goals. These organisations do not assume away risk and instead embrace it, accepting that they will need to frequently change direction. By following a portfolio approach to strategy and making use of real options and scenario planning, these firms mitigate the inherent risks of uncertainty and rapid change.

The modernist approach to strategy may not be efficient and may often be downright inefficient. However, a firm facing great uncertainty and turbulence is better off being inefficient and modestly successful most of the time than being highly efficient and sometimes succeeding on a grand scale while other times failing miserably. Simply put, inefficiency may be the cost of creating stability in turbulent and rapidly changing conditions.
The literature does not specifically disregard one or the other as being superior in general, nor does it suggest that either of these approaches to strategy formulation is wrong. What does suggest, however, is that in rapidly changing and uncertain environment, the former is far superior to the later. That in turbulent and rapidly changing conditions, where it is not possible to accurately or at least reasonably accurately predict the future, a modernist approach to strategy formulation and implementation is better suited. For industries that are mature or facing little change and uncertainty, where the conventional economics of improving efficiencies and cost effectiveness are still relevant, for these conditions, the traditional approach to strategy may well be better suited.
4. RESEARCH METHODOLOGY AND APPROACH

4.1. Scope
This research is concerned with analysing and understanding the approach to strategy adopted by companies within the South African ICT sector. Only firms that strictly form part of this sector have been included in the research.

For the purposes of this research the definition of the ICT sector that was chosen is one that was defined by and agreed to by the Organization for Economic Cooperation and Development (OECD) member countries. To view this definition, please refer to Appendix F: ICT Sector Defined.

4.2. Questionnaire Design
A comprehensive literature review was performed to understand the strategy theory landscape and to create insights into the prevailing strategy themes. These themes were taken from leading academics as well as international consulting firms.

The literature was then segmented into two overall themes, which are categorised as traditional strategy theories and modernist strategy theories. From the two overall themes twenty-six statements were drawn from the various theories, and opposing statements plotted on either side of the seven-point continuum, creating thirteen questions. These opposing statements reflect different sub themes that characterise the range of theories found. These are listed in Table 1 on the following page.
<table>
<thead>
<tr>
<th>Q</th>
<th>Modernist (M)</th>
<th>Traditional (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>We have many strategies that we follow simultaneously of varying scale and risk. These may include strategic alliances, many small investments with options, etc.</td>
<td>We have a single unique focused strategy. Sometimes our strategy may be diversified, but this involves large committed resources.</td>
</tr>
<tr>
<td>2</td>
<td>We sometimes choose the wrong markets, make mistakes, bounce back and fall into the right ones, i.e. we make choices, receive feedback and adapt</td>
<td>Through careful analysis and planning, we select markets, follow through with a detailed strategy in those markets. Resource utilisation is highly optimised and carefully allocated.</td>
</tr>
<tr>
<td>3</td>
<td>We have a loose organisational structure, with high levels of autonomy within our company. Our organisational structure can change with relative ease.</td>
<td>We have a formalised hierarchy with clear communication lines and levels of responsibility. Our organisational structure changes infrequently and is done through a formal process.</td>
</tr>
<tr>
<td>4</td>
<td>We focus primarily on the present (current execution) while taking cognisance of the past and future.</td>
<td>We analyse the present with the intention to predict, forecast and plan for the future.</td>
</tr>
<tr>
<td>5</td>
<td>Our strategy is: Giving the organisation a general direction and framework in which to operate, and allowing the organisation flexibility in achieving the stated intent.</td>
<td>Our strategy is: A well-defined plan that is communicated to all levels of the organisation and implemented accordingly with limited flexibility.</td>
</tr>
<tr>
<td>6</td>
<td>Generally changes are planned and continuous, and are independent of competitor events. For example, launching new products and/or services every 6 months rather than in response to a competitor.</td>
<td>Select a market position and defend it through operation efficiency, and change mostly when directly challenged by competitors.</td>
</tr>
<tr>
<td>7</td>
<td>Strategy formulation and execution is an organisation wide exercise.</td>
<td>Strategy formulation is a senior management exercise, which is to be executed by the whole organisation.</td>
</tr>
<tr>
<td>8</td>
<td>We leverage our company's competencies to create and/or find market positions.</td>
<td>We select a market position and align, create, and/or acquire competencies to meet the market position.</td>
</tr>
<tr>
<td>9</td>
<td>Our goal is to create a continuous flow of competitive advantages.</td>
<td>Our goal is to create a sustainable competitive advantage by selecting a unique defendable position within the market.</td>
</tr>
<tr>
<td>10</td>
<td>We continuously formulate and adapt our strategy. There typically is no predetermined cycle for this process.</td>
<td>We formulate and change strategy through a planned process. This typically takes place on a predetermined cycle.</td>
</tr>
<tr>
<td>11</td>
<td>We undertake many strategic investments catering for a number of different futures. Those that pan out are given support and those investments that do not are dropped.</td>
<td>We undertake a few strategic investments focused on one probable future.</td>
</tr>
<tr>
<td>12</td>
<td>We frequently change our organisational structure in order to exploit opportunities.</td>
<td>We align our organisational structure to best achieve our unique position and change this relatively infrequently.</td>
</tr>
<tr>
<td>13</td>
<td>One of our company's strengths is dealing with unexpected events by adapting to meet these challenges</td>
<td>One of our company's strengths is control and the ability to predict the future.</td>
</tr>
</tbody>
</table>

**Table 1: Survey Questions**
For each question, respondents were asked to select a single point along the seven-point continuum that best described their organisation’s behaviour. This seven-point scale was qualified with the following guidelines, which were mapped on each side of the continuum around 4 or N:

- ‘S’ indicates that the statement strongly describes the company's behaviour;
- ‘M’ indicates that the statement moderately describes the company's behaviour;
- ‘W’ indicates that the statement weakly describes the company's behaviour; and
- ‘N’ indicates that neither statement describes the company's behaviour.

In addition, the attributes for questions 2, 3, 4, 6, 8, and 12 were transposed in order to randomize the questions ensuring that it would be simple to identify corrupt responses.

**Questionnaire validation**

A draft survey and accompanying letter was sent to the research supervisor for initial review. Once feedback was received and changes made, a pilot survey was sent for external review by three senior managers who formed part of the target sample. Comments and feedback were noted and incorporated into the questionnaire before the survey was sent out to the entire sample.

A copy of the questionnaire can be viewed in Appendix A: Questionnaire.

**4.3. Target Population and Questionnaire Distribution**

The survey was sent to 1776 decision makers within organisations that form part of the South African ICT sector. The survey was made available on the Internet at two different Internet addresses so that the researchers could simultaneously survey two different sample population sets. The link to the questionnaire was sent via email to these two different samples with the responses of each sample being captured into separate databases so as to not mix the two datasets. The primary reason for pursuing
two simultaneous samples was to mitigate the risk of receiving a low response rate from the first sample.

The first sample that was targeted was JSE listed ICT companies. This sample included 54 companies, each belonging to one of the following sectors:

- Information Technology Hardware;
- Electronic and Electrical Equipment;
- Software and Computer Services; and
- Telecommunications.

Each company was called with the intention of identifying and personally requesting the relevant person to complete the survey. These calls were followed by email further explaining the purpose, scope, and benefit of the research to the participant, as well as requesting their participation. A list was compiled and a customised email, including a link to the specific survey for this sample, was sent. One week prior to the surveying being closed a follow-up email was sent to the recipients that were originally targeted.

To view the letter of request that was sent to sample 1 refer to Appendix B: JSE ICT Survey Request Letter, and to Appendix C: JSE ICT Survey Follow-up Letter for the follow up letter.

The second sample was selected from the Computing Society of South Africa’s (CSSA) database. This sample was selected by segmenting the CSSA’s database using the member’s job title, with only members holding senior positions being selected, resulting in a sample size of 1722.

A slightly modified email was sent, on behalf of the researchers, by the CSSA to the selected sample. Three days prior to the surveying being closed a follow-up email was distributed by the CSSA, on the behalf of the researchers, to the same recipients originally targeted.
To view the letter of request that was sent to sample 2 refer to Appendix D: CSSA Survey Request Letter, and Appendix E: CSSA Survey Follow-up Letter for the follow up letter.

4.4. **Data Integrity Checking and Cleansing**

To ensure data and response integrity, we employed the following filters and manipulations when preparing the data for analysis:

- Questions that were transposed in the questionnaire were reverted to their original and rightful place; and
- Data received from respondents that did not fall within the definition of the ICT sector, as well as incomplete and corrupted data were removed.

4.5. **Analysis Performed**

The survey was split into three broad categories:

- Respondent demographics;
- Strategy research questions; and
- Follow-up details.

First, various descriptive analysis was performed on the respondent demographic data to understand and categorise the respondents.

Next, factor analysis was employed to analyse the thirteen strategy questions. Factor Analysis is a data reduction technique aimed reducing a large number of variables to a few underlying constructs or factors. This is achieved by identifying patterns or common themes between subsets of variables. The underlying constructs or factors are expected to explain most of the variation inherent within the larger set of original variables. This analysis will be interpreted using observational techniques, which are ideally suited to factor analysis.

Finally, it was the intention of these researches to also perform qualitative research through personal interview with respondents who indicated their willingness to participate in such interviews. The intention of this was to provide further support for
the findings presented in this research report. However, due to time constraints this portion of the research was not undertaken.

5. FINDINGS, DISCUSSIONS AND ANALYSIS
In this section we will review the results, analyse, and discuss the findings of this research in order to draw conclusions. First we will review the respondent demographics to gain an understanding of their profile. This will be followed by an analysis of the approach to strategy adopted by the companies represented by these respondents. Finally, the insights obtained through this analysis will be discussed and any concluding remarks noted.

5.1. Respondent Profile
A total of 1772 emails were sent to the two samples of which 51 responses were received, representing a 2.8% response rate. Of these responses, only 24 responses met the screening criteria and were thus eligible for further analysis.

Twenty-two of the twenty-four valid responses received were unlisted companies, comprising almost 92% of the data. The companies are characterised predominantly as small businesses with 72% (17) of respondents having an annual turnover of less than R20m, 8.3% (2) of respondents with a turnover between R20m and R100m, 12.5% (3) having a turnover between R100m and R750m and 8.3% (2) of respondents having a turnover between R1500m and R5000m. Figure 3 below represents graphically the breakdown of the respondents by annual turnover category.
Similar trends are identified in the number of employees within the organisations that responded: 50% (12) of the respondents have less than 20 employees, 25% (6) of the companies having between 20 and 100 employees, 16.7% (4) between 101 and 300, and 8.3% (2) of companies have over 2000 employees. Figure 4 below represents graphically the breakdown of the respondents by number of employees’ category.
In terms of actual respondents to the survey and their current position we found that 37% (9) of the respondents held CEO positions, 20.8% (5) were at director level, 25% (6) were at senior or general management level, 4.2% (1) at middle management, and 12.5% (3) indicating that they played “other” roles within their respective organisations. Figure 5 below represents graphically the breakdown of the respondents by their role within their organisations.

![Respondent - Role in Organisation](image)

**Figure 5: Respondent by Role in Organisation**

**Respondent profile summary**
The companies that responded can be categorised predominantly as small to medium sized businesses with 80% (19) of respondents having an annual turnover of less than R100m and 75% (18) employing less than 100 people. At the other extreme just over 8% (2) of the responses received were from JSE listed companies with annual turnovers of between R1500m and R5000m as well as employing more than 2000 people each.

In terms of position held within the companies by the respondents, over 70% (15) held CEO, director, senior management, or a general management position. This is significant in terms of the reliability or validity of the data within the context of strategy and decision-making.
5.2. Review of Approach to Strategy

In order to validate the dataset, we performed the Cronbach’s Alpha test for reliability, which tests the extent to which the measurement taken, reflects the true score of the dimension that is being measured. Using this formula, the results showed reliability of 58% within the data and therefore the model was accepted as reliable for the purposes of this analysis.

To extract the initial factors, principle components analysis was used. Using Kaiser’s criterion, only factors with an eigenvalue of 1.0 or greater were retained, resulting in four statistically significant factors being identified. The method of Varimax normalized rotation was used to re-align these factors in order to improve its interpretability. Table 2 below presents the eigenvalues of these four factors, the percentage variation explained by each factor, as well as the cumulative percentage of variation explained.

<table>
<thead>
<tr>
<th>Values</th>
<th>Eigen Value</th>
<th>% Total Variance</th>
<th>Cumulative Eigen</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>3.252</td>
<td>25.016</td>
<td>3.252</td>
<td>25.016</td>
</tr>
<tr>
<td>Factor 2</td>
<td>2.280</td>
<td>17.542</td>
<td>5.533</td>
<td>42.558</td>
</tr>
<tr>
<td>Factor 3</td>
<td>1.850</td>
<td>14.232</td>
<td>7.383</td>
<td>56.790</td>
</tr>
<tr>
<td>Factor 4</td>
<td>1.207</td>
<td>9.288</td>
<td>8.590</td>
<td>66.078</td>
</tr>
</tbody>
</table>

Table 2: Significant Factors and Corresponding Eigenvalues

Collectively the four factors explain 66% of the total variation in the original data, and hence is significant in terms of explaining the underlying patterns within the data. Further discussion of these significant factors is presented later in this section.

Factor Loading

Factor loading measures the extent to which each original variable is explained by the derived factor and is the correlation between each original variable and that derived factor. Variables with a high factor loading can be regarded as having a significant impact on the factor and can be used to explain or describe that factor. Factor loadings of 0.5 or greater were considered significant for the purposes of this research and are used in determining the overriding themes within the factors.
Table 3 below presents the correlation between each question from the questionnaire and the factor identified from the model. Variables that have a factor loading of greater than 0.5 are highlighted in red.

<table>
<thead>
<tr>
<th>Question</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.679</td>
<td>-0.183</td>
<td>0.234</td>
<td>0.091</td>
</tr>
<tr>
<td>2</td>
<td>0.384</td>
<td>0.150</td>
<td>0.668</td>
<td>0.164</td>
</tr>
<tr>
<td>3</td>
<td>0.162</td>
<td>0.794</td>
<td>0.012</td>
<td>0.206</td>
</tr>
<tr>
<td>4</td>
<td>0.656</td>
<td>0.172</td>
<td>-0.109</td>
<td>-0.169</td>
</tr>
<tr>
<td>5</td>
<td>0.584</td>
<td>-0.241</td>
<td>-0.338</td>
<td>0.087</td>
</tr>
<tr>
<td>6</td>
<td>0.538</td>
<td>0.238</td>
<td>-0.144</td>
<td>-0.216</td>
</tr>
<tr>
<td>7</td>
<td>-0.200</td>
<td>0.769</td>
<td>0.009</td>
<td>-0.085</td>
</tr>
<tr>
<td>8</td>
<td>-0.159</td>
<td>-0.370</td>
<td>0.680</td>
<td>0.130</td>
</tr>
<tr>
<td>9</td>
<td>0.146</td>
<td>-0.226</td>
<td>-0.078</td>
<td>-0.867</td>
</tr>
<tr>
<td>10</td>
<td>0.867</td>
<td>0.148</td>
<td>0.182</td>
<td>-0.118</td>
</tr>
<tr>
<td>11</td>
<td>-0.409</td>
<td>-0.190</td>
<td>0.644</td>
<td>-0.338</td>
</tr>
<tr>
<td>12</td>
<td>0.191</td>
<td>0.854</td>
<td>-0.171</td>
<td>0.101</td>
</tr>
<tr>
<td>13</td>
<td>0.309</td>
<td>0.389</td>
<td>0.532</td>
<td>-0.505</td>
</tr>
<tr>
<td>Expl. Var</td>
<td>2.834</td>
<td>2.548</td>
<td>1.878</td>
<td>1.330</td>
</tr>
<tr>
<td>Prop. Total</td>
<td>22%</td>
<td>20%</td>
<td>14%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Table 3: Question No. / Factor Correlations and Factor Loadings

Each question was further analysed to understand which attribute had been identified by the factor. Since the questionnaire was structured such that each question comprised of two attributes on either side of the seven-point continuum, we extracted the mean of the responses for each question to assist in identifying which of the two attributes is significant for that factor.

In order to make the decision, it was decided to adopt the cut-off approach. This approach entails selecting a point on the scale such that any mean that falls below the point implies the one attribute and any point that lies above the point, the other attribute.

To this end, we selected 4 (or neutral) as the cut-off point for the purposes of this research, with any mean lying below the cut-off point implying a modernist (M) approach to strategy and any point lying above the cut-off point implying a traditional (T) approach.

Figure 6 below presents the box and whisker plot of thirteen questions showing the means as well as the standard deviation for each of the questions.
Through observation it can be noticed that the many of means are tightly positioned around the cut-off point, with one of the responses having a mean of 0.04 less that the cut-off point and another falling on the point. For this reason it was decided to further justify the decision using the median and the mode. Table 4 below presents the mean, mode and median for each of the strategy questions, as well as the respective approach according to the classification. To view histograms of the responses for each question refer to Appendix G: Question 1 - 13 Histograms.
The results show that eight (62%) of the thirteen questions tend towards the modernist approach, while four (31%) of the thirteen questions tend towards the traditional approach to strategy. Question 12 could not be placed in either end of the scale since the mean and median were found to be neutral, i.e. equal to 4.

The following sections presents each of the factors by means of a table showing the question (attributes), approach to strategy indicated by the sample for that question, and its respective factor loading. Attributes are ranked in descending order of their factor loading. This is followed by a brief discussion of the factor and its attributes.

**Factor one**

Factor one is made up of five unique attributes, which together explains 22% of the variation within the data. Table 5 below presents these attributes with the approach to strategy they represent as well as the factor loading of that attribute.

<table>
<thead>
<tr>
<th>Q</th>
<th>Question/Attributes</th>
<th>Approach</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>We continuously formulate and adapt our strategy. There typically is no predetermined cycle for this process.</td>
<td>M</td>
<td>0.867</td>
</tr>
<tr>
<td>1</td>
<td>We have many strategies that we follow simultaneously of varying scale and risk. These may include strategic alliances, many small investments with options, etc.</td>
<td>M</td>
<td>0.679</td>
</tr>
<tr>
<td>4</td>
<td>We analyse the present with the intention to predict, forecast and plan for the future.</td>
<td>T</td>
<td>0.656</td>
</tr>
<tr>
<td>5</td>
<td>Our strategy is: Giving the organisation a general direction and framework in which to operate, and allowing the organisation flexibility in achieving the stated intent.</td>
<td>M</td>
<td>0.584</td>
</tr>
<tr>
<td>6</td>
<td>Generally changes are planned and continuous, and are independent of competitor events. For example, launching new products and/or services every 6 months rather than in response to a competitor.</td>
<td>M</td>
<td>0.538</td>
</tr>
</tbody>
</table>

**Table 5: Factor 1 Principle Components, Approach, and Factor Loading**

Four (80%) out of the five attributes that form part of this factor indicates that the sample follows the modernist approach to strategy. This factor therefore shows a strong tendency towards the modernist approach, and it can thus be inferred through observation that 22% of the variation in the sample data can be explained by the modernist approach to strategy.
The attributes that comprise this factor suggest that strategy is a continuous process, with firm’s simultaneously following many different strategies, and taking a portfolio approach to mitigate risk.

Further, contrary to the literature, which suggests that rapidly changing and uncertain conditions render analysis and planning futile, our findings indicate that the firms sampled continue to perform such analysis with the intention of predicting and planning for the future.

Factor two
Factor two is made up of three unique attributes, which together explains 20% of the variation within the data. Table 6 below presents these attributes with the approach to strategy they represent as well as the factor loading of that attribute.

<table>
<thead>
<tr>
<th>Q</th>
<th>Question/Attributes</th>
<th>Approach</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>We align our organisational structure to best achieve our unique position and change this relatively infrequently. AND We frequently change our organisational structure in order to exploit opportunities</td>
<td>N</td>
<td>0.854</td>
</tr>
<tr>
<td>3</td>
<td>We have a loose organisational structure, with high levels of autonomy within our company. Our organisational structure can change with relative ease</td>
<td>M</td>
<td>0.794</td>
</tr>
<tr>
<td>7</td>
<td>Strategy formulation is a senior management exercise, which is to be executed by the whole organisation.</td>
<td>T</td>
<td>0.769</td>
</tr>
</tbody>
</table>

Table 6: Factor 2 Principle Components, Approach, and Factor Loading

Factor two comprises three highly significant factors, of which only two can be placed into either the modernist or traditional approach to strategy. Question 12 although significant, has a mean and median of 4 and multiple modes, and cannot therefore be placed into either of the approaches on our continuum.

Excluding question 12 from analysis leaves one attribute firmly in the modernist approach and one attribute firmly in the traditional approach, making it impossible to place this factor into either of the approaches and is therefore inconclusive.
This factor, however, which describes 20% of the variation in the sample, seems to have a common theme in terms of the organisational structure and the ability for the organisation to change its structure either frequently or infrequently. Furthermore, although the trends within this factor show that there is a high degree of autonomy within the organisation, through loose organisational structures, strategy formulation remains a senior management activity.

**Factor three**

Factor three is made up of four attributes, which together explains 14% of the variation within the data. Table 7 below presents these attributes with the approach to strategy they represent as well as the factor loading of that attribute.

<table>
<thead>
<tr>
<th>Q</th>
<th>Question/Attributes</th>
<th>Approach</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>We leverage our company’s competencies to create and/or find market positions.</td>
<td>M</td>
<td>0.680</td>
</tr>
<tr>
<td>2</td>
<td>Through careful analysis and planning, we select markets, follow through with a detailed strategy in those markets. Resource utilisation is highly optimised and carefully allocated.</td>
<td>T</td>
<td>0.668</td>
</tr>
<tr>
<td>11</td>
<td>We undertake many strategic investments catering for a number of different futures. Those that pan out are given support and those investments that do not are dropped.</td>
<td>M</td>
<td>0.644</td>
</tr>
<tr>
<td>13</td>
<td>One of our company’s strengths is dealing with unexpected events by adapting to meet these challenges</td>
<td>M</td>
<td>0.532</td>
</tr>
</tbody>
</table>

Table 7: Factor 3 Principle Components, Approach, and Factor Loading

Three (75%) out of the four attributes that form part of this factor indicates that the sample follows the modernist approach to strategy. This factor therefore shows a strong tendency towards the modernist approach, and it can thus be inferred through observation that 14% of the variation in the sample data can be explained by the modernist approach to strategy.

The attributes that comprise the majority of this factor are firmly based in the modernist approach. This factor is characterised by strategies that encompass leveraging a company’s core competencies to find markets, which appears to be done by making many investments and changing direction as the opportunities arise. Furthermore, the data suggests that many different futures are catered for, and thus implying that these companies follow strategies that are inefficient.
However, question 2, which forms part of the traditional approach, is heavily biased to selecting a particular strategy from careful analysis of the external market and ensuring resource optimisation. This creates an apparent anomaly between question 2 and the other questions within this factor since they completely contradict each other. The researches believe that one possible explanation for this anomaly is that it could be argued that the modernist attribute of this question was negatively phrased and could have resulted in respondents being biased.

Notwithstanding the anomaly of question 2 within this factor, it does not affect the outcome in terms of inferring the approach to strategy for this factor.

**Factor Four**

Factor four is made up of two attributes, which together explains 9% of the variation within the data. Table 8 below presents these attributes with the approach to strategy they represent as well as the factor loading of that attribute.

<table>
<thead>
<tr>
<th>Q</th>
<th>Question/Attributes</th>
<th>Approach</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Our goal is to create a sustainable competitive advantage by selecting a unique defensible position within the market.</td>
<td>T</td>
<td>-0.867</td>
</tr>
<tr>
<td>13</td>
<td>One of our company's strengths is dealing with unexpected events by adapting to meet these challenges</td>
<td>M</td>
<td>-0.505</td>
</tr>
</tbody>
</table>

**Table 8: Factor 4 Principle Components, Approach, and Factor Loading**

The two attributes that comprise this factor each form part of one approach to strategy thus rendering this factor inconclusive. Having said this, the factor loading for question 9 is highly significant within the context of factor four i.e. it explains a significant portion of factor 4. Furthermore, question 13 only just meets the significance criteria of 0.5 used in this research. One can therefore articulate that while South African ICT firms are still looking for a sustainable competitive advantage by selecting a unique position i.e. following a traditional approach to strategy, they acknowledge the need for coping with change.
5.3. Analysis, Discussion and Conclusion

The research objective this research sets out to understand is how South African ICT companies, within the context of uncertainty and rapid change, formulate strategy. The research targeted the entire population of listed companies operating within this context, as well as a large database of senior managers operating within the ICT sector.

The survey received a 2.8% response rate with a respondent profile of predominantly small to medium sized companies with 80% (19) of respondents having an annual turnover of less than R100m. In addition, 92% percent of the respondents represented unlisted companies. The observations and inferences are therefore not representative of the South African ICT sector as a whole, but rather of small to medium sized South African ICT companies.

Using the mean of the responses as a measure of strategy approach for each of the questions, the results show that eight (62%) of the thirteen questions indicate that companies adopt a modernist approach to strategy, while only four (31%) of the thirteen questions suggest that a traditional approach to strategy is adopted. Furthermore, two of the four factors, which together explain 36% of the variation within the data, suggest that respondent’s companies adopt a modernist approach to strategy. Four of the thirteen questions suggest, however, that the traditional approach to strategy is adopted.

Given the above findings it can be inferred, through observation, that there is a strong trend amongst small to medium sized South African ICT companies adopting a modernist approach to strategy. There is, however, also evidence that these companies have not fully abandoned certain principles and activities that form part of the traditional approach to strategy.

Finally, in terms of individual analysis of each of the questions, we found that the means of each of the questions were largely grouped around the midpoint suggesting that on average companies did not believe that either of the approaches alone strongly described their firm’s behaviour. This observation further supports the previous finding that although there is a clear trend towards the modernist approach to
strategy, companies have not fully entrenched this approach in their behaviour and instead follow some sort of hybrid.

Thus, while the academic literature may suggest that strategy is either traditional or modernist, the results seem to suggest that there is an interdependent relationship between the need for traditional and formal planning as well as the need for a modernist approach to strategy.

5.4. Testing the Hypothesis

Given that eight of the thirteen questions tended towards the modernist approach to strategy, as well as two factors further supporting this modernist, we will through observation accept the research hypothesis and therefore conclude that South African ICT companies adopt a modernist approach to strategy formulation and implementation.

Having said that, it should be pointed out that although we have accepted the research hypothesis, this should be viewed within the context of the following limitations:

- The data appears to have been collected from predominately small to medium sized businesses.
- There was a notable absence of JSE listed ICT companies.
- The overall response rate was low.
- There was no qualitative research that would have provided deeper insights for research of this nature.
6. CONCLUSION

While academics agree that the world and business as we know it is changing, there is little consensus on how to deal with this change. The trend is to choose sides within this war of words and to advocate a single truth that befits organisations operating under uncertainty.

The results of this research, however, show that while there seems to be a trend towards adopting a modernist approach, there still exists a need for formal planning and forecasting i.e. the traditional approach, within the context of strategy as formulated by South African ICT companies.

This research set out to understand how companies facing uncertain and rapidly changing conditions, and in particular, South African ICT companies formulate strategy. To this end, although with limitations, the research hypothesis was tested and found to be valid. Furthermore, this research provided useful insights into how firms facing these conditions formulate strategy. As exploratory research this report provides a base on which further research can be based.

One opportunity for further research is to investigate the relationship between the approach to strategy adopted by a company and that company’s life stage. This may prove insightful in that it could determine if there is a difference between how small, medium, and large companies approach strategy under conditions of uncertainty and rapid change.

Another possible avenue for further research is to perform the qualitative research that was omitted from this research due to time constraints. This may prove valuable by providing insight into the extent to which the modernist approach is entrenched in companies facing these uncertain conditions, as well as trying to determine why certain of the principles and activities that form part of the traditional remain in use.

It would also be of interest to perform this same research within the context of a different industry in order to determine if similar trends and patterns can be found.
This may include industries facing similar turbulent conditions, as well as industries operating in fairly stable conditions.

The South African ICT sector, specifically small to medium size business, seem to be embracing the international trend towards a modernist approach to Strategy. At the same time, it seems like South African firms are choosing to use strategies that best fit their needs by finding a balance between the traditional and modernist approach.

The value this adds to the Academic fraternity is to provide some insights into the apparent convergence of strategy approaches as adopted by practitioners. While providing some links between the literature and the various opposing views of strategy, it raises questions in terms of the validity of theories sitting firmly on either side of the continuum. In addition, it provides a platform from which further research may be conducted in order to gain deeper insights into strategy formulation in the South African context.
7. **APPENDICES**

7.1. **Appendix A: Questionnaire**

The following images have been captured directly from the Website where the questionnaire was available for completion. The options available for selection in the dropdown boxes are listed after these images.

---

Thank you for taking the time to respond to our survey. The survey comprises only 24 questions and will take approximately 20 minutes to complete.

The questions are categorised into the following three sections:

- Section 1 consists of 6 questions and will provide us with some demographical information regarding your company;
- Section 2 consists of 13 questions and will help us determine the approach your company takes regarding strategy formulation and execution; and
- Section 3 consists of 5 questions and will give you the opportunity to request a summary of the research.

---

**Company Information**

- Name of your company: [Optional]
- Role in your company: Please Select
  - If other, please specify: 
- International regions: [Optional]
  - UK, Central America, Western Europe, Middle East, Africa (Excluding South Africa), East Asia, Eastern Europe, Oceania (Australia, New Zealand), Russia, North America, South America, North America, South Asia, Scandinavia, South East Asia, Other
  - If other, please specify: 
- JSE listing: Please Select
  - If other, please specify: 
- Annual turnover: Please Select
  - How many people does your company employ? Please Select

---
## Approach to Strategy

The following questions present two opposing statements. For each question, please select a single point along the continuum where you believe your organisation falls. Where:

- ‘S’ indicates that the statement strongly describes your company’s behaviour;
- ‘M’ indicates that the statement moderately describes your company’s behaviour;
- ‘W’ indicates that the statement weakly describes your company’s behaviour; and
- ‘N’ indicates that neither statement describes your company’s behaviour.

<table>
<thead>
<tr>
<th>Statement</th>
<th>S</th>
<th>M</th>
<th>W</th>
<th>N</th>
<th>M</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>We have many strategies that we follow simultaneously of varying scale and risk. These may include strategic alliances, many small investments with options, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Through careful analysis and planning, we select markets, follow through with a detailed strategy in those markets. Resource utilisation is highly optimised and carefully allocated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have a formalised hierarchy with clear communication lines and levels of responsibility. Our organisational structure changes infrequently and is done through a formal process.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We analyse the present with the intention to predict, forecast and plan for the future.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our strategy is: Giving the organisation a general direction and framework in which to operate, and allowing the organisation flexibility in achieving the stated intent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select a market position and defend it through operation efficiency, and change mostly when directly challenged by competitors.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategy formulation and execution is an organisation wide exercise.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We select a market position and align, create, and/or acquire competencies to meet the market position.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have a single unique focused strategy. Sometimes our strategy may be diversified, but this involves large committed resources.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We sometimes choose the wrong markets, make mistakes, bounce back and fall into the right ones, i.e. we make choices, receive feedback and adapt.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have a loose organisational structure, with high levels of autonomy within our company. Our organisational structure can change with relative ease.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We focus primarily on the present (current execution) while taking cognisance of the past and future.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our strategy is: A well-defined plan that is communicated to all levels of the organisation and implemented accordingly with limited flexibility.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generally changes are planned and continuous, and are independent of competitor events. For example, launching new products and/or services every 6 months rather than in response to a competitor.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategy formulation is a senior management exercise which is to be executed by the whole organisation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We leverage our company's competencies to create and/or find market positions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Follow-up Information

Would you be prepared to participate in a face-to-face follow-up interview? [Please Select]

If you have answered yes to the previous question, please provide us with your contact details for arranging a follow-up interview:

Name
Telephone No.

Are you interested in receiving a summary of these research findings? [Please Select]

Email address to which the research findings can be sent

SubmitForm  ResetForm
### In which sector on the JSE is your company listed?
- Electronic and Electrical Equipment
- Software and Computer Services
- Information Technology Hardware
- Telecommunication
- Not listed
- Other

### What is the annual turnover of your company?
- Less than 20m
- 20m - 50m
- 50m - 100m
- 100m - 250m
- 250m - 750m
- 750m - 1500m
- 1500m - 5000m
- More than 5000m

### How many people does your company employ?
- Less than 20
- 20 - 50
- 50 - 100
- 101 to 300
- 301 to 500
- 501 to 1000
- 1001 to 2000
- More than 2000

### Would you be prepared to participate in a face-to-face follow-up interview?
- Yes
- No

### Are you interested in receiving a summary of these research findings?
- Yes
- No
7.2. Appendix B: JSE ICT Survey Request Letter

Dear [Recipient Name],

Corporate strategy is arguably one of the most important pillars determining business success. Recent international research and theories on strategy by leading academics and consulting firms have suggested that the "traditional" approaches to strategy are not effective in turbulent and rapidly changing conditions. However, within the context of South Africa few studies have been conducted into how companies formulate and implement strategy under these conditions.

To this end, we are conducting industry wide research on South African companies. Specifically, we have selected JSE listed ICT companies. This research is being conducted as a partial requirement to complete our MBA degrees at the UCT Graduate School of Business.

This research has value for your organisation by providing a South African baseline against which you will be able to benchmark your organisation's approach to strategy.

We encourage you to be a part of this industry wide research by completing our online survey at the following address: http://gsbnet.uct.ac.za/projects/msstrategysurvey

The survey should not take you longer than 20 minutes to complete and we would be grateful for your time. Please be assured that complete anonymity will be guaranteed. In return for your participation we will provide you with a summary of the major findings of the research if you so request at the end of the survey. Should you choose to participate, please respond before close of business 29 October 2004.

Should you have any questions regarding this research please feel free to contact either of us or our research supervisor, Professor Paul Sulcas, at the follows addresses:

Cassim Motala
mtlcas003@gsb.uct.ac.za
084 512-4022

Bradley Silber
slbbra001@gsb.uct.ac.za
083 260-9990

Professor Paul Sulcas
psulcas@gsb.uct.ac.za
(021) 406-1437

Sincerely,
Cassim Motala and Bradley Silber
7.3. Appendix C: JSE ICT Survey Follow-up Letter

Dear Senior Manager,

This email serves as a friendly reminder that there are only two days left to participate in our research. If you have already responded to our survey your input is greatly appreciated and we thank you for your participation.

This research has value for your organization by providing a South African baseline against which you will be able to benchmark your organization’s approach to strategy and is a first of its kind in South Africa.

To make this research meaningful and representative of the South African ICT industry we are trying to elicit as many responses as possible. To this end, we urge you to take the time in completing our questionnaire. The survey should take approximately 15-20 minutes to complete and we would be grateful for your time.

Please be assured that complete anonymity will be guaranteed. In return for your participation we will provide you with a summary of the major findings of the research if you so request at the end of the survey. Should you choose to participate, please respond before close of business 29 October 2004.

The online survey can be found at the following URL:
http://gsbnet.uct.ac.za/projects/msstrategysurvey

Should you have any questions regarding this research please feel free to contact either of us or our research supervisor, Professor Paul Sulcas, at the follows addresses:

Cassim Motala
mtlcas003@gsb.uct.ac.za
084 512-4022

Bradley Silber
slbbra001@gsb.uct.ac.za
083 260-9990

Professor Paul Sulcas
psulcas@gsb.uct.ac.za
(021) 406-1437

Sincerely,
Cassim Motala and Bradley Silber
7.4. Appendix D: CSSA Survey Request Letter

Dear Member,

Strategy is arguably one of the most important pillars determining business success. Recent international research and theories on strategy by leading academics and consulting firms have suggested that the "traditional" approaches to strategy are not effective in turbulent and rapidly changing conditions. However, within the context of South Africa few studies have been conducted into how companies formulate and implement strategy under these conditions.

To this end, we are conducting industry wide research on South African ICT companies. This research is being conducted as a partial requirement to complete our MBA degrees at the UCT Graduate School of Business.

This research has value for your organisation by providing a South African baseline against which you will be able to benchmark your organisation's approach to strategy.

We encourage you to be a part of this industry wide research by completing our online survey at the following address: http://gsbnet.uct.ac.za/projects/msstrategysurveyict

The survey should not take you longer than 20 minutes to complete and we would be grateful for your time. Please be assured that complete anonymity will be guaranteed. In return for your participation we will provide you with a summary of the major findings of the research if you so request at the end of the survey. Should you choose to participate, please respond before close of business 29 October 2004.

Should you have any questions regarding this research please feel free to contact either of us or our research supervisor, Professor Paul Sulcas, at the follows addresses:

Cassim Motala
mtlcas003@gsb.uct.ac.za
084 512-4022

Bradley Silber
slbbra001@gsb.uct.ac.za
083 260-9990

Professor Paul Sulcas
psulcas@gsb.uct.ac.za
(021) 406-1437

Sincerely,
Cassim Motala and Bradley Silber
7.5. Appendix E: CSSA Survey Follow-up Letter

Dear Member

This email serves as a friendly reminder that there are only three days left to participate in our research. If you have already responded to our survey your input is greatly appreciated and we thank you for your participation.

This research has value for your organization by providing a South African baseline against which you will be able to benchmark your organization’s approach to strategy and is a first of its kind in South Africa.

To make this research meaningful and representative of the South African ICT industry we are trying to elicit as many responses as possible. To this end, we urge you to take the time in completing our questionnaire. The survey should take approximately 15-20 minutes to complete and we would be grateful for your time.

Please be assured that complete anonymity will be guaranteed. In return for your participation we will provide you with a summary of the major findings of the research if you so request at the end of the survey. Should you choose to participate, please respond before close of business 29 October 2004.

The online survey can be found at the following URL:
http://gsbnet.uct.ac.za/projects/msstrategiesurveyict

Should you have any questions regarding this research please feel free to contact either of us or our research supervisor, Professor Paul Sulcas, at the follows addresses:

Cassim Motala
mtlicas003@gsb.uct.ac.za
084 512-4022

Bradley Silber
slbbra001@gsb.uct.ac.za
083 260-9990

Professor Paul Sulcas
psulcas@gsb.uct.ac.za
(021) 406-1437

Sincerely,
Cassim Motala and Bradley Silber
7.6. Appendix F: ICT Sector Defined

The definition of the ICT sector that will be used for the purpose of this research is one defined by and agreed to by the Organization for Economic Cooperation and Development (OECD) member countries in 1998. This definition was reviewed in April 2002 at which time it was agreed to keep it intact, with no changes anticipated until 2007. The definition as directly extracted from the *Measuring the Information Economy 2002* report is as follows:

> OECD member countries agreed to define the ICT sector as a combination of manufacturing and services industries that capture, transmit and display data and information electronically. This definition, based on an international standard classification of activities (ISIC Rev. 3), was considered to be a first step towards obtaining some initial measurements of ICT sector core indicators.

The principles underlying the definition are the following:

For manufacturing industries, the products of a candidate industry:
- Must be intended to fulfill the function of information processing and communication including transmission and display.
- Must use electronic processing to detect, measure and/or record physical phenomena or control a physical process.

For services industries, the products of a candidate industry:
- Must be intended to enable the function of information processing and communication by electronic means.

The ISIC Rev. 3 classes included in the definition are:

**Manufacturing:**
- 3000 – Office, accounting and computing machinery;
- 3130 – Insulated wire and cable;
- 3210 – Electronic valves and tubes and other electronic components;
- 3220 – Television and radio transmitters and apparatus for line telephony and line telegraphy;
- 3230 – Television and radio receivers, sound or video recording or reproducing apparatus and associated goods;
- 3312 – Instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process equipment;
- 3313 – Industrial process equipment.

**Services:**
- 5150 – Wholesaling of machinery, equipment and supplies (if possible only the wholesaling of ICT goods should be included);
- 7123 – Renting of office machinery and equipment (including computers);
- 6420 – Telecommunications;
- 72 – Computer and related activities.

*(OECD, 2002:81)*
7.7. Appendix G: Question 1 - 13 Histograms

Figure 7: Strategy Question 1 Histogram

Figure 8: Strategy Question 2 Histogram
Figure 9: Strategy Question 3 Histogram

Figure 10: Strategy Question 4 Histogram
Figure 11: Strategy Question 5 Histogram

Figure 12: Strategy Question 6 Histogram

Figure 13: Strategy Question 7 Histogram

Figure 14: Strategy Question 8 Histogram
Figure 15: Strategy Question 9 Histogram

Figure 16: Strategy Question 10 Histogram
Figure 17: Strategy Question 11 Histogram

Figure 18: Strategy Question 12 Histogram
Figure 19: Strategy Question 13 Histogram
8. **BIBLIOGRAPHY**


OECD, 2002, “Measuring the Information Economy 2002” [Online], Available from: [http://www.oecd.org/document/5/0,2340,en_2649_33757_2765701_1_1_1_1,00.html](http://www.oecd.org/document/5/0,2340,en_2649_33757_2765701_1_1_1_1,00.html) [12 November 2004]


