THE DESIGN OF A COMPETITIVE INTELLIGENCE METHODOLOGY FRAMEWORK

T.I.J. Kruger

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Supervisor: **Prof. J.G. Kotzé**

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SUMMARY

The design of a competitive intelligence methodology framework

In today's highly competitive global business arena, companies require some type of formal Competitive Intelligence (CI) system to gather and analyse information about its competitors and the industry. These kinds of systems go hand-in-hand with information technology and software, and since CI software can be very expensive for smaller companies, this study's aim was to provide a design for a CI methodology framework that could serve as the basis for the development of a relatively inexpensive modular CI software system. Other considerations for the study was to develop a CI performance measurement model for the CI design, as well as to establish best practises for the implementation of a CI system in a company. An extensive literature study was performed to aid in the design of the CI system.

An empirical study was performed to complement the design of a CI system in order to prove to companies that a formally structured CI programme is a necessity for a company to not only survive, but to excel in the competitive business arena. The empirical study attempted to meet the following research objectives: whether the success of a structured CI programme to improve the company's competitive performance can be measured; and whether the success of a structured CI programme to increase shareholder value can be measured. The key findings of the study were that there is evidence to suggest that there is a correlation between a high degree of structuring in CI and an increase in competitive performance, but that there was no conclusive evidence of a correlation between a high degree of structuring in CI and an increase in shareholder value.

OPSOMMING

Die ontwerp van 'n metodiek raamwerk vir mededingende intelligensie

In vandag se hoogs mededingende globale besigheidsarena is dit vir maatskappye nodig om oor 'n Mededingende Intelligensie (MI) stelsel te beskik wat inligting rakende die maatskappy se mededingers en die industrie kan versamel en ontleed. Hierdie stelsels beweeg hand-aan-hand met inligtingstegnologie en sagteware, en omdat MI sagteware baie duur kan raak vir kleiner maatskappye, is die oogmerk van hierdie studie om 'n ontwerp vir 'n MI metodiek raamwerk daar te stel wat as die basis kan dien vir die ontwikkeling van 'n relatief goedkoop modulêre MI sagteware stelsel. Ander oogmerke van hierdie studie was om 'n MI prestasie-metingsmodel vir die MI ontwerp te ontwikkel, asook om beste praktyke daar te stel vir die implementering van 'n MI stelsel in 'n maatskappy. 'n Uitgebreide literatuurstudie was onderneem as ondersteuning vir die ontwerp van die MI stelsel.

'n Empiriese studie was onderneem om die ontwerp van die MI stelsel te komplementeer en om aan maatskappye te bewys dat 'n formeel gestruktureerde MI program nodig is vir 'n maatskappy, nie slegs net om te kan oorleef nie, maar ook om te kan uitblink in die mededingende besigheidsarena. Die empiriese studie het onderneem om aan die volgende navorsingsdoelwitte te voldoen: om te bepaal of die sukses van 'n gestruktureerde MI program om die maatskappy se mededingende prestasie te bevorder, gemeet kan word; en om vas te stel of die sukses van 'n gestruktureerde MI program om waarde vir aandeelhouers te bevorder, gemeet kan word. Die sleutelbevindinge van die studie was dat daar genoegsame bewys is dat daar 'n korrelasie bestaan tussen 'n hoogs gestruktureerde MI program en 'n toename in mededingende prestasie, maar dat daar geen onweerlegbare bewys was dat daar 'n korrelasie tussen 'n hoogs gestruktureerde MI program en 'n toename in waarde vir aandeelhouers bestaan nie.

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

CHAPTER 1 : INTRODUCTION

1 Introduction

The global business arena is characterised by an incessant jostling for the best competitive position between all the players involved. South African companies have learned it the hard way, since after many years of international isolation during the apartheid era in the early 1990s, they suddenly had to deal with the harsh realities of global competition. Furthermore, the phenomenon of globalisation has been on a rapid increase since that period, due to improvements in technology and the effects of the wider acceptance of the Internet. Governments have also done much work recently in the removal of international trade barriers. Companies protected by these measures in the past have now suddenly become global players, and they are suffering the ill effects of this transition.

Any company wishing to be a serious contender in the global business arena must monitor its competitors and be aware of the changing attributes of the industry or market that it is operating in. This can be achieved by the systematic gathering of Competitive Intelligence (CI). Thompson and Strickland (2001:103) argue that a company cannot expect to outmanoeuvre its rivals without monitoring their actions and intentions, grasping their strategies, and anticipating their next likely moves. This is also true for smaller companies only targeting the South African market. In order to be successful, these companies have to monitor their local competitors as well as global companies competing on their home turf.

The Society of Competitive Intelligence Professionals defines CI as "a systematic and ethical programme for gathering, analysing, and managing external information that can affect a company's plans, decisions, and operations" (SCIP, 2003). O'Shaughnessy (1992:131) defines CI as "knowledge and analysis of competitor capabilities and intentions designed to assist in strategy formulation". Prescott (1995:73) provides the following definition of CI: "a Competitive Intelligence programme entails a continuously evolving integration of both formalised and informal processes by which organisational members assess key trends, emerging discontinuities, the evolution of industry structure, and the capabilities and behaviours of current and potential competitors to assist in maintaining or developing a competitive advantage."

2 Problem statement

Belasco and Stayer (1994:158-159) regard the importance of CI as follows: "...use the competitor as a rallying point to focus everyone on great performance, and continuously raise the standards. One of the leader's best friends, therefore, is the competitor who's planning to steal your lunch ... Lead people to learn about their competitors: who they are and what they plan to do. Enter the intelligence business – legally."

Similarly, Porter (1985:201) argues that competitors should not only be viewed as threats, but that the right competitors can strengthen rather than weaken a company's competitive position in many industries. According to Porter (1985:202), the presence of the right competitors for a company can yield a variety of strategic benefits that fall into four general categories, namely: increasing competitive advantage, improving current industry structure, aiding market development and the strategy that is followed by the company.

The arguments by Belasco and Stayer, as well as Porter, clearly indicate the need for some sort of a formal CI system in a company to gather and analyse information about its competitors and the industry.

Many companies have an informal process of CI gathering or competitor analysis, without even realising it (Kahaner, 1997:210; Miller, S.H., 2001b:xii; Underwood, 2002:14). Porter (1998:48) states that many companies only act on the basis of informal impressions, assumptions, and intuition gained through the scraps of information about competitors continually received by managers.

Other companies have formally structured CI programmes in place, but are not sure how successful these programmes are (Kilmetz and Bridge, 1999:5). Porter (1998:72) provides the following advice concerning a formal CI system: "Compiling the data for a sophisticated competitor analysis probably requires more than just hard work. To be effective, there is the need for an organised mechanism – some sort of competitor intelligence system – to ensure that the process is efficient."

According to Naudé (2002b), there is also a great need in South Africa for the development of CI software due to the high costs associated with CI software packages from other countries. In addition to this, Miller, S.H. (2001a:7) states that the market is growing for software that specifically facilitates the gathering of CI.

Although the Potchefstroom University has already undertaken a recent study in this field (Naudé, 2002a; Viviers *et al.*, 2002:27), other problems and issues in the field of study have been identified to which this proposed study would aim to provide the answers.

Regarding the value that a structured CI programme can provide to a company, a 1995 study of the University of North Texas found empirical evidence to show that companies accentuating CI, on average outperformed other companies in three important financial measures: sales, market share, and earnings per share. The study suggested that "there is a positive relationship between an emphasis on CI and successful financial performance" (Miller, S.H., 2001a:9).

The question could be asked whether the results of this study would still relate to companies in today's world of economic turmoil and recessions. This type of study would also make more sense if the financial measures were taken for a number of years to show that there is sustainable growth in the value that CI provides to a company and its shareholders.

The problem, therefore, is to determine the following:

- Whether the success of a structured CI programme to improve the company's competitive performance can be measured
- Whether the success of a structured CI programme to increase shareholder value can be measured
- Whether an appropriate performance measurement model for a structured CI programme can be developed
- How an appropriate methodology framework for a successful CI programme, that can also serve as a high-level design for a new CI software package, can be structured
- How such a programme should be implemented in a company to ensure its continuous success.

3 Research questions to be addressed

The following research questions related to the research problem have been formulated:

a. Can a structured CI programme play a role in and add value to a company's strategic planning process?
b. Will a structured CI programme be able to improve a company's strategic competitive advantage?

c. Can a structured CI programme create value for the company's shareholders?
d. Can the value and return on investment of a structured CI programme be measured?
e. Can an appropriate performance measurement model for a structured CI programme be developed?
f. What are the relationships between CI and Knowledge Management, Organisation Learning, Business Intelligence, Technology Management, and Strategic Benchmarking?
g. Who are the most typical users of the intelligence supplied by a structured CI programme, and what type of Intelligence Products should be delivered to these users of a structured CI programme?
h. How should the required information for a structured CI programme be gathered, analysed and disseminated in a company, i.e. what is the composition of the CI process?
i. What is the role of Information Technology in a structured CI programme?
j. What methodology framework should be used for a structured CI programme to be of value to a company?
k. How should a structured CI programme be implemented in a company?

4 Goals of study

4.1 Primary goals

The primary goals have been formulated from the research questions related directly to the research problem statement:

1a. To determine whether a structured CI programme will be able to improve a company's strategic competitive advantage.
1b. To determine whether a structured CI programme will be able to create value for the company's shareholders.
1c. To determine whether the value and return on investment of a structured CI programme can be measured.
1d. To develop an appropriate performance measurement model for a structured CI programme.
1e. To establish what methodology framework should be used for a structured CI programme to be of value to a company and to design such a framework that

could serve as a high-level design for the development of a custom CI software package.

1f. To establish how a structured CI programme should be implemented in a company.

4.2 Secondary goals

2a. To determine whether a structured CI programme can play a role in and add value to a company's strategic planning process.

2b. To determine the composition of the CI process.

2c. To determine the role of Information Technology in a structured CI programme.

2d. To establish the relationships between CI and Knowledge Management, Organisation Learning, Business Intelligence, Technology Management, and Strategic Benchmarking.

2e. To determine the type of Intelligence Products that should be delivered to the typical users of a structured CI programme.

5 Research methodology

5.1 Literature study

An extensive literature study related to the goals of the study was performed to aid in meeting the goals of this study. The literature study was also used to evaluate best practices for structured CI programmes, as well as to assist in the design of a CI methodology framework.

5.2 Empirical study

A survey was performed amongst companies listed on the Nasdaq and New York stock exchanges. Due to the limited time for this study, the scope of the study was constrained to ten different industries. A request to complete a questionnaire on a web site was sent out by electronic mail to each of the selected companies. This survey was used to develop a CI

structuring index, which is an index of the degree of structuring of the CI programme in place at a specific company.

Financial data, obtained from the Yahoo! Finance and Multex Investor websites was used to measure the different companies' competitive performance and shareholder values as growth figures over a period of time. The companies selected to participate in the survey needed to have financial information available for at least the last four financial years, which would was used to calculate growth figures for three consecutive financial periods. These figures provided an indication of the success in the implementation of CI programmes at the respective companies.

The growth in sales was used as a measure of the improvement in a company's competitive performance, since, if a company's competitive performance improves, there should be a marked increase in sales as market share is taken away from competitors. However, growth in sales should not be at the expense of profits, and therefore growth in measures of profit such as the profit margin and EPS were also included in the study. These three measures were combined into one "accounting" measure.

Growth in Economic Value Added (EVA), which is an estimate of a company's true economic profit for a year (Brigham and Ehrhardt, 2002:50), was used as a measure of the extent to which the company has added to shareholder value.

A correlation coefficient defines the strength of the relationship that might exist between two variables (Wisniewski, 1997:322), and this was used to test the relationship between the CI structuring index and both the accounting growth and EVA growth figures. This provided an indication as to what extent a structured CI programme was able to improve a company's competitive performance and increase shareholder value.

In order to meet the requirements of primary research goals 1a and 1b, these two correlation coefficients were used to determine the following hypotheses:

- There is a high correlation between a highly formalised CI programme and high levels of growth in competitive performance.
- There is a high correlation between a highly formalised CI programme and high levels of growth in shareholder value creation.

This study will attempt to meet the goals by means of the research methodology as follows:

Goal		Literature Study	Empirical Study
1a.	To determine whether a structured CI programme will be able to improve a company's strategic competitive advantage.		✓
1b.	To determine whether a structured CI programme will be able to create value for the company's shareholders.		✓
1c.	To determine whether the value and return on investment of a structured CI programme can be measured.	✓	
1d.	To develop an appropriate performance measurement model for a structured CI programme.	✓	
1e.	To establish what methodology framework should be used for a structured CI programme to be of value to a company and to design such a framework that could serve as a high-level design for the development of a custom CI software package.	✓	
1f.	To establish how a structured CI programme should be implemented in a company.	✓	
2a.	To determine whether a structured CI programme can play a role in and add value to a company's strategic planning process.	✓	
2b.	To determine the composition of the CI process.	✓	
2c.	To determine the role of Information Technology in a structured CI programme.	✓	
2d.	To establish the relationships between CI and Knowledge Management, Organisation Learning, Business Intelligence, Technology Management, and Strategic Benchmarking.	✓	
2e.	To determine the type of Intelligence Products that should be delivered to the typical users of a structured CI programme.	✓	

Table 1: Research methodologies to be employed in order to meet goals

6 Summary of further chapters

Chapter two is used to perform a literature study on the subject matter of Competitive Intelligence pertaining to the research goals.

Chapter three describes the empirical study with reference to the research methodology, the data sources, the data collection methods employed, the method of sampling, questionnaire design, the interviewing procedure, and coding and editing of the results.

Chapter four discusses the data analysis of the survey by looking at the survey results, as well as performing an analysis of the survey results.

Chapter five discusses the design of a CI methodology framework by firstly applying the literature study to the design of a CI methodology framework, and thereafter performing the actual design of the CI methodology framework. Consideration is thereafter given to the implications for the development of a custom CI software system based on the design. Lastly, the application of the Balanced Scorecard to CI is discussed in the development of a Performance Measurement Model for the design of the CI methodology framework.

Chapter six provides an evaluation of results, as well as recommendations. An evaluation of the empirical study and literature study results is given first, and thereafter the conclusions are provided are given. Lastly, recommendations for further study are discussed.

CHAPTER 2 : LITERATURE STUDY

1 Introduction to Competitive Intelligence (CI)

1.1 Definition of intelligence

In order to gain a better understanding of CI, it is first of all necessary to comprehend what is meant by intelligence.

Shaker and Gembicki (1999:5) mention that intelligence is a compilation and analysis of data and information provided by any source, human or otherwise, that has foresight and can deliver an insightful image of intentions, capabilities, or activities, as well as their possible implications and consequences. CI refers to intelligence that is specifically adapted to the commercial world.

Shaker and Gembicki (1999:9-10) provide a view of the hierarchy of information, as indicated in Figure 1, where the foundation of the pyramid is data, which is by far the largest block of information.

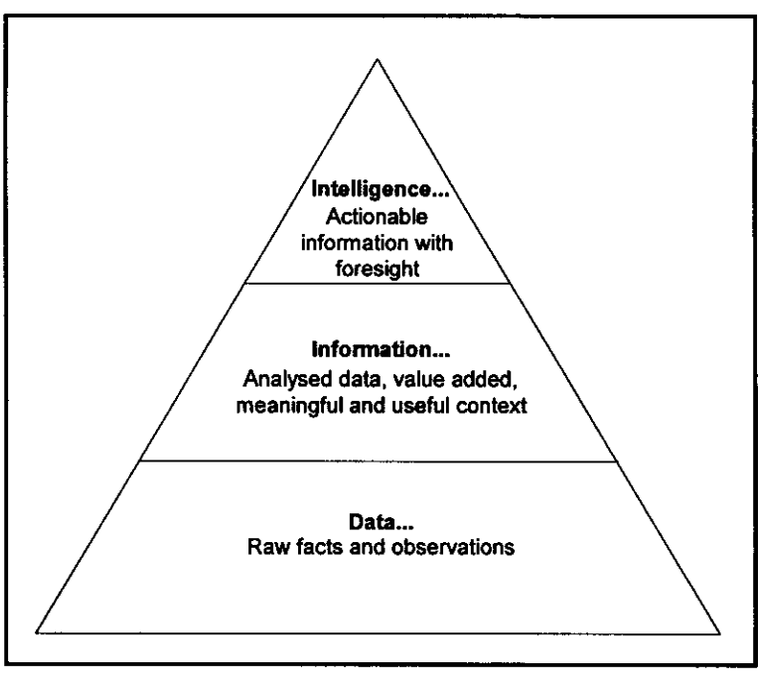

Figure 1: Information hierarchy

(Adapted from: Shaker and Gembicki (1999:9-10); O'Brien (1999:46-47))

Data consists of the most basic of information, and is often quantitative in nature (Shaker and Gembicki, 1999:9). Data are raw facts or observations, typically about physical phenomena or business transactions (O'Brien, 1999:46). The other, higher levels of information are built upon this underlying data.

The next level above data is called information. Information refers to data that has been analysed and therefore has some added value for business people (Shaker and Gembicki, 1999:9). Information is data that have been transformed into a meaningful and useful context for specific end users (O'Brien, 1999:47).

At the top of the pyramid is intelligence, which is information that enables a top executive to make a decision because it provides a degree of foresight of the future that could impact the company. It requires the executive to take some sort of action in response to the intelligence received, and therefore it is actionable. Kahaner (1997:20-21) states that information is factual, but intelligence is a collection of information pieces that have been filtered, distilled, and analysed. Intelligence is actionable information. Intelligence, and not information, is what managers need for decision-making. According to Kahaner (1997: 21), knowledge is another term for intelligence.

1.2 Definition of CI

To further comprehend CI, it is necessary to review a number of definitions from the literature and thereafter develop a definition of CI for this study from the definitions in the literature, as well as from the insights into CI that was acquired from chapter one.

Some of the definitions for competitive intelligence from the literature are:

- "Competitive Intelligence is a systematic and ethical programme for gathering, analysing, and managing external information that can affect a company's plans, decisions, and operations" (SCIP, 2003).
- "Competitive Intelligence is knowledge and analysis of competitor capabilities and intentions designed to assist in strategy formulation" (O'Shaughnessy, 1992:131).
- "A Competitive Intelligence programme entails a continuously evolving integration of both formalised and informal processes by which organisational members assess key trends, emerging discontinuities, the evolution of industry structure, and the

capabilities and behaviours of current and potential competitors to assist in maintaining or developing a competitive advantage" (Prescott, 1995:73).

- "Competitive Intelligence is the identification of strategically important corporate intelligence (knowledge) needs and the process of resolving those needs through ethical information-gathering, analysis, and the presentation of such analysis to clients (internal or external)" (Underwood, 2002:15).
- "Competitive Intelligence is a systematic programme for gathering and analysing information about your competitor's activities and general business trends to further your own company's goals" (Kahaner, 1997:16).
- "Competitive Intelligence is the use of publicly available information on competition and competitors to help your company use strategic decision-making to gain an advantage in a line of business in which it competes" (Burwell, 2000:3).
- "Competitive Intelligence is a systematic, ongoing business process to ethically and legally gather intelligence on targets such as customers, competitors, adversaries, personnel, technologies, and the total business environment. It can be provided by any and all sources, and is disseminated to decision-makers at all levels in a visually effective, timely, and secure manner" (Shaker and Gembicki, 1999:5).
- "Competitive Intelligence is the purposeful and coordinated monitoring of your competitor(s), wherever and whoever they may be, within a specific marketplace" (Johnson, 2003).

Taking all of these definitions into account, a definition for Competitive Intelligence can be formulated as follows: *Competitive Intelligence is a systematic, continuous programme consisting of formal and informal processes that entail the ethical gathering of external industry and competitor information, and analysing and managing this information to aid in a company's strategic decision making process that would lead to an improved competitive position for the company.*

2 The role and value of CI in the strategic planning process

According to McDonald (1996:74), the task of a competitive strategy is to reposition the business from its present position to a stronger competitive one. This is accomplished by adjusting and responding to external trends and forces such as competition, market changes and technology, and developing and matching corporate resources and capabilities in alignment with the company's opportunities. McDonald further remarks that appreciation of

the complexity of this task has led to the development of theories and techniques that specify the process of strategy formulation in a systematic approach, which has become known as the strategic planning process.

Thompson and Strickland (2001:3) define strategy as the game plan the management of a business uses to achieve its organisational objectives, stake out a market position, attract and please customers, conduct its operations, and compete successfully. Mintzberg (1991:12-16) presents five complementary definitions of strategy, namely strategy as plan, strategy as ploy (manoeuvre), strategy as pattern (stream of actions), strategy as position (chosen position), and strategy as perspective (an ingrained way of perceiving the world). Therefore, strategy as a plan is only one characteristic of strategy. Strategy as a plan is some sort of consciously intended course of action, a set of guidelines to deal with a situation (Mintzberg, 1991:12).

McDonald (1996:74) defines strategic planning as "...the process of formulating longer-term objectives and strategies for the entire business or business unit by matching its resources with its opportunities. Its purpose is to help a business set and reach realistic objectives and achieve a desired competitive position within a defined time. It aims to reduce the risk of error and place the business in a situation in which it can anticipate change, respond to it, and even create change to its advantage."

In terms of strategic planning, basic direction-setting tasks are the development of a strategic vision and mission, the establishment of objectives, and the selection of a strategy to pursue. These tasks chart out the future course for the company, its short-term and long-term performance targets, and the competitive actions and internal action steps to be used in attaining the required business results. They comprise a strategic plan for handling industry and competitive conditions, the expected actions of the key players in the industry, opportunities, and threats that could obstruct the company's success (Thompson and Strickland, 2001:17).

According to Luffman *et al.* (1996:16), a formula for success in the long term for any company can only be accomplished by means of some evaluation process. Therefore a company needs to develop a strategic perspective, which could be achieved through of a formal planning system.

Codell and Aleo (1995:156) maintain that strategic planning is essential for any company that seeks to improve its performance in a competitive environment. An empirical study

performed by Cohen (2001:36) concludes that the results indicate that strategic planning is both "a valid and worthwhile endeavour." According to Cohen, those companies that consistently emphasize the various strategic planning activities should expect to find significant performance improvements, but those companies that continue to rely on short-term decisions, and who focus on improvements only in the operational domain, will find themselves quickly losing profitability as well as their competitive position.

Since the literature points out that planning is a very important characteristic of strategy, an assessment of the strategic planning process was performed from the literature, and as indicated by Figure 2, it was established that CI forms an integral part of the strategic planning process (McDonald, 1996:76; Thompson and Strickland, 2001:60; Mockler, 1995:11,13; Aaker, 2001:19; Luffman *et al.*, 1996:42; Mintzberg *et al.*, 1998:26,50; Scholes, 1993:80-82,119).

However, Luffman *et al.* (1996:9) cautions that a highly formalised system of planning is no guarantee that the company will be successful, but by leaving things only to chance comprises the best possible guarantee of failure. The key to success is therefore not so much in embracing a formal approach to strategy formulation and planning, but more exactly in two characteristics:

- in the quality and consistency of the implementation of the strategic plan; and
- in the company's ability to adapt to an ever-changing business environment.

This view is amplified by Thompson and Strickland (2001:12) by stating that two types of strategies form the actual company strategy:

- Planned Strategy: This refers to a proactive strategy that is intended and deliberate and contains new strategic initiatives as well as ongoing strategy features continued from prior periods.
- Reactive Strategy: This refers to strategy that emerges as adaptive reactions to changing circumstances.

It is important to note that CI could lead to intended strategy as part of the planning process, but could also play a role in developing reactive strategies as events in the business environment start to unfold during the implementation of the intended strategy. It is further important to note that CI should not be used to only develop reactive strategies against

threats in the competitive environment, but also to develop reactive strategies to take advantage of opportunities in response to changes in the competitive environment.

Swystun (2000) argues that the roles of strategic planners and CI professionals are to maximize the information available to decision-makers, in order for the answer to suggest itself. Strategic planning and CI ultimately share the following goals:

- The process of each sets priorities
- The action of each builds a shared direction and challenges the status quo
- The output of each should lead to action by matching resources to opportunities.

Hovis (2001:87,90) states that Avnet has a comprehensive CI system in place that is fully integrated with their strategic management and planning system, and that every strategic long-range planning meeting and every quarterly review that occurs inside of Avnet throughout the globe, takes place with intelligence provided by their CI unit.

The role and value of CI in the strategic planning process is augmented by the definition for CI that was formulated earlier in this chapter: "CI is a systematic, continuous programme consisting of formal and informal processes that entail the ethical gathering of external industry and competitor information, and analysing and managing this information to *aid in a company's strategic decision making process that would lead to an improved competitive position for the company.*"

As an indication of the practical benefit of CI in strategic planning, Mockler (1995:28) states that since the mid-1980s, large companies have made significant investments in CI systems for use in strategic planning. Gieskes (2001:80) points out that CI is a vital element for finding the right strategies, and for executing the strategies right.

It has therefore been determined form the literature that not only does a structured CI programme play an integrated role in company's strategic planning process, but it can also add considerable value to this process by guiding, to a certain extent, the formulation of strategy.

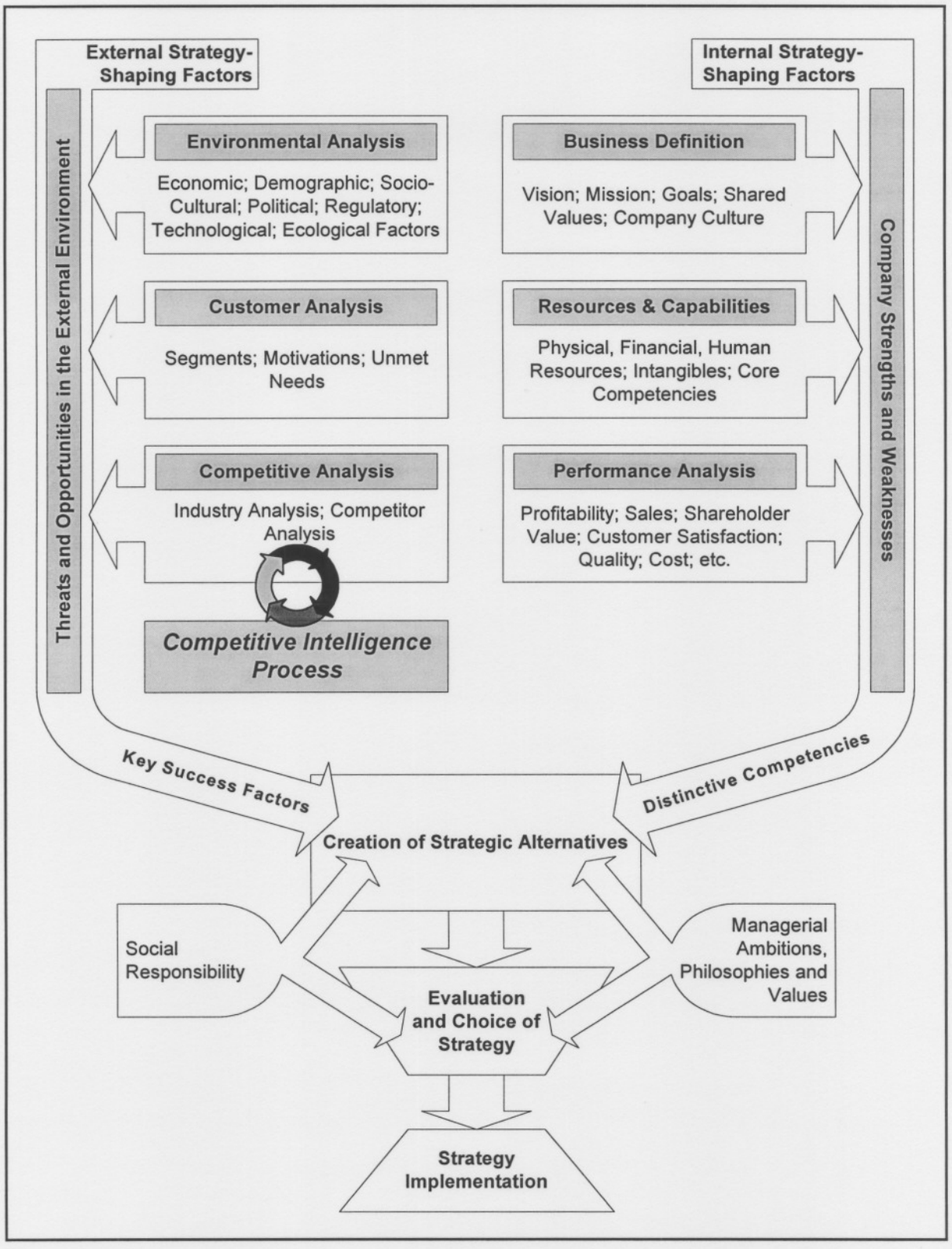

Figure 2: The role of CI in the strategic planning process

(Adapted from: McDonald (1996:76); Thompson and Strickland (2001:60); Mockler (1995:11,13); Aaker (2001:19); Luffman et al. (1996:42); Mintzberg et al. (1998:26,50); Scholes (1993:80-82,119))

3 The composition of the CI process

An examination of the literature regarding the process that is followed by the CI unit in a company, reveals that most of the sources refer to a process that is very similar to, or an adaptation of, the process used by the Central Intelligence Agency in the USA (CIA, 2001). This intelligence cycle was devised during World War II by the Office of Strategic Services (OSS) in the USA, the forerunner of the CIA (Kahaner, 2000). The process followed by the CIA is referred to as the Intelligence Cycle and is the process of developing raw information (data) into finished intelligence for policymakers to use in decision-making and action.

An assessment of the Intelligence Cycle used by the CIA, illustrates that the exact same cycle can also be applied to business, although some of the inner workings of the cycle may have to be adapted to business requirements. The CIA's Intelligence Cycle consists of five steps (CIA, 2001):

- Planning and Direction
- Collection
- Processing
- All Source Analysis and Production
- Dissemination

A summary of the CI process steps from the literature is listed as follows:

- Kahaner (1997:44); Underwood (2002:15): Planning and direction; Collection; Analysis; Dissemination
- Langabeer II (1999:29): Collect; Analyse; Disseminate
- Davison (2001:34): Planning and design; Data collection and organisation; Data analysis and interpretation; Dissemination and implementation; Evaluation, updating and maintaining
- Mignogna (1997): Establishing CI needs; Data collection; Data evaluation; Data/Information analysis and interpretation; Intelligence reporting and dissemination
- Nolan (2001:208): Define collection requirements; Tasking to collectors; Collection activities; Processing; Analysis; Dissemination
- Shaker and Gembicki (1999:42-43): Requirements; Collection; Analysis; Dissemination

- Marceau and Sawka (2001:154); Herring (2001:243): Planning and direction; Information storage and processing; Proper collection and reporting; Analysis and production; Dissemination
- Rosenkrans Jr. (2001:298): Needs assessment; Planning; Collection; Analysis; Presentation
- Hovis (2001:94): Plan/Collect; Analysis/Process; Make recommendation; Distribute (EIS)
- Porter (1987:73): Collecting field and published data; Compiling the data; Cataloguing the data; Digestive analysis; Communication to strategist
- Johnson (2003): Planning and direction; Collection and research; Processing and storage; Analysis and production; Dissemination and delivery
- Miller, S.H. (2001a:2): Planning and direction; Collection activities; Analysis; Dissemination; Feedback
- Lackman *et al.* (2001:196): Identify users; Asses their intelligence needs; Identify sources of information; Gather information; Interpret information; Communicate intelligence
- Dutka (1999:3): Data collection and storage; Data analysis and information interpretation; Dissemination
- Bresnahan (1998): Information gathering; Storage; Analysis; Dissemination
- Fahey (1999:27): Capturing data; Processing data; Crafting outputs; Decision-making.

By using the CIA's intelligence cycle and the literature study as a reference, a CI process cycle for business can be described as the following steps: *Planning and Direction*; *Collection*; *Processing*; *Analysis and Production*; and *Dissemination* (also refer to Figure 3). An explanation of each of the steps follows below:

3.1 Planning and direction

Planning and direction refers to the management of the entire CI effort, from identifying the need for data, to delivering an intelligence product to an intelligence user. It is both the start and the end of the CI cycle. It is the start of the CI cycle, since it involves drawing up specific information collection requirements from intelligence users. It is also the end of the CI cycle, since finished intelligence, which supports decision-making, generates new requirements.

This step also implies the Evaluation, Updating and Maintaining step described by Davison (2001:34), since intelligence fed back from the last step (Dissemination) into the first step have to be evaluated to determine the quality thereof, and can be updated by the triggering of new requests based on the previous requests.

Kahaner (1997:48-52) mentions that the Planning and Direction step should follow a three-pronged approach:

- *Get a clear understanding of the user's needs, including his time constraints.* It must be understood what the intelligence will be used for, why it is needed, and exactly who the intelligence user will be. The time frame involved is also critical, since it will determine how to allocate the resources of the intelligence unit.
- *Establish a collection and analysis plan.* This plan should outline what information should be collected, how the intelligence resources will be allocated, and it should also describe contingencies, if some of the requested information is not available.
- *Keep the user informed.* Go back to the user and ensure that the planned intelligence gathering will fit the user's needs.

The critical success factor in any CI operation is to be able to meet the intelligence user's real needs – and doing it in such a way that the company is able to act on the resulting intelligence that would lead to successful outcome for the company. This can be achieved by means of a formal management needs identification process (Herring, 2001:241). Herring developed the Key Intelligence Topic (KIT) process to identify and prioritise both senior management's and the company's intelligence requirements. The KITs allow the CI programme's designers and developers to determine the level of resources required to meet the expected demand in intelligence (Herring, 2001:244).

3.2 Collection

Collection refers to the gathering of the raw information (data) needed to produce finished intelligence. Data could be collected from two types of information sources, namely primary sources and secondary sources. Primary sources offer unadulterated facts directly from the source, and secondary sources offer altered information.

The main difference between primary and secondary sources is that information from primary sources is raw, unchanged, and usually in its entirety, while information from secondary

sources have been selectively stripped from larger sources of information, such as a speech excerpted on a television show, or altered by opinion, such as an analyst's industry report (Kahaner, 1997:54-55).

Examples of primary sources are annual reports, government documents, speeches, live TV and radio interviews, company financial reports, and personal observations (Kahaner, 1997:55). Examples of secondary sources are newspapers, magazines, books, pre-recorded and edited TV and radio programmes, and analysts' reports (Kahaner, 1997:55).

Some of the typical resources for the collection of data are (Kahaner, 1997:59-87; Porter, 1998:73; Kassler and Sandman, 2001:98-131):

- *Public domain data:* government information, local government information, printed media, trade associations, databases, the Internet, human intelligence (humint), customers, the sales force, observation, trade shows, jobs postings.
- *Commercial data:* commercial online services, CD-ROMS, news feeds, and patents resources.

3.3 Processing

Processing refers to the conversion of the vast amount of raw information (data) that was gathered during the Collection phase to a form of information usable by analysts. This process also entails the electronic storage of data (Kahaner, 1997:44). Although it was observed in many cases in the literature study that the Processing phase of the CI cycle had been included as part of the Collection phase, it essentially involves separate activities than mere collection of data, and should therefore be regarded as a phase on its own.

Data in paper document format may be filed in appropriately named folders that can easily be accessed (Kahaner, 1997:91). With the advances in Information Technology, companies can create searchable electronic databases in which the information can be stored and extracted from. Technologies such as Electronic Document Management (EDM) systems and Optical Character Recognition (OCR) software may be used to electronically scan the documents into electronic format and converting the text into machine-readable format. The system can then automatically store the document into the correct category in the database and create an index for the document.

Kahaner (1997:94) lists the following criteria for a system that organises data during the Processing phase:

- Data input and retrieval must be made very simple.
- It must be able to hold all media collected such as pictures, graphs, and brochures.
- It must be able to grow as a company's CI services grow.
- Data must be accurate. Information based on guesses, estimates, and rumours must be noted as such.
- It should be centrally located, although anyone should be able to extract information and use it to produce his/her own local database. They should be encouraged to share back with the central system whatever enhancements or filtering of information they have made.
- Large chunks of data should be broken down into smaller pieces and categorised so people can access only what they need without having to wade through all the information in large databases.
- It should be secure from unauthorised users.

3.4 Analysis and production

Analysis and Production refers to the conversion of basic information into finished intelligence. Analysis turns raw data, which is a collection of facts, figures, and statistics relating to business operations, into actionable intelligence, which is data that is organised and interpreted to reveal underlying patterns, trends, and interrelationships (Miller, S.H., 2001a:2). Analysis is a key thrust of CI.

Analysis includes integrating, evaluating, and analysing all available information, which is often fragmentary, and preparing intelligence products. Analysts, who are subject-matter specialists, consider the information's reliability, validity, and relevance. They integrate data into a coherent whole, put the evaluated information in context, and produce finished intelligence useful to decision-makers. According to Herring (2001:243), this step is about making the intelligence actionable and understandable.

The techniques used during this step will differ from company to company and will depend on the specific needs of a particular company. Typical analysis techniques are (Mignogna,

1997; Hovis, 2001:96; Sandman, 2001:71-94; Kahaner, 1997:103-132; Underwood, 2002:55-60; Westphal and Blaxton, 1998:493-499; Codell and Aleo,1995:122; Smart, 1995:414; Dalton, *et al.*, 1995:223-226);

- Industry / competitor descriptions and profiling
- Leadership / management profiling
- Mission / vision statement analysis
- SWOT analysis
- Porter's Five Forces analysis
- Vulnerability analysis
- Core competency analysis
- Critical success factor analysis/matrix
- Growth-Share matrix
- Value chain analysis
- Morphological analysis
- War-gaming
- Political stability forecasting
- Pattern analysis
- Structured interviews / expert opinion
- Impact wheels
- Trend extrapolation
- Trend impact analysis
- Market share analysis & forecasting
- Technology substitution analysis
- Data envelopment analysis
- Technology state-of-the-art indexing
- Patent analysis
- Precursor trends/analogical prediction
- Delphi surveys
- Financial ratio analysis
- Activity-based costing analysis
- Economic Value Management (EVM) / Economic Value Added (EVA) analysis
- Scenario writing
- System dynamics modelling
- Strategic group analysis

- Stakeholder analysis
- Price / cost analysis
- Benchmarking
- Statistical analysis
- Gap analysis
- Merger & Acquisition analysis
- Political risk analysis
- Linear forecasting / Non-linear forecasting
- Market segment cluster analysis

3.5 Dissemination

Dissemination, the last step, which also feeds back into the first step, refers to the distribution of the finished intelligence to the intelligence users, the same decision-makers whose needs initiated the intelligence requirements.

The decision-makers, the recipients of finished intelligence, then make decisions based on the information, and these decisions may lead to the levying of more requirements, thus re-triggering the CI Cycle. Miller, S.H. (2001a:2) refers to this as the feedback step.

According to Marceau and Sawka (2001:155), during this step the CI unit must ensure that intelligence reach decision-makers in a timely manner, and unless intelligence is disseminated to those with both the responsibility and the authority to act, no intelligence has been created.

Kahaner (1997:134-135) lists the following important criteria for the dissemination and presentation of intelligence reports:

- The analysis must be responsive to the decision-makers' needs.
- The analysis must be focused, not general.
- The analysis must be timely.
- There must be a high level of trust between the decision-makers and CI professionals.
- The analysis should be in the format to make the best impact on decision-makers.

3.6 Summary of the CI cycle

It is critical that the CI process is a systematic, ongoing activity that resides within the organisation, otherwise a company may not be able to gain a sustainable advantage from CI that would lead to the enrichment of strategy development and execution (Marceau and Sawka, 2001:154).

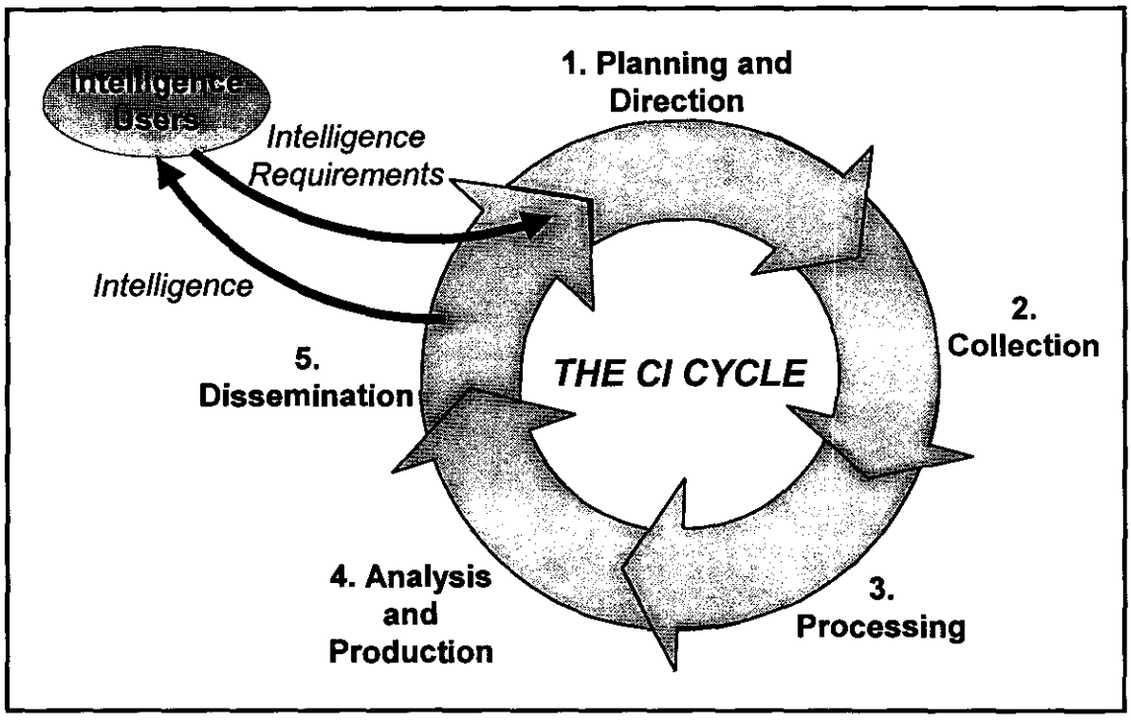

Figure 3: The CI Cycle

Many companies believe they can bypass the intelligence process and under-develop one or more of the components of the CI cycle. Usually it is the Analysis and Production function that suffers, resulting in the provision of little more than data summaries to intelligence users, disguised as intelligence. All the components of the CI cycle are required, since they form a value-added sequence of events and processes.

4 The role of Information Technology (IT) in a structured CI programme

O'Brien (1999:9) defines an information system as "an organised combination of people, hardware, software, communications networks, and data resources, that collects, transforms and disseminates information in an organisation." However, this definition of information systems also includes simple manual (paper-and-pencil) hardware devices and informal (word-of-mouth) communications channels. When referring to computer-based information systems, the term information technology (IT) is used (O'Brien, 1999:9).

According to Prescott (2001:15), IT has become a great enabler for facilitating the flow of information in recent times. Information permeates all phases of the CI cycle (Hohhof, 2001:133), and therefore the CI process could only benefit from the use of IT systems. This observation is amplified when considering O'Brien's definition of information systems that collects, transforms and disseminates information in an organisation, and how this directly correlates with the CI process.

Mockler (1995:28) states that since the mid-1980s, large companies have made significant investments in CI systems for use in strategic planning. This has been stimulated both by rapid advances in computer information systems and telecommunication technology, as well as by growing business market environments.

Due to the global Internet-enabled economy prevalent today, where information is available at everyone's fingertips at an instant's notice, CI staff should undertake to provide their companies with the IT tools needed to stay fast, focused, and flexible, in order for the companies to a obtain a sustainable competitive advantage in the industry (Miller, S.H., 2001a:9).

A well-integrated electronic information system provides several organisational advantages (Hohhof, 2001:141):

- it improves CI staff's productivity by minimizing time spent finding information and maximizing the time devoted to analysis
- it delivers an enhanced intelligence product, making the intelligence more timely and accessible
- it moves intelligence staff out of the publishing business

- it increases intelligence awareness throughout the company

Hohhof (2001:141-142) provides a list of guidelines of the characteristics and capabilities of IT systems that support CI functions:

- They deliver value-added information (intelligence), not redistribute documents
- They serve both intelligence users (decision makers) and intelligence participants (field sales personnel, marketing personnel, subject experts, etc.)
- They provide both ad hoc retrieval (short-lived query to a static, historical collection) and routing (ongoing subject profiles selecting text from a constantly changing stream of information)
- They measure success by providing focused, detailed intelligence, not merely more information
- They assign a confidence factor (validity measurement) to each unit of source information
- They are accessible through the organisation's primary software systems, such as groupware, intranet, portals, etc.
- They have a full-time support staff, either in the CI or the IT organisation, or both
- They can search, locate, and display compound documents containing a variety of formats and multiple data types (text, spreadsheet, image, video, audio, and graphics)
- They integrate information from the Internet, intranets, extranets (private information exchange networks between two or more companies, often suppliers), e-mail, local (decentralised) and legacy (centralised) information systems
- They constantly evolve as the organisation's intelligence requirements change.

Each component of the CI cycle will usually command different types of IT infrastructure and software, although certain cycles may share IT infrastructure and software with other cycles. The following technologies and/or software systems are most commonly used to support the CI process (Hohhof, 2001:143-152; De Carvalho and Ferreira, 2001; O'Brien, 1999:484; Kahaner, 2000):

- E-mail
- Text-based searching
- Groupware
- Intranet-based systems

- Internet and extranets
- Internet search engines and web spiders
- Document indexing
- Workflow systems
- Filtering/Agent technology
- Profiling/Push technology and Intelligent Agents
- Electronic document management (EDM)
- Imaging software/Optical Character Recognition (OCR)
- Knowledge portals
- Business Intelligence (BI) systems, such as data warehousing, data mining, Online Analytical Processing (OLAP), etc.
- Knowledge Management (KM) systems
- Document mining
- Artificial Intelligence (AI) systems

Many businesses still have not incorporated CI into their corporate cultures, let alone into their IT systems (Miller, S.H., 2001a:7), placing them at a competitive disadvantage to competitors that have integrated CI into their IT systems.

The literature pointed out that, today, effective CI cannot be practised without integrating CI into the company's IT systems, and therefore IT plays an essential role in CI.

5 The relationships between CI and other business disciplines

It is important to take cognisance of the relationships between CI and other business disciplines, since these disciplines may have an effect on the value that CI adds to the company, as well as on the design of a CI methodology framework.

5.1 The relationship between CI and Knowledge Management (KM)

Barclay and Kaye (2001:156) argue that the knowledge that resides within an organisation's people, processes, and products can be viewed as *the* critical competitive asset. De Carvalho and Ferreira (2001) augment this view by stating that the intelligence of knowledge workers has become the fuel of organisational growth. Kreitner and Kinicki (1998:628) view

an organisation's capability to learn as a key strategic weapon, and they define a learning organisation as "one that proactively creates, acquires, and transfers knowledge and that changes its behaviour on the basis of new knowledge and insights."

In today's highly competitive business world, the knowledge that a company possesses, determines what the company can provide and sell, and whom they can sell it to. Thus, the company who has the most knowledge, and uses that knowledge most effectively, will outperform its competitors. However, knowledge is constantly being outdated, and therefore learning organisations will tend to update their knowledge on a continual basis to retain their excellent competitive position (Heller and Spenley, 2001:240). Fahey (1999:11) states that every employee is now a knowledge worker, and companies have now become generators and users of knowledge.

Two interrelated change processes are used to help organisations develop and use knowledge to change and improve themselves continually, namely organisation learning (OL) and knowledge management (KM) (Cummings and Worley, 2001:515). Organisation learning improves a company's capability to acquire and develop new knowledge. Knowledge management concentrates on how to organise this new knowledge in order to improve a company's performance.

Both OL and KM can enable companies to acquire and apply knowledge more quickly and effectively than competitors, leading to a sustained competitive advantage for the company (Cummings and Worley, 2001:515; Barclay and Kaye, 2001:157). OL focuses on how companies can be designed to promote effective learning processes. KM focuses on the outcomes of the learning processes, on how strategically relevant knowledge can be effectively organised and used throughout the company (Cummings and Worley, 2001:519).

Underwood (2002:50) states that by viewing an organisation as a complex adaptive system operating in a complex dynamic environment, the profit-critical link between organisational learning and strategy development is clear. Cummings and Worley (2001:521) mention that the linkage between organisation knowledge and performance depends on the organisation's competitive strategy. Therefore, if the organisation knowledge is relevant and applied effectively to the strategy, it will lead to higher performance.

The main outcome of the organisational learning processes is organisation knowledge, which comprises knowledge of organisation members about organisational processes, products, customers, and competitive environments. This knowledge may take on one of two forms:

- *Explicit knowledge*: Knowledge that exists in codified forms, such as documents, manuals, and databases (Cummings and Worley, 2001:525). April and Cradock (2000:186) refer to this type of knowledge as *component* knowledge.
- *Tacit knowledge*: Knowledge that resides mainly in organisational members' skills, memories, and intuitions (Cummings and Worley, 2001:525). It refers to knowledge that cannot be written down or defined, and is entrenched in the interactive customs, rituals, and behaviours of individuals within their companies (April and Cradock, 2000:186).

The process followed by KM involves three essential steps for generating, organising, and distributing knowledge within organisations (Cummings and Worley, 2001:527-528).

From the description of KM in the literature, it becomes clear that CI is analogous to KM in several ways:

- The KM process of Generating, Organising, and Distributing knowledge is very similar to the CI process cycle (Planning and Direction, Collection, Processing, Analysis and Production, and Dissemination) described earlier.
- KM seeks to organise new knowledge to improve a company's performance, and CI proposes to make knowledge actionable to lead to improved company performance.
- Effective KM is based upon organisation characteristics that can promote effective learning processes by means of OL, such as structure, information systems, HR practises, culture, and leadership. Although CI's user base may be much smaller than that of KM, where CI focuses mainly on decision-makers and some tactical users (such as the sales force), whilst KM focuses on everyone in the company, it is also implied that CI will not be able to be practised effectively in a company if all these organisation characteristics are not encouraging the use of CI.
- Explicit knowledge, or component knowledge, includes external knowledge about the marketplace, which is the same type of knowledge that is generated by a CI programme.

The lines of differentiation between CI and KM thus turn out to be very blurred, and an inevitable convergence is shaping between these two disciplines (Barclay and Kaye,

2001:163-166). Breeding (2001:56) aptly demonstrates how the CI and KM functions converge in a case study of Shell Services International. CI functions can therefore be made an integral part of any effective KM programme.

Since companies today have knowledge workers for employees, and since companies should embrace a knowledge culture to stay competitive, the CI cycle should be embedded into this knowledge culture (Rosenkrans Jr., 2001:301). Complementing this, Thompson and Strickland (2001:20) maintains that proficient strategy execution is always the product of much organisational learning.

Grzanka (1999) maintains that the dissemination phase of the CI cycle is where CI plugs best into KM. During this phase, the CI practitioner has already determined the appropriate format for the report and the appropriate end-users to receive the intelligence.

Fahey (1999:26) shows how closely integrated OL, KM and CI is by stating that the learning is not just about the acquisition of creation of knowledge, but the outputs of learning must be integrated into decision-making, i.e. knowledge must be made actionable.

However, there are differences between CI and KM that have to be taken in consideration. CI's user base may be much smaller than that of KM, whereas KM focuses on everyone in the company. Furthermore, as pointed out by Miller, S.H. (2001a:2) and Gieskes (2001:79-80), KM's scope of knowledge includes all internal knowledge in the company that would improve the company's performance, while CI's focus is on external events and trends, with a strong focus on competitors' activities and likely intentions.

5.2 The relationship between CI and Business Intelligence (BI)

Delaney (2003:80) quotes a report from research house Gartner from 1996 stating that making sound business decisions on accurate and current information takes more than intuition. However, Business Intelligence (BI) provides the means to extract meaningful information for decision-makers from a vast amount of data.

Data analysis, reporting, and querying tools that provide meaningful information to decision-makers collectively fall into a category labelled BI (Delaney, 2003:80). Kurtyka (2003) defines BI as "the knowledge gained about a business through the use of various hardware/software technologies which enable organisations to turn data into information." BI

is software that interrogates the data stored on a company's computers and generates report that offers meaningful insight into the company's activities (Gordon, 2003:43).

De Carvalho and Ferreira (2001) define BI as "a set of tools used to manipulate a mass of operational data and to extract essential business information from them." Hohhof (2001:150) argues that software companies active in the data warehouse/data mining areas often use the term BI to describe their products, and that BI focuses on accessing, analysing, and developing insights from internally collected information in structured data files.

The view taken by Simon (2003) is that in any company a collection BI processes exist that fall into three main categories, namely operational intelligence, strategic intelligence, and special situations intelligence.

In the BI cycle, there is a transformation of data from its raw form into successively higher levels of usage. There is a progressive distillation of the data generated in the business and externally to support the processes of analysis, decision-making and action in the company (Kurtyka, 2003). Kurtyka (2003) describes the BI cycle as a sequence of the following processes: Capture, Analyse, Decide, and Act.

The following technologies and tools are considered to fall under the BI umbrella (Delaney, 2003:80-81; Kurtyka, 2003; De Carvalho and Ferreira, 2001; Hohhof, 2001:151):

BI Technology	Description
Front-End Technologies	
Decision Support Systems (DSS)	A DSS provides interactive information to support managers during the decision-making process (O'Brien, 1999:460).
Executive Information Systems (EIS)	An EIS combines many of the features of management information systems and DSS, but their focus is on the strategic information needs of top management (O'Brien, 1999:469).
On-Line Analytical Processing (OLAP)	OLAP enables managers and analysts to interactively examine and manipulate large amounts of detailed and consolidated data from nay perspectives to discover patterns, trends, and exception conditions. An OLAP session takes place online in real-time, with rapid responses to the user's queries (O'Brien, 1999:460).
Artificial Intelligence (AI)	AI refers to the development of computer functions normally associated with human intelligence, such as reasoning, learning, and

BI Technology	Description
	problem-solving (O'Brien, 1999:476). AI systems include neural networks, predictive modelling, link analysis, visualisation, and decision trees (Hohhof, 2001:151).
Back-End Technologies	
Data Warehouse Systems (DWS)	A data warehouse is a database management system (DBMS) that stores current and historical data extracted from operational databases of a company. It forms a central data store that can be used for various forms of business analysis (O'Brien, 1999:273-274).
Data Marts	A data mart holds a specific subset of data from the warehouse (O'Brien, 1999:273-274).
Data Mining Systems	This type of system allows data from the warehouse to be queried and processed to identify key factors and trends in historical patterns of business activity (O'Brien, 1999:273-274).
Extract, Transform, and Load (ETL) Tools	These tools are used to extract data from operational Enterprise Resource Planning (ERP) systems, financial systems, and other company data sources, transform the data into data warehouse models, and load these into the data warehouse (Delaney, 2003:80).

Table 2: BI Technologies

The literature has shown up to this point that certain relationships between BI and CI do exist. However, a further study of the literature reveals some mystifying facts that will have to be cleared out first.

Miller, J.P. (2001b:13) distinguishes between BI and CI as follows: "Business intelligence incorporates the monitoring of a wide range of developments across an organisation's external business environment or marketplace. Competitive intelligence focuses on the present and potential strengths, weaknesses and activities of organizations with similar products or services within a single industry."

These definitions of BI and CI differs from what was discussed earlier, and suggests that CI is a simply a subset of BI. In contrast with this view, Burwell (2000:3) states that BI is a broader concept than CI and comprises of information that is not necessarily competitive in nature. In support of this view of BI, Gieskes (2001:79) argues that BI largely comes from a company's own (internal) systems, and CI comes from a company's people and from masses of external data.

The terms BI and CI are also used interchangeably to a small extent by some of the literature, especially in the books *Millennium Intelligence* (of which Miller, J.P. is the editor, and in which his definition appears), and *Proven Strategies in Competitive Intelligence* (Nolan, 2001:206-209; Pepper, 2001:208-209). In one of the works in *Millennium Intelligence*, the definition of BI is stated by Hohhof (2001:150), as cited earlier, that software companies active in the data warehouse/data mining areas often use the term BI to describe their products, and that *in this form* BI focuses on accessing, analysing, and developing insights from internally collected information in structured data files.

To complicate matters even more, another view of the relationship between CI and BI is that CI is an umbrella term for two parallel information tracks, namely Technical Intelligence, and Business Intelligence, where Technical Intelligence refers to analysed information collected from technical data, and Business Intelligence refers to analysed information collected from business data (SCIP, 2001:308-309).

It therefore seems that there is some confusion amongst the CI fraternity about the meaning of the term BI and its relation to CI. From the literature review, CI could be seen as having four meanings:

- CI is simply a subset of BI, and BI does the same as CI, but only with a larger scope.
- CI and BI have the same meaning, and can be used interchangeably
- CI is an umbrella term for two parallel information tracks, namely Technical Intelligence, and Business Intelligence
- BI could be, as suggested by Burwell (2000:3), a broader concept than CI, and consist of information that is not necessarily competitive in nature. Breeding (2001:64-65) supports this view, by stating that CI is a component of BI (not a subset), where BI is an umbrella that spans five types of intelligence: competitor intelligence, customer/prospect intelligence, market intelligence, technical intelligence, and partner intelligence. This definition of BI also includes the definition by Delaney (2003:80), namely that BI includes data analysis, reporting, and querying tools that provide meaningful information to decision-makers.

In order to eliminate confusion, this study will refer to BI using the latter of the four meanings (as provided by Burwell, Breeding and Delaney), as well as the definitions and discussion provided at the beginning of this section. This study will also refer to Technical Intelligence used in a competitive sense as Competitive Technical Intelligence (CTI).

Since the BI tools are more appropriate for analysing information, it follows that CI could make best use of BI analysis tools during the analysis and production phase of the CI cycle.

From the description of BI in the literature, it becomes clear that certain parallels can be drawn between BI and CI:

- The BI process cycle of Capturing, Analysing, Deciding, and Acting is very similar to the CI process cycle (Planning and Direction, Collection, Processing, Analysis and Production, and Dissemination) described earlier.
- BI and CI both strive to provide meaningful information for decision-makers to improve a company's competitive performance.

However, BI is a broader term than CI, and encompasses many forms of business and technical information, and therefore, CI is a component of BI. Any company with a BI function should thus integrate CI into this function, to prevent duplication of processes and resources.

5.3 The relationship between CI and Technology Management

In today's highly competitive technological environment, effective competitive technical intelligence (CTI) can be a an effective strategic tool aiding companies to exploit new opportunities and gain first-mover advantages in addition to sensing and warding off threats before they turn into real problems. Under these conditions, those companies with the most effective CTI functions are likely to be around a lot longer than those without (Chace-Ortiz and Steel, 2003).

According to April & Cradock (2000:28), a company's technology should be co-aligned with its strategy in order to achieve competitive advantage from technology. In order to achieve co-alignment, the company should perform the following actions:

- Incorporate technological issues into business strategy.
- Identify the organisation's distinctive technical implications.
- Identify the technology that contributes, or will contribute, to business success.

- Align systems for implementation, ensuring that the systems necessary to implement the business strategy support the execution of that strategy.

The substance of technology strategy in a company consists of four elements (Burgelman *et al.*, 2001:36):

- The deployment of technology in the company's strategy to position itself in terms of cost and differentiation, to achieve a technology-based competitive advantage
- The use of technology in the various activities in the company's value chain
- The company's resource commitment to various areas of technology
- The company's use of organisation design and management techniques to manage the technology function

Two notable types of technologies that are used in a company can be determined from Burgelman's four elements of technology strategy:

- *Product technology*: This refers to the technologies that are inherent in the product's design. Only manufacturing companies will employ product technologies; service companies or resellers will not employ product technologies.
- *Process technology*: This refers to the technologies that are applied in the process of manufacturing the product or delivering a service. These are the technologies that are inherent in any company's value chain, whether the company is a manufacturer, a service company, or a reseller.

According to Joubert (1998:121), technology management includes the following:

- Surveillance of emerging and competing technologies
- Evaluation of new technologies
- Insight into the company's core technologies and core competencies
- Continuous audit and appraisal of the competitiveness of a company's technologies
- Procurement or development of new technologies
- Protection of the intellectual and commercial value and ownership of the company's technologies

Ransley (2001:287) suggests that a company should employ "External Technology Watching" (ETW) to monitor changes in the technology arena that can have an impact on the company's performance, both positively and negatively. Therefore, ETW should be used to recognise and react to possible opportunities as well as threats in the technological environment. Downes and Mui (1998:189) maintain that companies that have already implemented successful technological strategies invariably nurture a zealous, rigorous, and company-wide technology radar, which is the pipeline feeding the technological strategy.

Rosenkrans Jr. 2001:297) argues that the conducting of Competitive Technical Intelligence (CTI) in a highly technical service or industry is imperative for a company to stay competitive by having the best intelligence available for decision-making. There are four types of companies that may require CTI (Mignogna, 1997):

- Companies that operate in a technologically dynamic industrial environment that is subject to rapid technological change.
- Companies with technology intensive products and/or processes for which technology is an important differentiating factor.
- Companies with extensive R&D portfolios. They are R&D intensive, i.e. they have a high ratio of R&D expenditure to sales.
- Companies with a slow reaction time to changes in the technical competitive environment, since there is a trade-off between reaction time, or agility, and intelligence capability.

As an integral part of any high-performance R&D process, everyone in an R&D organisation requires high-quality CTI information (Chace-Ortiz and Steel, 2003). Examples of people and business functions that may require CTI in such an organisation are (Chace-Ortiz and Steel, 2003; Mignogna, 1997):

- Individual scientists and engineers need good CTI in order to help them do their daily work in planning or conducting R&D activities. They primarily need detailed technical intelligence on technical objectives, R&D approaches, manufacturing methods, and technical contacts.
- Project managers and technical managers need to be able to direct the work of large, complex and expensive R&D teams in a manner that best counters or beats the competition's work. They have a need for intelligence related to competitors' programme funding plans, R&D strategies, and technology acquisition strategies.

They also need to understand how and when to change direction when new competitive developments take place.

- Senior management needs CTI to understand long-term trends in science and technology, technical breakthroughs, and new products introduced by competitors to understand what the competition is planning to do, and to map their R&D strategy accordingly.
- Marketing personnel have a need for information concerning competitive product features, product sales, and cost/price information.
- Governance bodies, policy makers and regulators need CTI to help make the right go/no-go decisions at major stage gates of the development process.
- Business development needs it for the purposes of understanding competitive investments and deal-making, as well as for spotting new partnership opportunities.
- Licensing needs CTI to understand in- and out-license activities and make the best strategic moves accordingly.

Technology transfer has two sides in on the deal, a technology acquirer (buyer) and a technology provider (seller), and a company's CTI needs will differ depending on which side of the equation it is situated (Mignogna, 1997).

Companies typically acquire technology from outside to complement their internal technological resources, shorten new product development time, or provide access to new markets. There are three principal uses for CTI by Technology Acquirers (Mignogna, 1997):

- Analysing the competition.
- Identifying potential sources of required technology.
- Providing an early warning of technical developments in fields of interest to a company.

Technology Providers, especially innovative companies with extensive R&D portfolios, have a completely different set of needs for competitive intelligence. There are six principal uses for CTI by Technology Providers (Mignogna, 1997):

- Identifying potential purchasers/licensees of a company's technology.
- Performing due diligence on potential licensees.
- Evaluating the value of a technology to potential licensees.
- Analysing licensee performance.

- Identifying potential collaborators in a technical field.
- Identifying possible patent infringers.

CTI can therefore provide valuable information to companies on either side of the technology transfer equation, leading to more complete and rapid evaluations of technological options, better decisions, and a more successful transfer of technology (Mignogna, 1997).

Regarding the CTI process cycle, both Rosenkrans (2001:298-299) and Mignogna (1997) point out that the CTI cycle and the CI cycle are one and the same thing. Only the needs and requirements would differ, and therefore the analysis and presentation to decision-makers may also be different.

As mentioned in the discussion of BI, CTI can be seen as a parallel process with CI, since both are components of BI, and they share many of the same processes. However, any company which already has a CI process in place, will be able to create a CTI process with less difficulty than attempting to start from scratch, since most of the CI process and resources can be shared between CI and CTI.

5.4 The relationship between CI and Strategic Benchmarking

The premise of benchmarking is that a company could measure itself against the best-in-class competitors in certain performance areas to lift its own standards and improve itself. Benchmarking involves finding and copying a best-in-class practice or product (Underwood, 2002:95). Watson (1993:3) defines benchmarking as "a systematic and continuous measurement process; a process of continuously measuring and comparing an organisation's business processes against business process leaders anywhere in the world to gain information which will help the organisation take action to improve its performance."

Competitive benchmarking targets specific process designs, process capabilities, or administrative methods used by a company's direct competitors (Watson, 1993:109).

Kahaner (1997:145) argues that unless a company has a well-developed knowledge of CI methods and techniques, it will not be able to gain the most value out of its benchmarking programme, and some facets of quality benchmarking are actually impossible without employing CI.

There are five steps in the benchmarking process. The following table shows the steps and how CI can assist in each step (Kahaner, 1997:145-150):

Benchmarking Process Step	Assistance from CI
1. Identify what requires improvement in the company.	Applying CI methods to a company can help to identify processes that need to be measured.
2. Identify best-in-class companies.	CI methods can help a company find the best-in-class companies to benchmark against whether it is in the same industry or not, and whether they are willing participants or not. CI will help a company to benchmark against any company it wants to.
3. Measure the company's performance.	CI methods can help a company to measure its process.
4. Measure the performance of other companies.	A well-focused CI project will prepare a company to ask the right questions. CI will also reveal the true reason for a competitor's success.
5. Apply what the company has learned to improve your its performance.	The system in a company that already connects CI and strategic planning should be used to link benchmarking and strategic planning.

Table 3: The benchmarking process

(Kahaner, 1997:145-150)

The literature study therefore has indicated that CI can be used to enhance the strategic benchmarking process, and that some aspects of quality benchmarking are actually impossible without employing CI.

6 Intelligence products and the users of a structured CI programme

As mentioned before, the critical success factor in any CI operation is to be able to meet the intelligence user's real needs – and doing it in such a way that the company is able to act on the resulting intelligence that would lead to successful outcome for the company. This can

be achieved by means of a formal management needs identification process (Herring, 2001:241). This process involves two-way communication between the senior manager and the CI professional. On the one hand, the senior manager will communicate his intelligence needs, and on the other hand, the CI professional will communicate the capabilities and intelligence offerings of the CI function or department in the company.

According to Swystun (2000), CI has done a poor job of advancing the technical aspects and benefits of CI to its users. It is therefore the duty of CI professionals to continue to provide value to the CI users on a daily basis while educating decision-makers on CI's tangible benefits.

The CI function in a company can describe its intelligence offerings to its "clients", the intelligence users in the company, in terms of a CI "product line." This CI "product line" is useful for communicating the capabilities of the CI function to the intelligence users by exemplifying the variety of intelligence products that are available (Dugal, 1998:17).

Dugal (1998:17-18) developed a generic CI product line of ten products, namely current intelligence, basic market intelligence, technical intelligence, early warning intelligence, estimated intelligence, work group intelligence, targeted intelligence, crisis intelligence, foreign intelligence, and counterintelligence. These CI products are significantly unique in terms of their generation and applicability. They differ from one another in terms of their shelf life (short, medium, or long), type of audiences or intelligence users for which they are most useful (middle level, upper level, or specific functional area managers), CI processes (collection, analysis, dissemination) focused upon in the product offering, sources (primary or secondary) used for collecting information for the product, analytical tools and methods of dissemination used for generating and delivering the product, and relative cost (low, medium, or high) of the product.

Table 4 shows a summary of the ten generic intelligence products and their respective characteristics (Dugal, 1998:20-21).

Intelligence Product	Description	Shelf Life	Primary Audience	Analytical Tools
Current Intelligence	Provides users with their first exposure to new developments	Short	Strategic managers, finance/marketing managers	None

Intelligence Product	Description	Shelf Life	Primary Audience	Analytical Tools
Market Intelligence	Researched, analysed and documented intelligence about competitors and industries	Long	Tactical managers	Industry analysis, competitor profiles, management profiles
Technical Intelligence	Identification and understanding of scientific / technological breakthroughs and trends	Medium to Long	Engineers and scientists	Patent analysis, research impact assessment
Early-Warning Intelligence	Provides, in advance, indications of emerging opportunities and threats	Short	Strategic managers	None
Estimated Intelligence	Forecasts and likely scenarios of products, processes, technologies and markets	Medium to Long	Marketing and production managers	Delphi method, experience curves, value chains, econometrics
Work Group Intelligence	Supports internal projects and cross-functional teams	Short to Medium	Tactical managers	Specific to the problem
Targeted Intelligence	Intelligence that addresses narrow, specific and unique requirements of internal clients	Short to Medium	Tactical and strategic managers	Benchmarking, customer surveys, M&A analysis
Crisis Intelligence	Procured and utilised during an organizational crisis	Short	Strategic managers	Specific to the crisis
Foreign Intelligence	Focuses on foreign governments, foreign industries/markets, and foreign competitors	Short to Medium	Tactical and strategic managers	Political risk analysis, assumption surfacing and testing
Counter - Intelligence	Undertaken to secure an organisation against CI activities of other companies	Medium	Tactical managers	Current Intelligence

Intelligence Product	Dissemination Method	Relative Cost	CI Focus	Main Sources
Current Intelligence	Daily verbal or written briefings, Intranet	High	Dissemination	Both primary and secondary
Market Intelligence	Written reports, central databases	High	Collection and analysis	Secondary
Technical Intelligence	Written reports, trade journal clippings	Medium	Collection and analysis	Secondary
Early-Warning Intelligence	Telephone, face-to-face communication	Low to medium	Collection and dissemination	Primary

Intelligence Product	Dissemination Method	Relative Cost	CI Focus	Main Sources
Estimated Intelligence	Written reports, tables, graphs	Medium	Analysis	Secondary
Work Group Intelligence	Group meetings	Low	Analysis and dissemination	Both primary and secondary
Targeted Intelligence	E-mail, written reports	Low to medium	Collection	Both primary and secondary
Crisis Intelligence	Face to face communication, group meetings	Medium	Collection and dissemination	Primary
Foreign Intelligence	Written and oral translations and briefings	High	Collection and analysis	Both primary and secondary
Counter - Intelligence	Seminars, intranet	Medium	Collection and analysis	Primary

Table 4: Comparison of generic CI products
(Dugal, 1998:20-21)

7 Measuring the value and ROI of a structured CI programme

It is all very well for a company to have a CI system in place that promises to gather external competitor and marketplace information and deliver insightful reports to decision-makers to help the company to achieve a competitive advantage. However, senior management would very soon like to see how their investment in CI has paid off, not in vague, esoteric terms, but in actual improvement of the bottom line.

Not only does the CI department need to be able to measure its contribution to the company's bottom line, but it should also look inward and measure its delivered value to the client (the intelligence users) and the efficiency of its internal processes and systems. The CI department should also monitor the development of the CI professionals inside the department.

Hronec (1993:1) defines performance measures as the "vital signs" of a company. They quantify how well the activities within a process or the outputs of a process achieve a specified goal. Only with a consistent view of the vital signs can everyone work toward implementing the strategy, achieving the goals, and improving the company.

However, according to the literature, the measurement of the successfulness of the CI department is a considerable problem; not only what to measure, but also how to measure it (Kilmetz and Bridge, 1999:5; Langabeer II, 1999:27; Davison, 2001:27; Rosenkrans, 2001:300).

In the literature review, four different approaches of measuring the value and ROI of a structured CI programme will be considered: Kilmetz and Bridge's Three-Step Analysis to Gauge the ROI in CI, Davison's CI Measurement Model (CIMM) to Measure CI Effectiveness, Langabeer's CI Value Equation, and Rosenkrans' Past, Present and Future Directions in Measuring CI Value.

7.1 Kilmetz and Bridge's three-step analysis to gauge the ROI in CI

To measure the returns on investments (ROI) in CI, Kilmetz and Bridge (1999:5) propose a three-part analysis, a tool that will help executives to:

- Address the internal and external variables that influence investment costs and revenues
- Develop cash flow projections as part of the ROI formula
- Assess the value of the investment by comparing it to other demands on a company's capital.

7.1.1 Step 1: The variables of CI valuation:

Step one is a process of variable identification. It involves considering the market, business, and human variables that generate or influence the costs and payoffs of an investment. The following key considerations are important in measuring ROI of intelligence (Kilmetz and Bridge, 1999:6): Information, Implementation, External Factors, Timing, and Time Frame.

7.1.2 Step 2: The fundamentals of CI valuation:

Once the issues in step one have been weighed, the second step entails attaching values to each factor: costing the information itself, accounting for the internal costs of executing the

strategy, and estimating the costs and revenues that are generated as a result of doing business in the market (Kilmetz and Bridge, 1999:7).

Kilmetz and Bridge simply calculate the ROI of CI by multiplying the initial cost of the CI and the cost of implementing the strategy and subtracting this total cost from the revenues.

7.1.3 Step 3: Assessing the value of the investment:

This final step requires a decision-maker to value the investment in relation to other demands on a company's capital. A decision-maker must measure the estimated ROI of CI against the estimated returns from other potential investments contemplated by the company. From this, a decision-maker should evaluate the investment based on the risk of the venture. The risks should be measured against the company's long-term business objectives and the particular risk predisposition of the decision-maker. This should be directly correlated to the investment's return (Kilmetz and Bridge, 1999:10).

However, according to Kilmetz and Bridge (1999:10), the most important consideration may be the associated opportunity cost, which refers to the value of not having any information at all. Garrison and Noreen (2000:61) define opportunity cost as the potential benefit that is given up when one alternative is selected over another. Therefore, the potential risks and returns of implementing a business plan as a result of CI must be weighed up against to the implementation of a plan without CI.

7.1.4 Evaluation of the three-step analysis to gauge the ROI in CI

Kilmetz and Bridge (1999:7-10) illustrate their "Three-Step Analysis to Gauge the ROI in CI" by means of an example where an investment is evaluated by means of three scenarios and the respective costs (including the cost of CI) and expected returns are evaluated for each scenario. This is similar to what Wisniewski (1997:175) terms as a *pay-off table*, which shows the financial consequences - or pay-offs - in terms of the alternative decisions that can be made and the alternative rewards (or losses) that may result.

This model of measuring the ROI in CI is an excellent tool, but it is limited to specific projects that require specific intelligence to be gathered for decision-makers to select the scenario with the highest possible return. Over the course of a specific financial reporting period it

does not calculate an overall ROI for the CI department as a whole, or the CI department's contribution to company profit.

Kilmetz and Bridge (1999:10) argue that it is quite possible that the actual returns will differ from original forecasts from their three-step analysis model, since expected returns are not confirmed until after the investment has been made. As Kilmetz and Bridge (1999:10) rightly indicate, this three-step analysis is only one of many tools decision-makers can apply to their individual CI investment situations.

7.2 Davison's CI Measurement Model (CIMM) to measure CI effectiveness

Davison's model stems from the need for CI departments to become accountable for the work they produce. Davison (2001:25) suggests that the CI Measurement Model (CIMM) provides concrete generic measures for determining CI effectiveness, and that, additionally, the model aids in the calculation of the return on CI investment.

Davison (2001:33) believes that the value of strategic output is impossible to value, and therefore, return on investment of the whole CI department should be based on return on tactical projects. Davison further argues that CI projects should be classified as either tactical or strategic. If CI projects are strategic, effectiveness should be measured through assessing objective fulfilment, decision-maker satisfaction, and prediction accuracy. Tactical CI projects should be measured by assessing the reduction in risk, objective fulfilment, money saved/made, and decision-maker satisfaction.

Since the value of strategic output is impossible to value, return on investment should be based on return on tactical projects (Davison, 2001:33). To calculate return on tactical projects, the decision-maker should estimate the reduction in the level of uncertainty (risk) as applicable to the most appropriate course of action. The percentage reduction in risk should then be multiplied be the amount of money riding on the decision to determine a monetary value of CI output. This value should then be compared to the costs to determine the return on investment. An alternate method of determining the value of CI output is to have the decision-maker perform a calculation of the associated cost and revenues based on the course of action taken before the CI report, compared to the cost and revenues associated with the decision after the CI report (Davison, 2001:33).

Davison (2001:33) has also developed a CIMM form that helps to measure tactical CI effectiveness. Davison (2001:33) states that this CIMM form should be attached to every tactical CI project. The decision-maker should complete this CIMM form by at the end of the project. This CIMM form not only collects valuable information, but also helps involve the decision-maker in the CI process and helps the decision-maker to take ownership in the success of the CI department. The CIMM The form is broken down into five sections (Davison, 2001:34-35):

- *Section A - Project Particulars*
- *Section B - Decision Value and Risk*
- *Section C - Report Objectives*
- *Section D – Decision-Maker Satisfaction*
- *Section E - Open-Ended Question*: This final section allows the decision-makers to describe exactly which areas of the CI report provided them satisfaction and which areas did not, as well as which areas they would like to see enhanced in future CI reports.

7.2.1 Evaluation of the CI Measurement Model (CIMM)

Davison (2001:35) discusses a few limitations of the CIMM:

- The CIMM does not address the other variables that go into determining the direction of a decision; it assumes the importance of actionable CI outputs means that decision-makers are basing actions solely on CI recommendations. However, CI and market research outputs could go into making a decision, in which case the CI output should not be credited with the full value of the decision. Measuring the reduction in the level of risk does resolve this problem, although it may be difficult for the decision maker to separate out information sources when determining uncertainty reduction.
- The CIMM does not account for inconsistent valuing techniques between decision-makers, which potentially could be addressed through appropriate training.
- The CIMM clearly classifies CI output as either tactical or strategic, but in reality the line between tactical and strategic outputs may be blurred.
- When calculating the return on CI investment, an assumption is made that the return on tactical CI investment is equal to the return on strategic CI investment.

Similar to Kilmetz and Bridge's "Three-Step Analysis to Gauge the ROI in CI", Davison's CIMM is limited to specific projects that require specific intelligence to be gathered for decision-makers (referred to as tactical CI by Davison.)

Davison's assumption that the return on tactical CI investment is equal to the return on strategic CI investment, in order to calculate an overall ROI for the CI department as a whole, cannot be applied in practice. Davison does not provide substantial reasons or evidence that this should be the case. However, Davison's CIMM form is a valuable tool that can be used very effectively to measure, to some extent, the effectiveness of the CI programme in a company.

7.3 Langabeer's CI value equation

Langabeer (1999:27) discusses how CI professionals can position their departments as valuable and essential elements of a company's value equation. A concept for estimating the value-added by CI through a formula described as I^4, is introduced.

When reviewing the CI cycle, it becomes clear that the focus of improving intelligence is by providing information - which is also the first component of the CI value equation. While information remains the overarching concern of the CI process, this is rarely sufficient to show the value-added by CI during increasingly competitive times. Therefore, most companies should attempt to move beyond this into other areas (Langabeer, 1999:28).

According to Langabeer (1999:28), the basic premise of I^4 is that there are four key variables that will improve the positioning of CI intelligence efforts: Information, Interpretation, Insight, and Impression. All four of these begin with the letter I, and therefore the term I^4 (which is used for symbolic purposes only).

For CI departments to continue creating value for their companies, they have to follow the value equation: $CI = I^4$. In other words, they need to ensure that they do four things right (Langabeer, 1999:31-32):

- Improve the quality, reliability, and speed of the *information* gathering processes.

- *Interpret* findings sufficiently so that decision-makers can apply them and integrate them into future plans and decisions.
- Provide special *insight* to bind the intelligence to overall competitive dynamics.
- Create a lasting favourable *impression* of CI.

By performing each of these key variables properly, CI departments can position themselves as a value-added component of the company (Langabeer, 1999:32).

7.3.1 Evaluation of the CI value equation

Langabeer does not provide many practical applications of the CI Value Equation, but the four key variables of the equation may be measured by means of questionnaires provided to the decision-makers. The CI Value Equation does not provide any financial measurements.

7.4 Rosenkrans' past, present and future directions in measuring CI value

Rosenkrans Jr. (2001:299-307) discusses some methods of valuing the CI activity: how it was done in the past, how it is done presently, and how it may be done in the future.

7.4.1 Past directions in measuring CI value

According to Rosenkrans Jr. (2001:299), usually the more easily tracked statistics, i.e. those with a numerical determinant, have been the ones used in the past. Examples of these measures are as follows:

- Quantitative: number of alerts, number of reports, number of users
- Qualitative: quality of the Intelligence Product, overall approval rating

7.4.2 Present directions in measuring CI value

Presently, measuring value is more important than measuring number of reports or number of users. The contribution to the strategy and to the decision that was being made is now important. A new set of measures are being used in the present (Rosenkrans Jr., 2001:303-304):

- Quantitative
  - Opportunity Value / Cost - What was the opportunity value or cost that was realised through the CI activity? Regarding a strategic acquisition, what was the opportunity cost or the opportunity profit that was supported by this activity?
  - Market Entry Value / Cost - What was the market entry value or cost that was supported by this activity?
- Qualitative
  - Innovation (relating to CTI) – How is your CI activity supporting the innovative process within your company?
  - Linkage to strategy – What is the link to the company's strategy? Where is the decision supporting the strategy and how do I contribute to that? That becomes the primary driver for the organisation today.

7.4.3 Future directions in measuring CI value

As the CI process evolves into the core process supporting KM, parameters more indicative of this progression will emerge (Rosenkrans Jr., 2001:306-307):

- Quantitative
  - Company / Division value
  - Degree of corporate knowledge progression
- Qualitative
  - Influence on corporate change agency
  - Impact on corporate/divisional strategic value and corporate knowledge direction

7.4.4 Evaluation of the past, present and future directions

Although very little is given in the form of practical applications, the view of the present direction of CI measurement supports the views held by Kilmetz and Bridge, Davison, and Langabeer. However, Rosenkrans Jr's view of the future direction of CI measurement will be more difficult to establish, since terms like "degree of knowledge progression" and "influence corporate change agency" seem more esoteric at this stage, and will not be measured quite

easily. The question could also be posed whether these really are the type of measurements the executive management would be interested in.

7.5 Further exploration of CI performance measurement

The CI department should have its own mission, vision and strategy to ensure that it stays focused and stays viable within the company that it resides in. This CI strategy should include ways and means to help the company to achieve its strategy and to create more value for the company. The CI department must also realise, just as the case is with any company, the importance of the client. If the CI department does not serve its clients (the intelligence users) well, it will be to the detriment of the company as a whole.

One method of measuring the performance of the execution of corporate strategy is by means of the Balanced Scorecard technique, as introduced by Kaplan and Norton. This technique can also be applied to the CI department, since this department should have its own strategy that can be measured.

According to Kaplan and Norton (2001:1), the Balanced Scorecard is a tool to manage strategy by measuring the strategy. Furthermore, the Balanced Scorecard is a performance measurement system to define objectives derived from the vision, mission and strategy, and to define how and when these objectives will be measured to determine if the execution of the strategy is still on track. The Balanced Scorecard system can also be used to determine the shareholder value that is being created in the company by the correct execution of the strategy.

Kaplan and Norton (2001:11) argue that with the Balanced Scorecard, corporate executives could measure how the business units created value for current and future customers while retaining an interest in financial performance, which supports the view that the CI department could make use of this technique.

The Balanced Scorecard provides the framework to look at the strategy used for value creation from four different perspectives (Kaplan & Norton, 2001:23):

- *Financial*: The strategy for growth, profitability, and risk viewed from the perspective of the shareholder.

- *Customer*: The strategy for creating value and differentiation from the perspective of the customer.
- *Internal Business Processes*: The strategic priorities for various business processes, which create customer and shareholder satisfaction.
- *Learning and Growth*: The priorities to create a climate that supports organisational change, innovation, and growth.

The application of the Balanced Scorecard to CI will be further discussed in Chapter five when the development of a Performance Measurement Model for the design of the CI Methodology Framework is considered.

8 The implementation of a structured CI programme in a company

Prescott *et al.* (2001:176-190) present the following findings from a 1996 benchmarking study of CI practises, where the focus was on identifying the processes that leading-edge companies use to implement their CI programmes:

- These companies had evolving, yet stable CI infrastructures with experienced CI personnel, well-developed CI networks, and CI champions dispersed throughout the company.
- These companies had decentralised, but coordinated, networks.
- These companies had responsive IT systems operating as learning systems.
- These companies had linkages between the strategic planning process and the tactical part of the company.
- These companies had a CI client (user) feedback-implementation linkage.
- The CI personnel in these companies provided hypothesis-driven recommendations.
- These companies institutionalised intelligence cultures.

The following support factors are critical to the intelligence function, regardless of the size and breadth of the company (Miller, J.P., 2001a:32-33):

- *Cultural values*, such as information sharing, willingness of decision-makers to welcome input from staff, responsiveness to marketplace changes, and the willingness to adjust organisational processes to address these changes

- *Structural factors*, such as ease of interaction between decision-makers and intelligence staff and placement of intelligence staff in proximity to decision-makers (although advances in digital communication technologies have reduced the need for a physical proximity)
- *Behavioural factors*, such as mechanisms to support the gathering and sharing of information, and mechanisms to award contributors and punish hoarders

Kahaner (1997:201-208), Underwood (2002:118-129), Swystun (2000), Marceau and Sawka (2001:165), Lackman *et al.* (2001:208-209), Prescott (2001:4-14), and Fuld & Company (2002:3-4) recommend some important points to be considered for the establishment of a CI system in a company:

- Ensure CEO sponsorship of the intelligence team. Leadership in the company should embrace the core values of CI and support it
- Select a director of CI and put him or her in the right location
- The director should determine who the key intelligence users are and what they will use the intelligence for
- A CI programme requires a clearly articulated role
- An entire administrative structure needs to be developed
- Perform an intelligence audit of the company
- Develop a promotional plan for the CI function
- Involve all employees in CI training
- Design a network to move information and intelligence around the company using what is already in place
- The company should have a well-developed procedure for managing human source networks and gathering human source information
- Establish companywide ethical and legal guidelines for CI at an early stage
- Select the right people for the intelligence team. The company should attract and hire top-flight CI professionals who are highly motivated and committed to CI
- Allocate a suitable budget for CI
- Give the CI team appropriate resources and access
- Establish a war room
- Link a company's strategy with its CI function and focus on strategic situations, since CI's greatest impact is delivering intelligence on competitive advantage
- Design the CI process to fit the project
- Use strategic profiles to facilitate organisational learning

- Set and manage scope appropriately
- Involve the decision-maker from the beginning and let CI's mandate be customer (intelligence-user) driven
- Focus on key-decision-makers and only on a few key intelligence topics (KITs) that will make a difference
- Never stop communicating with decision-makers
- Establish an integrated analysis and collection unit
- The company should have a defined set of regular intelligence products
- The company should recognise that CI is still chiefly a human process
- The company should understand that the success of any CI software technology tool depends on the sophistication of its CI process
- Different companies derive different value from different approaches to CI, and therefore a company needs a customised set of CI software technology tools

There are several pitfalls to the implementation of CI in a company, and there are many ways to endanger CI projects. Kahaner (1997:219-221), Prescott (2001:4-14), and Swystun (2000) provide a few common problems with the implementation of CI:

- Top management was not involved
- Tasks are not focused or issue-oriented
- Too much emphasis is placed on collection
- Not everyone in the company was involved
- Not establishing ethical guidelines
- Leaders and decision-makers were not actively involved
- Not being creative and focusing on differentiated value
- Too much detail with little relevance
- No linkage to the overall strategic planning process
- No early, tangible results (no quick wins) leads to lost momentum
- Ethical mishaps destroys credibility and trust

Kotter developed an eight-stage process for transformational change in organisations that could equally be applied to the implementation of a CI programme (Kotter, 1996:21; Kreitner and Kinicki, 1998:622):

Step	Description
1. Establish a sense of urgency	Unfreeze the organisation by defining a compelling reason for why change is needed.
2. Create the guiding coalition	Establish a cross-functional team with enough power to lead the change.
3. Develop a vision and strategy	Create a vision and strategic plan to direct the change effort.
4. Communicate the change vision	Create and implement a communication strategy that uses every vehicle possible to consistently communicates the new vision and strategic plan.
5. Empower broad-based action	Eliminate barriers to change, and use target elements of change to transform the organisation. Encourage risk taking and creative problem solving.
6. Generate short-term wins	Plan for and create short-term or quick "wins" or improvements. Visibly recognise and reward people who contribute to the wins.
7. Consolidate gains and produce more change	The guiding coalition should use credibility from short-term wins to create more change. Reinvigorate the change process with new projects, themes, and change agents.
8. Anchor new approaches in the culture	Reinforce the changes by highlighting connections between new behaviours and processes and organisational success. Develop methods to ensure leadership development and succession.

Table 5: Kotter's eight-stage process for transformational change

According to Smit and Cronjé (1997:265), most organisational change efforts run into some form of employee resistance, because change triggers an emotional reaction due to the uncertainty involved. This would also be true for the implementation of a CI programme. Some of the main reasons why employees resist change, are (Smit and Cronjé, 1997:265): threatened self-interest, lack of trust, misunderstanding, different assessments and perceptions, low tolerance for change, inertia (hold on to status quo), timing, surprise, and peer pressure. These types of resistance to change will have to be recognised and actively managed and monitored to ensure the success of the implementation of the CI programme.

Richmond *et al.* (1995:259-260) describe three steps that can be taken to reduce resistance to change:

- Step 1: Develop and communicate a compelling case for change
- Step 2: Paint a clear picture of where the change will lead
- Step 3: Illuminate a clear pathway for getting there.

CHAPTER 3 : EMPIRICAL STUDY

1 Research methodology

1.1 Introduction

The empirical research was undertaken to meet the requirements of primary research goals 1a and 1b. Research goal 1a is to determine whether a structured CI programme will be able to improve a company's strategic competitive advantage. Research goal 1b is to determine whether a structured CI programme will be able to create value for the company's shareholders.

As was established in the literature study in chapter two, CI plays a vital role in crafting successful strategic plans. According to Thompson and Strickland (2001:276), one of the most important points to consider when attempting to craft a successful business strategy is to plan for strategic moves that will enhance the company's competitive position for the long term. The shareholders of a company are never well served by a management team who place short-term financial performance considerations before that of the longer-term view of the company's competitive position and competitive strength. The single most dependable contributor to a company's above-average profitability is the creation of a sustainable competitive advantage (Thompson and Strickland, 2001:276).

Therefore, to be able to measure a company's sustainable competitive advantage, certain financial indicators will have to be measured over a period of time, and not just at a single point in time.

Since it would make no sense to only look at financial indicators to determine the role that is played by CI to create sustainable competitive performance for a company, another measure, regarding how well the CI process is entrenched in the company, must also be considered.

1.2 Financial indicators

The growth in sales should be used as one measure to verify the improvement in a company's competitive performance, since, if a company's competitive performance improves due to the use of a formal CI programme, there should be a marked increase in sales as market share is taken away from competitors. One problem with monitoring growth in sales is that sales for a particular company could increase from year to year due to inflation, and not necessarily due to an increase in units sold. Nevertheless, if sales increase due to inflation, so would the cost of sales. This may cause the net profit of the company to stay the same, or even decrease if the company is highly leveraged and interest rates also increase due to the rise in inflation.

However, growth in sales should not be at the expense of profits. The more of a competitive advantage a company has, the more it will be able to gear its internal structure and processes to delivering additional value, and therefore, the more it should be able to increase profits.

Three important ratios of profitability are the gross profit margin, the operating profit margin, and the net profit margin (Gitman, 1988:106). The gross profit is also referred to as the earnings before interest, taxes, depreciation and amortisation (EBITDA), the operating profit is also referred to as the earnings before interest and taxes (EBIT), and the net profit is also referred to as the net income (Brigham and Ehrhardt, 2002:37). The net profit margin measures the percentage of the total sales income that is left over after deducting all expenses, including taxes. Furthermore, the net profit margin is a frequently quoted measure of a company's financial success with respect to earnings on sales (Gitman, 1988:108).

Brigham and Ehrhardt (2002:86) argue that the most important, or "bottom line" accounting ratio is the ratio of net income to common equity (ordinary share capital), which measures the return on common equity (ROE). Shareholders invest in a company to eventually get a return on their money, and the ROE ratio indicates how well they are doing in an accounting sense. To the extent that ROE only focuses on the rate of return, increasing ROE may in some circumstances be inconsistent with increasing shareholder wealth (Brigham and Ehrhardt, 2002:99).

Earnings per share (EPS) is an indication of the company's profitability expressed per share (Magliolo 1995:71), and EPS represents the amount of money earned on behalf of each

outstanding share of common equity (Gitman, 1988:109). Therefore, EPS indicates to an investor how much profit each share that he possesses, has achieved over the past year (Magliolo 1995:71). If EPS has been increasing over a number of years, investor sentiment would improve, which would normally push the share price up and increase the investor's capital growth.

EPS is one of the most widely used quoted statistics in discussion of a company's performance and share value (Walsh, 1994:136). It serves no purpose to compare the EPS in one company with that in another company, because a company can elect to have a large number of shares of low denomination or a smaller number of shares of a higher denomination. A company can also decide to double the number of shares on issue and this would automatically reduce the EPS by 50 percent.

Walsh (1994:136) states that, while the absolute amount of EPS indicates nothing about a company's performance, the growth in EPS values over time is a very important statistic. Furthermore, the growth in EPS has a significant influence on the market price of the share. Growth in EPS is used in preference to growth in absolute profit when assessing a company's performance, because growth in profits can result from a great many things. For example, a company could acquire another company, paying with shares, and thereby increases its profit. However, if the percentage increase in profit is less than the percentage increase in the number of shares, EPS will decrease, and the shareholders will lose out.

Rappaport (1986:19) believes that there is an obsessive fixation on EPS as the scorecard of corporate performance, as often reported in both corporate reports and the financial press. This fuels the business community's belief that share prices are strongly influenced, if not totally determined, by reported EPS. Furthermore, it is commonly assumed that if a company produces satisfactory growth in EPS, then the market values of the shares will increase. However, Rappaport (1986:19) argues that EPS growth does not necessarily lead to an increase in the market value of the shares.

There are several reasons why earnings measures such as ROE and EPS fail to measure changes in the economic value of the company (Rappaport, 1986:20; Brigham and Ehrhardt, 2002:99):

- Alternative accounting methods may be employed
- Risk is not considered
- The amount of invested capital is not considered

- Dividend policy is not considered
- The time value of money is ignored

With these problems in mind, academics, practitioners, and consultants have tried to develop alternative measures that overcome ROE's and EPS's potential problems. One such measure of the extent to which the company has added to shareholder value is Economic Value Added (EVA), which supplies an estimate of a company's true economic profit for a year (Brigham and Ehrhardt, 2002:50, 99).

1.3 EVA - the indicator of true economic profit

Price and Collins (1995:115) state that the creation of value for the shareholders of a company is an economic, and not an accounting concept. In order to measure shareholder creation, a view must be taken from within the company, as well as of the share market. In agreement with this statement, Brigham and Ehrhardt (2002:50) mention that EVA is an estimate of a company's true economic profit for a given year, which differs sharply from accounting profit.

According to Stern Stewart & Co. (2003), EVA is the measure of financial performance that comes closer than any other to capturing the true economic profit of a company, and in addition, it is the performance measure most directly linked to the creation of shareholder wealth over time. EVA is therefore an estimate of true economic profit, or the amount by which earnings exceed or fall short of the required minimum rate of return that shareholders and lenders could obtain by investing in other securities of similar risk (Stern Stewart & Co., 2003). EVA is a registered trademark of Stern Stewart & Co.

EVA represents the residual income that remains after the cost of all capital, including equity capital, has been deducted. In contrast with EVA, accounting profit is determined without imposing a charge for equity capital (Brigham and Ehrhardt, 2002:50). However, equity capital has a cost, since funds provided by shareholders could have been invested elsewhere, where they would have earned a return. Shareholders therefore sacrifice the opportunity to invest elsewhere when they invest capital into the company. The return that investors could earn elsewhere in investments of similar risk represents the cost of equity capital. This cost is an opportunity cost rather than an accounting cost (Brigham and Ehrhardt, 2002:50).

Stern Stewart & Co. (2003) describes the calculation of EVA, in its most simple form, as net operating profit after taxes (NOPAT) minus an appropriate charge for the opportunity cost of all capital invested in a company. EVA can therefore be calculated as follows:

$$EVA = NOPAT - (Capital \times Cost\ of\ Capital)$$

A positive EVA would therefore indicate that shareholder value has been created, and a negative EVA would indicate that shareholder value has been destroyed.

1.4 Researching performance indicators

Due to the problems that have been highlighted with measures of accounting profit, it was decided to use a combination of three of these indicators in the research to measure a company's strategic competitive advantage, and that EVA would be used to measure a company's shareholder value creation.

1.4.1 Accounting measures

The following three accounting indicators have been used in the research to measure a company's strategic competitive advantage:

- Growth in sales
- Growth in the net profit margin
- Growth in EPS

Sales were determined by using the total sales turnover from the company's income statement. Net profit was determined from the income statement as net profit attributed to ordinary activities, which is net profit after tax, but before the deduction of extraordinary items. The Net Profit Margin was calculated from (Gitman, 1988:108):

$$Net\ Profit\ Margin = \frac{Net\ Profit}{Sales}$$

EPS was calculated from the net profit after tax (attributed to ordinary activities) divided by the number of common (ordinary) shares outstanding (Brigham and Ehrhardt, 2002:37):

$$EPS = \frac{Net\ Profit}{Issued\ Ordinary\ Shares}$$

The growth in each of the three accounting indicators was determined over the past four financial years, namely 1999, 2000, 2001 and 2002. A growth figure (positive or negative) was determined as a percentage value between consecutive years, i.e. from 1999 to 2000, from 2000 to 2001 and from 2001 to 2000.

An index was developed for each of these accounting growth figures, and a final accounting index was derived by adding the three accounting growth figures. The methodology employed to derive this accounting index is explained in Annexure C.

1.4.2 Measure of shareholder value creation

EVA was used to obtain a measure of a company's shareholder value creation. EVA is calculated as the net operating profit after taxes (NOPAT) minus the after-tax cost of capital used to support operations. The after-tax cost of capital used to support operations is calculated as the operating capital multiplied by the weighted average cost of capital (WACC). WACC represents the required rate of return of investors (Brigham and Ehrhardt, 2002:48-49).

The methodology followed in the calculation of EVA is presented in Annexure F.

The growth in EVA was determined over the past four financial years, namely 1999, 2000, 2001 and 2002. A growth figure (positive or negative) was determined (as a percentage value) between consecutive years, i.e. from 1999 to 2000, from 2000 to 2001 and from 2001 to 2000. An EVA index was developed for these EVA growth figures, and the methodology employed to derive this EVA index is explained in Annexure D.

1.5 The CI structuring index

Since it would make no sense to only look at accounting measures as well as measures of shareholder value creation to determine the role that is played by CI to create sustainable competitive performance for a company, another measure, indicating to what degree the CI process is entrenched in the company, must also be considered.

A questionnaire was developed to aid the researcher to determine the CI structuring index value of a company, which is an index of the degree of formalised structuring of the CI programme in place at a specific company.

1.6 The correlation study

A correlation coefficient defines the strength of the relationship that might exist between two variables (Wisniewski, 1997:322), and this was used to test the relationship between the CI structuring index and both measures of accounting and EVA growth figures.

Two correlation coefficients were calculated, one between the CI structuring indices for all the companies involved in the study and their respective accounting measures, and one between the CI structuring indices for all the companies and their respective EVA measures.

In order to meet the requirements of primary research goals 1a and 1b, these two correlation coefficients were used to test the following hypotheses:

- There is a high correlation between a highly formalised CI programme and high levels of growth in competitive performance.
- There is a high correlation between a highly formalised CI programme and high levels of growth in shareholder value creation.

2 Data sampling

Since certain financial information pertaining to company performance is required for the empirical study, it was first decided to focus the study on South African public companies listed on the JSE Securities Exchange, where this type of information is readily available.

However, a recent South African CI study performed by the Potchefstroom University sent out questionnaires to over 2000 South African companies, but the response rate was only 4.9% (Viviers *et al.*, 2002:30). According to the study, the Bureau of Market Research in South Africa has found that mail surveys that ask security-related information in South Africa generally result in 2% to 4% response rates. Viviers *et al.* (2002:30) also refer to a recent Canadian CI study with a much higher response rate of 33%, which is attributed to extensive support from industry and the government in Canada.

Due to the limited time for this study, and the low response rate that could be expected from companies in South Africa, it was decided to perform the study on companies outside of South Africa. It was decided to shift the focus of this study to public companies trading on the Nasdaq and New York stock exchanges in the USA, since financial and share price information on these companies is readily available from the Yahoo! Finance web site and Multex Investor web site.

Since it would be too time-consuming to generate a full listing of companies from these stock exchanges, it was decided to focus the study on 10 industries, from which a random sample of companies would be drawn. An initial list of industries obtained from Yahoo! Finance resulted in a list of 102 industries. The list of 10 industries determined by random sample from the list of 102 industries is shown in Annexure A.

A total number of 1494 companies were found within these 10 industries. It was also decided to focus the study on larger companies, and the cut-off point was arbitrarily decided upon as being a market capitalisation of 300 million US dollars. Therefore, all companies with a market capitalisation of less than 300 million US dollars were excluded from the list. Thereafter, a further random sample of 150 companies was drawn from the remaining list of companies, which is also shown in Annexure A. These companies were also tested to ensure they all had at least four years of financial data available.

3 Data sources and collection methods

The Yahoo! Finance (Yahoo! Finance, 2003) and Multex Investor (Multex Investor, 2003) websites were used to obtain financial data, as well as historical share prices and required interest rates.

The data for the compilation of the CI structuring index was obtained by performing a survey amongst the selected companies by means of a questionnaire designed specifically for this purpose. The questionnaire was converted to an electronic web format and posted on a web site (http://hanju.netfirms.com).

A suitable e-mail address was obtained from each company's web site, and an e-mail was sent out to each of the 150 companies requesting the person responsible for CI in the company to complete the questionnaire on the web site. The web site was designed to automatically e-mail the results of each questionnaire in a coded format to the researcher's e-mail address. A special computer program was developed to read the contents of each e-mail that was received and to input the coded questionnaire results into a Microsoft Excel spreadsheet, where the final results were determined.

4 Questionnaire design

The questionnaire to determine the CI structuring index of a company, as well as the coding thereof, is presented in Annexure B. A set of nine questions and a set of five statements have been prepared to provide a score of the degree of formalised structuring of CI in a company. All five of the statements have been designed by using a Likert scale.

Question one proposes to determine whether a formal CI department or function or group or unit already exists within the company, and if so, a score of 10 is given to the question. It may be the case that no formal CI department exists within a company, but that there is still a formal CI process followed, which question two addresses. Question three applies a low score if the respondent is aware of the fact that CI is collected on an informal basis, i.e. a low score is given for the fact that some CI is collected, but not on a formal basis.

Question four gives a higher score if all the CI work in the company is performed in-house, and none is outsourced, since in-house CI professionals have a better understanding of the company and its environment, and should be able to deliver better quality intelligence products to decision-makers. Question five assigns a higher score if the CI department has been in existence for a longer period of time.

Question six evaluates the portion of the total budget that is assigned to CI in the company, and assigns a higher score, the larger the portion of the budget. If the respondent does not

know the exact percentage portion, but the amount assigned to CI, this portion can then be calculated by dividing the amount allocated to CI into the previous financial year's expenses. The same method is applied if the respondent only knows the amount spent on CI in the previous financial year.

Question seven determines whether the CI department has a full-time manager, and applies the highest score to this result. The more employees that are working in the CI department, the higher the score provided by question eight. Full-time employees also receive a higher rating than part-time employees. The higher the level of management that the CI manager belongs to, the higher the score given by question nine.

Statement one attempts to determine the climate that exists in the company regarding top management's support for CI. Statement two tests the degree to which formal ethical guidelines for the practicing of CI in the company have been set. Statement three measures the fact that the company has a defined set of regular intelligence products, since these would normally be used very little or be totally absent in a company with a less structured CI system.

Statement four determines whether there is a strong link between strategic planning and intelligence requirements, which would be present in a company with a highly structured CI system. Statement five tests whether any performance evaluation of the CI process is performed, which should receive a high score in a company with a highly structured CI system.

CHAPTER 4 : SURVEY DATA ANALYSIS

1 Survey results

A total of 150 e-mails have been sent out, requesting companies to complete the questionnaire on the indicated web site. A total of 32 companies have responded, resulting in a 21.3% response rate. The results of the survey are presented in the following table.

1	23	8	67.7%
2	27	7	70.0%
3	8	11	27.7%
4	11	6	45.4%
5	20	8	72.3%
6	16	18	39.2%
7	23	14	64.6%
8	21	9	62.3%
9	20	6	56.2%
10	12	4	47.7%
11	-2	8	38.5%
12	-4	13	36.2%
13	10	9	43.1%
14	-38	6	29.2%
15	-20	16	35.4%
16	21	19	63.8%
17	15	3	42.3%
18	12	8	33.1%
19	25	3	65.4%
20	24	13	61.5%
21	38	16	65.4%
22	20	0	36.2%
23	1	14	46.2%
24	5	16	23.1%
25	18	10	44.6%
26	28	16	51.5%
27	19	12	30.8%
28	39	8	56.2%
29	7	12	19.2%
30	12	16	37.7%
31	29	11	53.8%
32	24	15	43.8%

Table 6: Survey results

2 Analysis of survey results

The following table indicates the number of respondents per industry. There were no respondents from the Computer Storage Devices industry.

No.	Industry	No. of Respondents
1	Business Services	3
2	Communications Equipment	6
3	Computer Storage Devices	0
4	Construction & Agricultural Machinery	1
5	Consumer Financial Services	2
6	Major Drugs	6
7	Office Equipment	1
8	Photography	2
9	Semiconductors	4
10	Software & Programming	7
	Total	32

Table 7: Number of respondents per industry

The market capitalisation figures of the respondents were quite widespread. This figure showed an average of 35547 million US dollars, a maximum value of 244880 million US dollars, and a minimum value of 341 million US dollars. This means that the respondents ranged from very large to small companies (a cut-off point was set at a market capitalisation value of 300 million US dollars in the empirical study as pointed out in chapter three.)

The following coefficients of correlation have been determined from the data:

Coefficient of correlation between the accounting index and the CI index	0.615
Coefficient of correlation between the EVA index and the CI index	-0.082
Coefficient of correlation between the accounting index and the EVA index	-0.010

Table 8: Coefficients of correlation

These relationships are depicted in the following scatter diagrams and trend lines of the data:

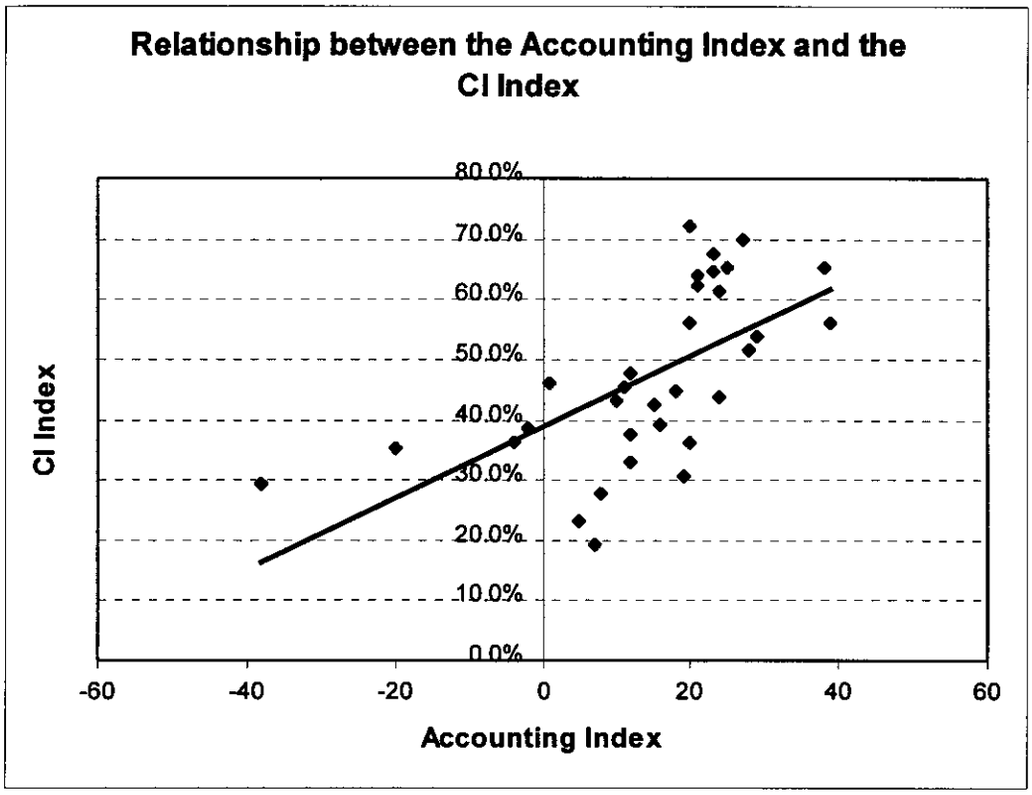

Figure 4: Relationship between accounting index and CI index

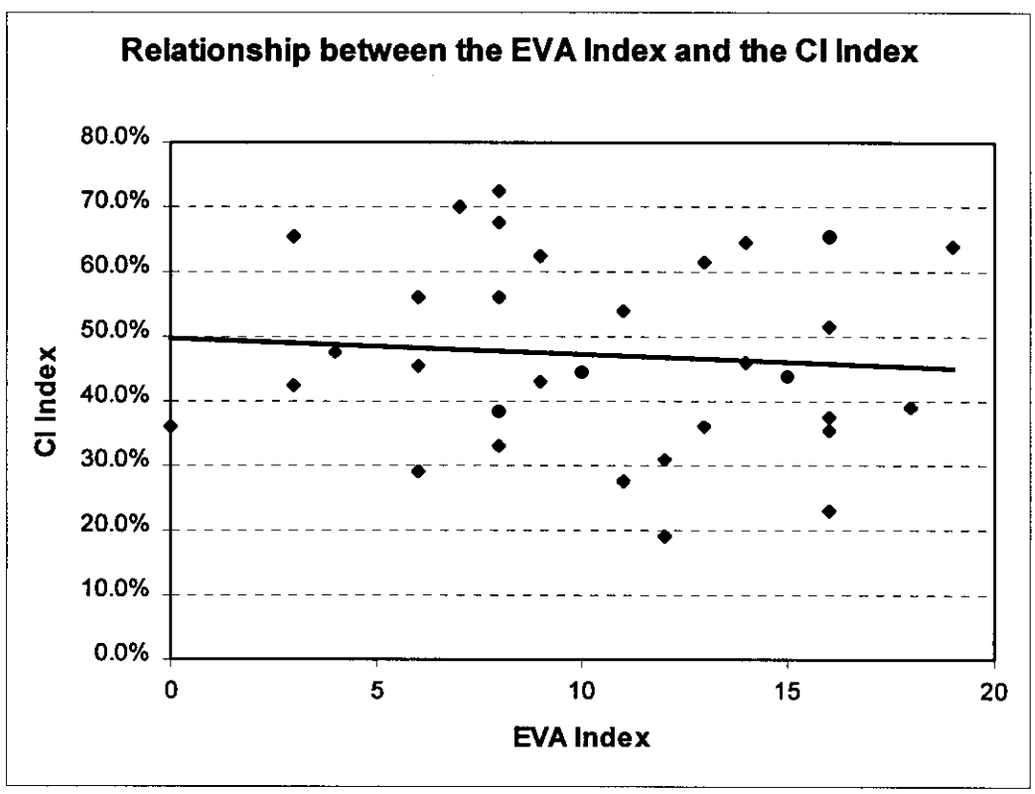

Figure 5: Relationship between EVA index and CI index

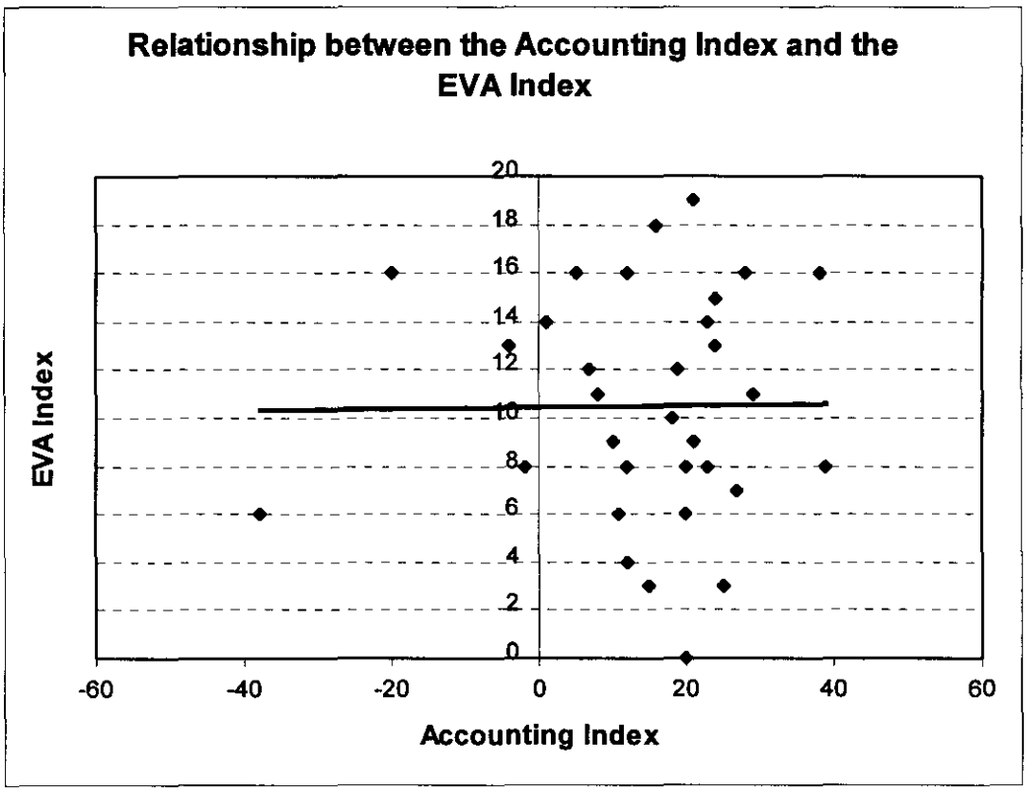

Figure 6: Relationship between accounting index and EVA index

The following table shows the respective averages, standard deviations, minimum and maximum values of the three indices.

	14.5	10.5	47.2%
	15.1	4.7	14.5%
	39	19	72.3%
	-38	0	19.2%

Table 9: Index statistics

The coefficient of correlation between the accounting index and the CI index of 0.615 indicates a weak positive relationship between the two variables. This value, together with the slope of the trend line as shown in figure 4, suggests that the following conclusion can be made: the higher the degree of formalised structuring of CI in a company, the better its competitive performance would be. This therefore means that there is a significant

correlation between the effective functioning of a CI programme and a company's strategic performance.

The coefficient of correlation between the EVA index and the CI index of -0.082 is close to 0, which is also true of the coefficient of correlation between the accounting index and the EVA index, which is -0.01. Therefore, the conclusion can be made that there is no correlation between the EVA index and the CI index, because the coefficient of correlation is so close to 0 (Berenson and Levine, 1996:732).

This means that, according to this study, no proof could be found that a structured CI programme would be able to create value for a company's shareholders in terms of sustainable growth in EVA. Therefore, there is no correlation between a highly formalised CI programme and high levels of growth in shareholder value creation.

CHAPTER 5 : DESIGN OF A CI METHODOLOGY FRAMEWORK

1 CI methodology framework design

The CI methodology design is depicted in figure 7 and has evolved around the five phases of the CI process cycle. The components shown in a grey background are part of the CI system, the components shown in a clear background are external items linked to the CI system in some way, and the components with a dotted grey background could either be part of the CI system, or could be external items.

The CI framework's design uses modular components where possible, so that the system could be less expensive for smaller companies that do not own expensive third-party components such as knowledge management systems or business intelligence tools.

The *workflow system* is integrated with all phases and role players in the CI system and directs process flows and notifications and alerts within the CI system.

1.1 Planning and direction

The *CI practitioners* in the CI department develop a suite of *generic CI products* that could be presented to *intelligence users* to give them a better insight into what could be done by the CI department. These CI products could also serve as the basis of further CI product development.

Together, the intelligence users and the CI practitioners would develop *key intelligence topics (KITs)* from the requirements and needs of the intelligence users. The KIT process was discussed in chapter two. The KIT process identifies and prioritises the requirements of the intelligence users, and the KITs also allow the CI practitioners to determine the level of resources required to meet the expected demand for intelligence, which should be described in the *collection plan*. The collection plan should also describe contingencies if some of the requested information is not available. The collection plan should also describe the

frequency of collection, the objectives that the intelligence users want to meet, as well as the intelligence product that will be used.

The intelligence users could also have ad-hoc intelligence requests from time to time. Some of these requests might be turned into regular intelligence products at a later stage, if required.

The objectives described in the collection plan should be measured at the end of the CI cycle to see how well the CI department has performed in meeting these objectives. This can be achieved by using a third-party *performance management system*, or a small dedicated performance management system that is developed as part of the CI system. The performance management system can have some manual inputs, as well as inputs from other legacy systems, such as the financial system used in the company. Special *performance indicator interfaces* may have to be developed to obtain the performance measurement data from legacy systems.

1.2 Collection

Different types of collected data are fed into a document management system, which can be a third-party system, or a component of the CI system. The collected data can be obtained from various sources, such as *printed documents*, *human collection*, the Internet, or other electronic sources, such as news feeds or CD-ROMs, as well as data from various legacy systems in the company, such as an ERP (Enterprise Requirements Planning) system. Special *"probes" or interfaces* may have to be developed to obtain the required data from legacy systems.

Printed data will have to be scanned in, preferably by a high-speed document scanner, and the contents of the scanned documents will have to be converted to electronic format by means of an *optical character recognition (OCR)* system.

Data from the *Internet* can be obtained from known web sites, or *"CI scouts"* can be used to search for data with certain characteristics. The CI scouts will have to be developed as part of the CI system, and could consist of components such as web crawlers, web robots, web spiders, or active agents. These scouts will automatically travel through the Internet to find web documents fulfilling preset characteristics. Existing search engines can also be utilised,

or a special search engine can be built into the CI system to facilitate manual Internet searches.

An *early warning radar* component can bypass the document collection system and directly notify the CI system of any potential threats. The inputs to the early warning radar could come from the same sources that connect to the document management system, but the early warning radar does not merely collect data, it is an event-driven component that should notify CI practitioners about potential threats that may come from the external business environment, or from the company's competitors. A *rules-base* component may be developed, or a third-party rules-base system may be employed to develop rules for exactly when the early warning radar should trigger its responses.

1.3 Processing

The document management system also ties in with the processing phase and indexes and classifies collected documents, i.e. it converts the vast amount of raw information (data) that was gathered during the collection phase to a form of information usable by CI analysts. The document management system also ensures that the information is stored in the correct place in the CI *database* or the company's *data warehouse*, should the company already have a data warehouse in operation.

1.4 Analysis and production

Different analysis plug-in modules will be used in the CI system, allowing companies to select only the modules that they require, therefore saving costs. A further benefit of using analysis plug-in modules is that new modules can be developed over time as needs arise, and companies may acquire these and literally plug them into the CI system with very little or no modifications necessary. The analysis plug-in modules can be based on the analysis techniques discussed in chapter two, such as industry profiling, competitor profiling, SWOT analysis, five forces analysis, growth-share matrix analysis, value chain analysis, benchmarking, etc.

Third-party *Business intelligence tools* may also be linked to the analysis phase to provide further means of analysis for companies that can afford these tools.

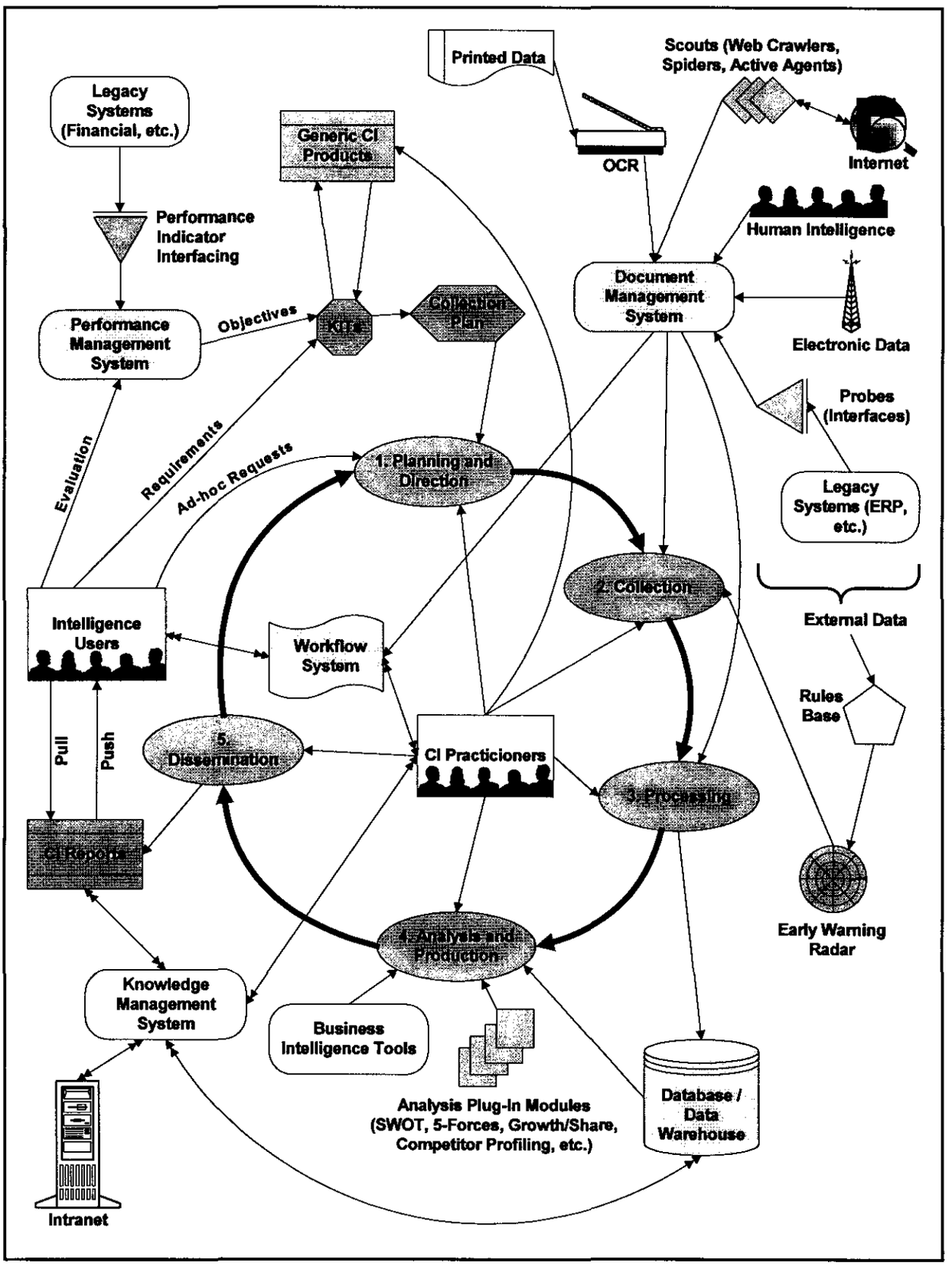

Figure 7: CI methodology framework design

Although human intervention is still crucial in performing CI analysis, some of the analysis tools can be designed as expert systems and also make use of artificial intelligence to aid the analysts and decision-makers in their jobs.

1.5 Dissemination

The dissemination phase produces *CI reports* for the intelligence users from the analysis of the collected data. The formats of these reports are dictated by intelligence user requirements, the type of CI products used, and the type of analysis used. If the company has a *knowledge management system* in place, the CI reports can be stored in this system, or else the CI reports can be stored on the company's Intranet.

The reports can be disseminated to the intelligence users by means of either the *pull* method or the *push* method, depending on the needs of the individual intelligence users. Using the push method, CI reports are delivered to the intelligence users as soon as these reports become available. With the pull method, intelligence users can access the CI reports whenever it is convenient for them, provided that the requested reports are available at that point in time.

2 Implications for the development of a custom CI software system

The CI software system should be developed using a multi-tier client/server architecture, since this allows the development of "thin" client applications that require less maintenance. The CI system could use three tiers:

- The presentation layer, or client-tier, would perform information presentation functions to end-users, as well as user-interaction functions, and it should be in the form of a graphical user interface (GUI)
- The data layer or data tier houses the database
- Sandwiched between these two layers would be an application layer, or middle-tier, that handles all the business logic of the CI system. The middle-tier is also referred to as the application server

This configuration allows for smaller software applications to run on the client-tier computers (called thin clients), which means that any changes in the business logic of the software will only have to be implemented in one central place, i.e. in the middle tier.

Since the CI software system should most likely be deployed on the company's Intranet, and Intranet applications are served via an Internet browser application, it would make most sense to design the client-tier application to run within an Internet browser application, such as Microsoft's Internet Explorer or Netscape's browser. There are several advantages to following this route:

- True thin client applications will be delivered, since no software for the CI system will have to be installed on the individual client-tier computers, due to the fact that the browser application will download the required CI software from the application server on the middle-tier when needed.
- The computers in the client-tier can even be widely distributed and the CI software will still be delivered via the Internet browser application. Since the company's Intranet makes use of the same data transmission protocols as the Internet, the client computers can be situated in other countries and still access the company's CI system by making use of the company's Extranet or the Internet.

Two main types of software development platforms are available to develop a software system conforming to the above-mentioned specifications, namely Microsoft's .NET (pronounced "dot-net") platform and the Java platform developed by Sun Microsystems. Both are highly integrated with the Internet technology and both would therefore be ideal candidates to be used for the development of the CI software. However, the Java technology may be more appropriate for the following reasons:

- Java is designed to deliver software applications that can run on any computer hardware and/or operating system, whilst the Microsoft .NET framework can only deliver software that run on computers that use Microsoft operating systems. Certain technologies used in client-tier software that run in an Internet browser also allow the software to only run on computers with Microsoft operating systems.
- Software development with Java can make use of open-source or "freeware" software development tools. Software development with Microsoft's .NET framework can only make use of Microsoft software development tools, which is more expensive than using open source tools. Java can also make use of open-source application servers and even use open-source database management systems. Java can also run on

the open-source operating system Linux, a variant of Unix, which is gaining in popularity.

A further possibility for the development of the CI software is that it could be developed in-house by a company requiring such software, or by a software house. The in-house development would be more specialised, based on the company's specific needs, and will for example, have less generic CI products and less analytical components available. The development by a software house would be more generic to cater for the needs of various companies, and would also tend to be more of an "off-the-shelf" or "shrink-wrapped" product, although this CI software product may also be combined with additional CI consulting work, as well as training, when deploying it at a company's site.

3 Developing a performance measurement model for the CI design

Since it was established in the literature study that the measurement of a CI department's performance is a major headache for many companies, a solution to this problem is provided in this study. As was mentioned in chapter two, one method of measuring the performance of the execution of corporate strategy is by means of the Balanced Scorecard technique. Since the CI department should have its own strategy that can be measured, the Balanced Scorecard technique can also be applied to this department. The Balanced Scorecard can be applied to measuring CI's performance as follows:

Balanced Scorecard Perspective	Approaches to Measuring CI Performance
Financial	The profits generated directly by the CI department cannot be measured, but the costs incurred by this department can be measured. As shown previously, the ROI in CI can be measured for specific projects (tactical CI), since the actual costs of the CI project is known, and the revenues that were generated by the decision based on the insights supplied by the CI is also known. Total costs incurred by the CI department should always be offset by the number and magnitude of requests for CI from decision-makers.

Balanced Scorecard Perspectives	Approaches to Measuring CI Performance
	However, since it is generally accepted that CI (strategic CI) will lead to an improved competitive position for the firm, several measures can be taken in this regard. Since the insights from CI should therefore lead to increased sales, it should also lead to an increase in profits, since these insights from CI will enable the company to improve its internal processes. It can be argued that other factors could have lead to the improved financial situation for the company, such as major advertising promotions, or the introduction of a total quality management programme, but then again, these projects could have been undertaken due to the insights generated by the CI department. Therefore, any improvement in the company's financial situation should be weighed against the decision-makers' assessment of the CI function in terms of quality of intelligence, timeliness of intelligence, and the fulfilment of CI objectives (this could be measured in the Customer perspective.)
Customer	Since the CI department's customer is the intelligence user (decision-maker), the overall customer satisfaction should be measured in terms of quality of intelligence, timeliness of intelligence, and the fulfilment of CI objectives. A Customer Satisfaction Index could be developed from all these measurements, and this index could be tracked to monitor that it does not decrease.
Internal Business Processes	These refer to all the internal processes executed by the CI department, i.e. all the processes that form part of the CI cycle. Generally, each phase of the CI cycle will involve different processes and each would require a different set of measurements to gauge the effectiveness of these processes.
Learning and Growth	A Staff Satisfaction Index could be created to assess the climate that exists in the CI department. The skill, competency, and educational levels of the staff in this department can be monitored, and a skills gap could also be measured.

Table 10: A CI performance measurement model

CHAPTER 6 : CONCLUSIONS AND RECOMMENDATIONS

1 Evaluation of the literature study results

The results of the literature study will be compared to each of the research objectives linked to this study to determine whether the stipulations of each of these objectives have been met.

Research objective 2a: To determine whether a structured CI programme can play a role in and add value to a company's strategic planning process.

It has been determined from the literature that not only does a structured CI programme play an integrated role in a company's strategic planning process, but it can also add considerable value to this process by guiding, to a certain extent, the formulation of strategy, thereby satisfying the stipulations of research goal 2a.

Research objective 2b: To determine the composition of the CI process.

The literature revealed that the CI process consists of a similar number of steps that follow a particular sequence, which is also referred to as the CI cycle. It has been established from the literature that typical steps in the CI cycle are: Planning and Direction, Collection, Processing, Analysis and Production, and Dissemination. It has, furthermore, been established that not one of the steps of the CI cycle should be bypassed. All of the components of the CI cycle are required, since they form a value-added sequence of events and processes.

Herewith, the stipulation of research goal 2b has been satisfied.

Research objective 2c: To determine the role of Information Technology in a structured CI programme.

The literature study pointed out that effective CI cannot be practised without integrating CI into the company's IT systems, and therefore, IT plays an essential role in CI. The different types of IT infrastructure and software that may play a role in effective CI have also been discussed. With this, the stipulation of research goal 2c has been satisfied.

Research objective 2d: To establish the relationships between CI and Knowledge Management, Organisation Learning, Business Intelligence, Technology Management, and Strategic Benchmarking.

The literature uncovered that organisation learning (OL) and knowledge management (KM) are two interrelated change processes that are used to help organisations develop and use knowledge to change and improve themselves continually. OL improves a company's capability to acquire and develop new knowledge and KM concentrates on how to organise this new knowledge in order to improve a company's performance.

According to the literature, the lines of differentiation between CI and KM (including OL) turn out to be very blurred. An inevitable convergence is shaping between these two disciplines, and therefore, CI functions can be made an integral part of any effective KM programme. It was furthermore established that the dissemination phase of the CI cycle is where CI plugs best into KM.

However, there are differences between CI and KM that have to be taken into consideration. CI's user base may be much smaller than that of KM, whereas KM focuses on everyone in the company. Furthermore, as pointed out by the literature, KM's scope of knowledge includes all internal knowledge in the company that would improve the company's performance, while CI's focus is on external events and trends, with a strong focus on competitors' activities and likely intentions.

With regards to business intelligence (BI), the literature showed that BI is a collective term for data analysis, reporting, and querying tools that provide meaningful information to decision-makers. Since BI tools are more appropriate for analysing information, it follows that CI could make best use of BI analysis tools during the analysis and production phase of the CI cycle.

From the description of BI in the literature, it becomes clear that certain parallels can be drawn between BI and CI:

- The BI process cycle of capturing, analysing, deciding, and acting is very similar to the CI process cycle (planning and direction, collection, processing, analysis and production, and dissemination.)
- BI and CI both strive to provide meaningful information for decision-makers to improve a company's competitive performance.

However, BI is a broader term than CI, and it encompasses many forms of business and technical information. Therefore, CI can be seen as a component of BI. Any company with a BI function should thus integrate CI into this function, to prevent duplication of processes and resources.

According to the literature, the conducting of Competitive Technical Intelligence (CTI) in a highly technical service or industry is imperative for a company to stay competitive by having the best intelligence available for decision-making. It was also suggested that companies in these industries should monitor changes in the technology arena that can have an impact on the company's performance, both positively and negatively. Therefore, a technology "early warning radar" should be used to recognise and react to possible opportunities as well as threats in the technological environment as soon as these occur.

The literature, furthermore, pointed out that CTI can provide valuable information to companies on either side of the technology transfer equation, leading to more complete and rapid evaluations of technological options, better decisions, and a more successful transfer of technology.

The literature also highlighted the fact that the CTI process cycle and the CI cycle are one and the same thing. Only the needs and requirements would differ, and therefore the analysis and presentation to decision-makers may also be different.

It was also established that CTI could be seen as a parallel process with CI, since both are components of BI, and they share many of the same processes. However, any company which already has a CI process in place, will be able to create a CTI process with less difficulty than attempting to start from scratch, since most of the CI process and resources can be shared between CI and CTI.

With regards to strategic benchmarking, the literature showed that competitive benchmarking compares a company to its direct competitors by considering specific process designs, process capabilities, or administrative methods. It was also established that unless a company has a well-developed knowledge of CI methods and techniques, it would not be able to gain the most value out of its benchmarking programme. The literature also pointed out how CI could assist in each of the five steps in the benchmarking process.

The literature study, therefore, has indicated that CI can be used to enhance the strategic benchmarking process, and that some aspects of quality benchmarking are actually impossible without employing CI.

With this, the stipulation of research goal 2d has been satisfied.

Research objective 2e: To determine the type of intelligence products that should be delivered to the typical users of a structured CI programme.

According to the literature, the CI department can describe its intelligence offerings to its clients, the intelligence users in the company, in terms of a CI "product line." This CI product line is useful for communicating the capabilities of the CI function to the intelligence users by exemplifying the variety of intelligence products that are available to the intelligence users.

A generic CI product line of ten products was highlighted by the literature, namely current intelligence, basic market intelligence, technical intelligence, early warning intelligence, estimated intelligence, work group intelligence, targeted intelligence, crisis intelligence, foreign intelligence, and counterintelligence. These CI products are significantly unique in terms of their generation and applicability.

With this, the stipulation of research goal 2e has been satisfied.

Research objective 1c: To determine whether the value and return on investment of a structured CI programme can be measured.

In the literature study, four different approaches of measuring the value and ROI of a structured CI programme were considered, namely Kilmetz and Bridge's Three-Step Analysis

to Gauge the ROI in CI, Davison's CI Measurement Model (CIMM) to Measure CI Effectiveness, Langabeer's CI Value Equation, and Rosenkrans' Past, Present and Future Directions in Measuring CI Value.

All four of these approaches have their respective advantages and disadvantages, but not one of them is quite able to capture the value of the CI department as a whole. Kilmetz and Bridge's approach, as well as Davison's approach are limited to specific projects that require specific intelligence to be gathered for decision-makers to select the scenario with the highest possible return. Over the course of a specific financial reporting period, both of these approaches do not calculate an overall ROI for the CI department as a whole, or the CI department's contribution to company profit.

Langabeer's approach measures CI value by means of questionnaires provided to the decision-makers, and it does not provide any financial measurements. Rosenkrans Jr's view of the present direction of CI measurement refers to performance measurement, but very little information is provided by Rosenkrans Jr in this regard

However, according to the literature, the measurement of the successfulness of the CI department is a considerable problem; not only in terms of what to measure, but also how to measure it. Therefore, research objective 1d would attempt to provide a more practical approach to performance measurement of a CI department.

Herewith, the stipulation of research goal 1c has been satisfied.

Research objective 1d: To develop an appropriate performance measurement model for a structured CI programme.

Since it was established in the literature study that the measurement of a CI department's performance is a major headache for many companies, a solution to this problem was provided in chapter five of this study. The literature study indicated that one method of measuring the performance of the execution of corporate strategy is by means of the Balanced Scorecard technique. Since the CI department should have its own strategy that can be measured, the reasoning was that the Balanced Scorecard technique could also be applied to the CI department.

The Balanced Scorecard was used to develop a Performance Measurement Model for the design of the CI Methodology Framework by applying the four perspectives of the Balanced Scorecard, namely financial, customer, internal business processes, and learning and growth, to the unique performance measurement needs of the CI department.

With this, the stipulation of research goal 1d has been satisfied.

Research objective 1e: To establish what methodology framework should be used for a structured CI programme to be of value to a company and to design such a framework that could serve as a high-level design for the development of a custom CI software package.

A CI methodology framework design, employing the five phases of the CI process cycle as a basis, is presented in chapter five. This design utilises modular components where possible, so that the system could be less expensive for smaller companies that do not own expensive third-party components such as knowledge management systems or business intelligence tools. The implications that this design would have for a software system based upon it, is also discussed in chapter five.

Herewith, the stipulation of research goal 1e has been satisfied.

Research objective 1f: To establish how a structured CI programme should be implemented in a company.

The literature study provided an extensive list of important points to be considered for the establishment of a CI system in a company, as well as a comprehensive list of pitfalls to the implementation of CI in a company. Also pointed out by the literature is the fact that for the implementation of CI in a company to be successful, it has to go hand-in-hand with a culture transformation within the company. The literature also highlighted the fact that a successful CI software system could not be implemented in a company if the correct processes have not been established first.

It was also established from the literature that Kotter's eight-stage process for transformational change in organisations could equally be applied to the implementation of a CI programme. Furthermore, the literature pointed out that resistance to change is a barrier to the implementation of transformational projects, which would equally apply to the

implementation of CI in a company. The literature also indicated three steps that could be followed to reduce resistance to change.

Herewith, the stipulation of research goal 1f has been satisfied.

2 Evaluation of the empirical study

In order to meet the requirements of primary research goals 1a and 1b, two correlation coefficients were used to determine the outcomes the following hypotheses:

- There is a high correlation between a highly formalised CI programme and high levels of growth in competitive performance.
- There is a high correlation between a highly formalised CI programme and high levels of growth in shareholder value creation.

The results of the empirical study will also be compared to each of the research objectives linked to this study to determine whether the stipulations of each of these objectives have been met.

Research objective 1a: To determine whether a structured CI programme will be able to improve a company's strategic competitive advantage.

It was determined from the empirical study that the coefficient of correlation between the accounting index and the CI index indicated a weak positive relationship between the two variables. This value, together with the slope of the trend line, however, suggested that the conclusion could be made that there is a high correlation between a highly formalised CI programme and high levels of growth in competitive performance.

This therefore means that there is a significant correlation between the effective functioning of a CI programme and a company's strategic performance. Herewith, the stipulation for research goal 1a is satisfied.

Research objective 1b: To determine whether a structured CI programme will be able to create value for the company's shareholders.

The coefficient of correlation between the EVA index and the CI index was close to 0, which leads to the conclusion that there is no correlation between the EVA index and the CI index. It could be concluded that for this empirical study, there was no proof that a structured CI programme would be able to create value for a company's shareholders. The finding of this empirical study is therefore that there is a no correlation between a highly formalised CI programme and high levels of growth in shareholder value creation.

This therefore means that the second hypothesis is rejected and the stipulation for research goal 1b is also therefore also satisfied.

3 Conclusions

The finding of this empirical study that a structured CI programme will be able to improve a company's strategic competitive advantage correlates with other such studies that have been made, as determined from the literature. However, the value of the coefficient of correlation between the accounting index and the CI index did not reflect a very strong relationship between these two variables. This could be attributed to a number of factors, such as the general economic conditions that have prevailed in the world in recent years, as well as the effect that the tragic events of 11 September 2001 had on the US economy.

It is a well-known fact that the US economy, as well as the economies of most countries of the world has been in a recession in the past number of years. Technology companies, especially IT companies and telecommunications companies, have been severely affected by the slump in the economy. Since many of the companies that responded to the survey are from these industries, it could be understood that the financial performance of these companies have been under tremendous pressure in recent years.

When terrorists hit the World Trade Centre in New York in September 2001, an immediate effect could be seen on the US economy, as well as most economies of the Western world. It took companies a long time to recover from this disastrous event. Since the financial

performance of the companies in the empirical study has been measured from 1999 to 2002, this event definitely had an effect on these figures used in the study.

However, the fact that no correlation could be found between a structured CI programme and value creation for a company's shareholders, is a more difficult matter to explain. Surely, the same economic reasons for a low financial performance would also apply to shareholder value creation (EVA), but then there should have at least been a correlation between the accounting index and the EVA index, which there was not. In fact, no correlation could be found between these two variables.

It must be stressed however, that in very few of the cases, a negative EVA value was measured, meaning that these companies did create some type of shareholder value, although there was usually not any sustainable growth in such value over time. The EVA figures for each company tended to vary independently with accounting figures for each of the financial periods under scrutiny.

Nonetheless, this study also presented a design for a methodology framework, as well as a CI performance measurement model that would aid a company to establish a successful CI programme and a obtain or develop a CI software system to assist it in improving its competitive performance.

4 Recommendations for further study

A similar empirical study could be performed for a larger sample of companies, especially in a time period of improved economic conditions. An empirical study could also be performed to establish to what extent companies are serious about creating shareholder value, and what measures they employ to do this.

Another such study could also be performed for South African companies, but then personal interviews will have to be conducted with managers responsible for CI in the respective companies, since the response rate for this type of study is so low amongst South African companies.

ANNEXURE A: LIST OF COMPANIES USED IN THE EMPIRICAL STUDY

List of industries used in the survey

1. Business Services
2. Communications Equipment
3. Computer Storage Devices
4. Construction & Agricultural Machinery
5. Consumer Financial Services
6. Major Drugs
7. Office Equipment
8. Photography
9. Semiconductors
10. Software & Programming

List of companies used in the survey

No.	Company	Sector	Industry	Market cap ($ million)
1	Abbott Laboratories	Healthcare	Major Drugs	67 910
2	Adecco SA (ADR)	Services	Business Services	10 100
3	Adobe Systems Inc.	Technology	Software & Programming	9 650
4	Advent Software, Inc.	Technology	Software & Programming	585
5	Aeroflex Incorporated	Technology	Semiconductors	551
6	Agere Systems, Inc.	Technology	Semiconductors	5 450
7	Alcatel (ADR)	Technology	Communications Equipment	16 250
8	Altiris, Inc.	Technology	Software & Programming	531
9	American Express Company	Financial	Consumer Financial Services	60 560
10	American Home Mortgage	Financial	Consumer Financial Services	315
11	AmeriCredit Corp.	Financial	Consumer Financial Services	1 850
12	Analog Devices, Inc.	Technology	Semiconductors	15 140
13	Andrew Corporation	Technology	Communications Equipment	2 120
14	ARAMARK Corporation	Services	Business Services	4 800
15	ARM Holdings plc (ADR)	Technology	Semiconductors	1 840
16	ASAT Holdings Limited	Technology	Semiconductors	301
17	Ask Jeeves, Inc.	Services	Business Services	963
18	ASML Holding N.V. (ADR)	Technology	Semiconductors	7 230

No.	Company	Sector	Industry	Market Cap ($ million)
19	Aspect Communications	Technology	Software & Programming	468
20	ATMI, Inc.	Technology	Semiconductors	851
21	AudioCodes Ltd.	Technology	Communications Equipment	314
22	Axcelis Technologies, Inc.	Technology	Semiconductors	944
23	Bayer AG (ADR)	Healthcare	Major Drugs	17 210
24	BEA Systems, Inc.	Technology	Software & Programming	5 620
25	BMC Software, Inc.	Technology	Software & Programming	3 410
26	Bristol-Myers Squibb Co.	Healthcare	Major Drugs	52 830
27	Carlisle Holdings Ltd.	Services	Business Services	384
28	Caterpillar Inc.	Capital Goods	Constr. & Agric. Machinery	24 560
29	CDI Corp.	Services	Business Services	537
30	Centillium Communications	Technology	Communications Equipment	315
31	Certegy Inc.	Services	Business Services	2 180
32	ChipPAC, Inc.	Technology	Semiconductors	638
33	CIT Group Inc.	Financial	Consumer Financial Services	6 330
34	Cognos Incorporated	Technology	Software & Programming	2 960
35	CompuCredit Corporation	Financial	Consumer Financial Services	881
36	Comverse Technology, Inc.	Technology	Communications Equipment	2 980
37	Concord Camera Corp.	Consumer Cyclical	Photography	341
38	Corning Incorporated	Technology	Communications Equipment	12 620
39	Credit Acceptance Corp.	Financial	Consumer Financial Services	523
40	Cross Country Healthcare	Services	Business Services	496
41	CSG Systems International	Services	Business Services	837
42	Deere & Company	Capital Goods	Constr. & Agric. Machinery	13 360
43	Digimarc Corporation	Technology	Software & Programming	306
44	Digital River, Inc.	Technology	Software & Programming	926
45	Digitas Inc.	Services	Business Services	426
46	Dun & Bradstreet Corp.	Services	Business Services	3 180
47	Eastman Kodak Company	Consumer Cyclical	Photography	7 970
48	Echelon Corporation	Technology	Software & Programming	549
49	eCollege.com	Technology	Software & Programming	315
50	Electronic Arts Inc.	Technology	Software & Programming	13 970
51	Enterasys Networks, Inc.	Technology	Communications Equipment	1 250
52	Entrust, Inc.	Technology	Software & Programming	313
53	Exult, Inc.	Services	Business Services	1 010
54	Financial Federal Corp.	Financial	Consumer Financial Services	606
55	Finisar Corporation	Technology	Communications Equipment	566
56	First Advantage Corp.	Services	Business Services	340
57	Flextronics International	Technology	Semiconductors	8 020
58	Forrester Research, Inc.	Services	Business Services	344
59	Foundry Networks, Inc.	Technology	Communications Equipment	2 980
60	Fuji Photo Film Co., Ltd.	Consumer Cyclical	Photography	15 360
61	Gartner, Inc.	Services	Business Services	956
62	Gemplus International S.A.	Technology	Semiconductors	1 150
63	Getty Images, Inc.	Services	Business Services	2 160
64	Gevity HR, Inc.	Services	Business Services	331
65	GlaxoSmithKline plc (ADR)	Healthcare	Major Drugs	126 180
66	Global Imaging Systems, Inc.	Technology	Office Equipment	518
67	GlobeSpanVirata, Inc.	Technology	Semiconductors	1 150
68	Hugoton RoyaltyTrust	Financial	Consumer Financial Services	748
69	Hummingbird Ltd.	Technology	Software & Programming	371

70	Hutchinson Technology	Technology	Computer Storage Devices	947
71	Hyperion Solutions Corp.	Technology	Software & Programming	1 170
72	IKON Office Solutions, Inc.	Technology	Office Equipment	1 080
73	Inet Technologies	Technology	Communications Equipment	532
74	Infineon Technologies AG	Technology	Semiconductors	10 670
75	Integrated Circuit System	Technology	Semiconductors	2 430
76	Intel Corporation	Technology	Semiconductors	189 900
77	Intersil Corporation	Technology	Semiconductors	3 840
78	Interwoven, Inc.	Technology	Software & Programming	339
79	Intuit Inc.	Technology	Software & Programming	10 050
80	Iomega Corporation	Technology	Computer Storage Devices	604
81	JLG Industries, Inc.	Capital Goods	Constr. & Agric. Machinery	497
82	Johnson & Johnson	Healthcare	Major Drugs	149 320
83	Juniper Networks, Inc.	Technology	Communications Equipment	6 290
84	Kronos, Inc.	Technology	Software & Programming	1 130
85	Kulicke and Soffa Inds.	Technology	Semiconductors	615
86	L-3 Communications Hldgs.	Technology	Communications Equipment	4 600
87	Lam Research Corporation	Technology	Semiconductors	3 170
88	Lattice Semiconductor	Technology	Semiconductors	932
89	Linear Technology Corp.	Technology	Semiconductors	12 220
90	Manitowoc Company, Inc.	Capital Goods	Constr. & Agric. Machinery	635
91	Maxim Integrated Products	Technology	Semiconductors	14 070
92	MAXIMUS, Inc.	Services	Business Services	792
93	Micromuse, Inc.	Technology	Software & Programming	754
94	Microsemi Corporation	Technology	Semiconductors	522
95	MicroStrategy Inc.	Technology	Software & Programming	780
96	MKS Instruments, Inc.	Technology	Semiconductors	1 290
97	Moody's Corporation	Services	Business Services	8 080
98	Motorola, Inc.	Technology	Communications Equipment	25 810
99	MPS Group, Inc.	Services	Business Services	1 010
100	MTC Technologies, Inc.	Services	Business Services	331
101	Mykrolis Corporation	Technology	Semiconductors	551
102	National Semiconductor Co.	Technology	Semiconductors	6 600
103	Navigant Consulting, Inc.	Services	Business Services	631
104	NDCHealth Corporation	Services	Business Services	801
105	NetGear, Inc.	Technology	Communications Equipment	487
106	NetRatings, Inc.	Services	Business Services	339
107	NetScreen Technologies	Technology	Communications Equipment	2 000
108	New Century Financial	Financial	Consumer Financial Services	981
109	Novartis AG (ADR)	Healthcare	Major Drugs	99 540
110	Novellus Systems, Inc.	Technology	Semiconductors	5 840
111	Open Text Corporation	Technology	Software & Programming	690
112	Oracle Corporation	Technology	Software & Programming	63 350
113	Parametric Technology	Technology	Software & Programming	1 060
114	Paychex, Inc.	Services	Business Services	13 190
115	PeopleSoft, Inc.	Technology	Software & Programming	8 010
116	Pfizer Inc.	Healthcare	Major Drugs	244 880
117	Photon Dynamics, Inc.	Technology	Semiconductors	521
118	Photronics, Inc.	Technology	Semiconductors	794
119	Pitney Bowes Inc.	Technology	Office Equipment	9 230
120	Polycom, Inc.	Technology	Communications Equipment	1 690

121	QLogic Corporation	Technology	Semiconductors	4 820
122	Quest Software, Inc.	Technology	Software & Programming	1 140
123	RealNetworks, Inc.	Technology	Software & Programming	1 190
124	Redwood Trust, Inc.	Financial	Consumer Financial Services	762
125	Reuters Group PLC (ADR)	Services	Business Services	5 600
126	RF Micro Devices, Inc.	Technology	Semiconductors	1 850
127	Ricoh Company Ltd. (ADR)	Technology	Office Equipment	13 630
128	Ritchie Bros. Auctioneers	Services	Business Services	728
129	Rofin-Sinar Technologies	Capital Goods	Constr. & Agric. Machinery	306
130	Rollins, Inc.	Services	Business Services	811
131	SafeNet, Inc.	Technology	Communications Equipment	524
132	Saxon Capital, Inc.	Financial	Consumer Financial Services	515
133	Scientific-Atlanta, Inc.	Technology	Communications Equipment	5 090
134	Semtech Corporation	Technology	Semiconductors	1 430
135	SRA International, Inc.	Technology	Software & Programming	971
136	Storage Technology Corp.	Technology	Computer Storage Devices	2 940
137	Stratex Networks, Inc.	Technology	Communications Equipment	363
138	Synopsys, Inc.	Technology	Software & Programming	5 330
139	Tetra Tech, Inc.	Services	Business Services	1 150
140	Texas Instruments Inc.	Technology	Semiconductors	41 840
141	Tibco Software, Inc.	Technology	Software & Programming	1 250
142	Trend Micro Incorporated	Technology	Software & Programming	2 910
143	Ultratech, Inc.	Technology	Semiconductors	700
144	Verint Systems Inc.	Technology	Software & Programming	609
145	Verity, Inc.	Technology	Software & Programming	519
146	Watson Wyatt & Company	Services	Business Services	771
147	West Corporation	Services	Business Services	1 720
148	WFS Financial Inc.	Financial	Consumer Financial Services	1 640
149	Xerox Corporation	Technology	Office Equipment	8 420
150	Zarlink Semiconductor Inc.	Technology	Semiconductors	650

ANNEXURE B: CI STRUCTURING INDEX QUESTIONNAIRE

Questionnaire structure and coding:

Please select the most appropriate answer to each of the following questions:

No.	Question	Answer Choices	Rating	Max Score
1	Is there is a formal CI department/function/group/unit in your company?	Yes	10	10
		No	0	
		CI is integrated throughout the company	1	
2	Is there is a formal CI process/framework used in your company?	Yes	10	10
		No	0	
3	Does your company only collect information about competitors and the market on an informal basis?	Yes	1	5
		No (Does not collect any such information)	0	
		No (CI is a formal process)	5	
4	Is some of the CI work in you company outsourced?	All the work is outsourced	1	5
		Part of the the work is outsourced	2	
		None (CI is performed in-house)	5	
		No formal CI is collected	0	
5	For what length of time has the CI function/department/group/unit in your company been in existence?	Does not exist	0	20
		Less than 1 year	1	
		1 - 2 years	2	
		3 - 4 years	5	
		5 - 10 years	10	
		More than 10 years	20	
6	What is the size of the budget allocated to CI as a percentage of the total budget of the company?	0%	0	5
		0.1 - 0.5%	1	
		0.6 - 1%	2	
		1.1 - 2%	3	
		2.1 - 5%	4	
		More than 5%	5	
7	Does your CI function/department/group/unit have a full-time or part-time Manager?	Full-time	5	5
		Part-Time	1	
		No Manager	0	
8	What is the number of employees in your CI function/department/group/unit (excluding the CI manager)?	*Number of full-time employees:*		10
		0	0	
		1	2	
		2 - 3	3	
		4 - 5	4	
		5 - 10	5	
		More than 10	8	
		Number of part-time employees:		
		0	0	
		1 - 5	1	
		More than 5	2	
9	Which level of management does the CI manager belong to?	Board/Exco level	10	10
		Functional unit management level	5	

		Department management level	2	
		Project/Group/Team leader level	1	
		Other	0	

Please select the most appropriate choice for each of the following statements:

No.	Statement	Answer Choices	Rating	Max Score
1	Top management in our company provides excellent support for CI	Strongly agree	10	10
		Agree	5	
		Neither agree nor disagree	2	
		Disagree	1	
		Strongly disagree	0	
2	Our company has a set of strong ethical and legal guidelines for practicing CI	Strongly agree	10	10
		Agree	5	
		Neither agree nor disagree	2	
		Disagree	1	
		Strongly disagree	0	
3	Our CI function/department/group/unit has a defined set of regular intelligence products	Strongly agree	10	10
		Agree	5	
		Neither agree nor disagree	2	
		Disagree	1	
		Strongly disagree	0	
4	There is a strong linkage between the strategic planning process and the CI requirements in our company	Strongly agree	10	10
		Agree	5	
		Neither agree nor disagree	2	
		Disagree	1	
		Strongly disagree	0	
5	The performance of our CI function/department/group/unit is measured on a regular basis	Strongly agree	10	10
		Agree	5	
		Neither agree nor disagree	2	
		Disagree	1	
		Strongly disagree	0	
			Maximum possible score:	**130**

Covering letter on the website (http://hanju.netfirms.com):

Competitive Intelligence (CI) Questionnaire

T.I.J. Kruger (iank@worldonline.co.za)

This questionnaire is used to collect data for the empirical research I am performing as part of the mini-dissertation of my MBA studies at the Potchefstroom Business School (Potchefstroom University) in South Africa.

The aim of this questionnaire is to determine the degree of formalized structuring of the CI program in place at a specific company. These values will be determined for a number of companies and it will be paired with values of financial growth performance for each of the respective companies to determine whether a strong correlation exists between a highly formalized CI program and good financial performance, as well as growth in shareholder value creation.

Please note that your company's information will be kept confidential, and in no way will it be possible to infer your company's CI structuring index from the results presented in the study.

Please complete the questionnaire by clicking on the most appropriate choice in each case, and finally by clicking on the Submit button at the end of the questionnaire.

I thank you for your time and effort to complete this questionnaire.

ANNEXURE C: METHODOLOGY USED FOR DETERMINING THE ACCOUNTING INDEX

The accounting index is made up of the sum of two indices, the positive value index, and the amount of growth index. The positive value index is allocated to each year as a value of 1 if the accounting value for that year is larger than 0, and –1 if the accounting value is 0 or less than 0. The total positive value index is the sum of the values for each of the four years.

The amount of growth index is determined from the lookup table presented below for each of the three years involved, depending on the amount of accounting value growth achieved for the particular year. The total amount of growth index is the sum of all three of the values.

The total accounting index for a particular accounting indicator is calculated as the sum of the positive value index and the amount of growth index. Three accounting indicators are being used, namely sales, profit margin and EPS. The total accounting index for a company is the sum of the respective accounting indices for these three accounting indicators.

Accounting indicator Growth	Index Value
< -1000%	-12
-1000% to -750%	-11
-750% to -500%	-10
-500% to -250%	-8
-250% to -200%	-7
-200% to -150%	-6
-150% to -100%	-5
-100% to -50%	-4
-50% to -25%	-3
-25% to -10%	-2
-10% to 0%	-1
0% to 10%	1
10% to 25%	2
25% to 50%	3
50% to 75%	4
75% to 100%	5
100% to 150%	6
150% to 200%	7
200% to 250%	8

Accounting indicator Growth	Index Value
250% to 500%	9
500% to 750%	10
750% to 1000%	11
> 1000%	12

Lookup table to determine the amount of growth index

The following table shows an example of how the accounting index was determined for a particular company.

	2002	2001	2000	1999	Total
Sales	$129	$180	$168	$118	
Positive value index	1	1	1	1	4
Sales Growth	-28.21%	7.39%	41.64%		
Amount of growth index	-3	1	3		1
				Total Sales Index	

	2002	2001	2000	1999	Total
Profit Margin	-4.02%	-6.55%	11.69%	6.50%	
Positive value index	-1	-1	1	1	0
PM Growth	38.62%	-156.06%	79.71%		
Amount of growth index	3	-6	5		2
				Total Profit Margin Index	

	2002	2001	2000	1999	Total
EPS	-$0.191	-$0.453	$0.891	$0.351	
Positive value index	-1	-1	1	1	0
EPS Growth	57.84%	-150.84%	153.85%		
Amount of growth index	4	-6	7		5
				Total EPS Index	

Total Accounting Index = sum of Sales, Profit Margin, and EPS indices:

Total Accounting Index

ANNEXURE D: METHODOLOGY USED FOR DETERMINING THE EVA INDEX

The EVA index is made up of the sum of two indices, the positive value index, and the amount of growth index. The positive value index is allocated to each year as a value of 1 if the EVA value for that year is larger than 0, and –1 if the EVA value is 0 or less than 0. The total positive value index is the sum of the values for each of the four years.

The amount of growth index is determined from the lookup table presented below for each of the three years involved, depending on the amount of EVA growth achieved for the particular year. The total amount of growth index is the sum of all three of the values.

The total EVA index is calculated as the sum of the positive value index and the amount of growth index.

EVA Growth	Index Value
< -1000%	-12
-1000% to -750%	-11
-750% to -500%	-10
-500% to -250%	-8
-250% to -200%	-7
-200% to -150%	-6
-150% to -100%	-5
-100% to -50%	-4
-50% to -25%	-3
-25% to -10%	-2
-10% to 0%	-1
0% to 10%	1
10% to 25%	2
25% to 50%	3
50% to 75%	4
75% to 100%	5
100% to 150%	6
150% to 200%	7
200% to 250%	8
250% to 500%	9

EVA Growth	Index Value
500% to 750%	10
750% to 1000%	11
> 1000%	12

Lookup table to determine the amount of growth index

The following table shows an example of how the EVA index was determined for a particular company.

	2002	2001	2000	1999	Total
EVA	$78	$34	$63	$13	
Positive value index	1	1	1	1	4
EVA Growth	127.49%	-45.75%	367.80%		
Amount of growth index	6	-3	9		12
				Total EVA Index	[redacted]

ANNEXURE E: INTEREST RATES USED IN THE CALCULATION OF WACC

The interest rate of debt was obtained from the current coupon rate of a 10-year US treasury note. The rate used in the calculations for this study was 4.25%.

The average annual rate of the US 10-year T-bond was used to specify the risk for each of the four years of the research. The following risk-free rates were used in this study:

1999	5.69%
2000	5.96%
2001	4.97%
2002	4.53%

ANNEXURE F: METHODOLOGY FOLLOWED IN THE CALCULATION OF EVA

EVA was used to obtain a measure of a company's shareholder value creation. EVA is calculated as the net operating profit after taxes (NOPAT) minus the after-tax cost of capital used to support operations. The after-tax cost of capital used to support operations is calculated as the operating capital multiplied by the weighted average cost of capital (WACC). WACC represents the required rate of return of investors (Brigham and Ehrhardt, 2002:48-49).

NOPAT can be defined as the profit a company would generate if it had no debt and held no financial assets (Brigham and Ehrhardt, 2002:45). NOPAT can be calculated by (Brigham and Ehrhardt, 2002:49):

$$NOPAT = EBIT(1 - Tax\ Rate)$$

The EVA equation is therefore represented by (Brigham and Ehrhardt, 2002:49):

$$EVA = EBIT(1 - Tax\ Rate) - (Operating\ Capital \times WACC)$$

EBIT was directly obtained from the income statement and the tax rate was calculated by dividing the amount of tax paid into EBT, the earnings before taxes (Brigham and Ehrhardt, 2002:37).

The total operating capital is the sum of net operating working capital and operating long-term assets (Brigham and Ehrhardt, 2002:44).

Net operating working capital refers to all current assets that do not pay interest minus all current liabilities that do not charge interest. This can also be stated as operating current assets minus operating current liabilities (Brigham and Ehrhardt, 2002:44).

The operating current assets consist of the sum of cash, accounts receivable, and inventories (stock), all obtained from the balance sheet. The operating current liabilities can

also be obtained from the balance sheet, and these include accounts payable and accruals (Brigham and Ehrhardt, 2002:44).

Operational assets or operating long-term assets are often referred to as fixed assets, or property, plant, and equipment on the balance sheet (Libby *et al.*, 1998:250).

Although it is possible to finance a company entirely with common equity (ordinary shares), most companies employ a combination of several types of capital, called capital components. The three most frequently used capital components are common (ordinary) shares, preferred (preference) shares, and debt. All capital components possess one common feature: the investors who provided the funds expect to receive a return on their investment (Brigham and Ehrhardt, 2002:420-421).

Due to the combination of capital components employed in most companies, and due to the differences in risk associated with each of these, each capital component will have a different required rate of return for its investors. The required rate of return on each capital component is called its component cost (Brigham and Ehrhardt, 2002:421).

The cost of capital used to analyse capital budgeting decisions should be a weighted average of the various components' costs. This weighted average is referred to as the weighted average cost of capital, or WACC (Brigham and Ehrhardt, 2002:421). The weights refer to the respective percentage of the required capital that each capital component comprises. The weightings used for WACC in this research were based on accounting values (Brigham and Ehrhardt, 2002:435) and were obtained by dividing the amount of component capital allocated on the balance sheet for each component into the total capital as obtained from the balance sheet.

The equation to calculate WACC is (Brigham and Ehrhardt, 2002:435):

$$WACC = w_d k_d (1 - T) + w_{ps} k_{ps} + w_{ce} k_s$$

where

w_d = the weight of debt

k_d = the component cost of debt

T = the tax rate

w_{ps} = the weight of preferred shares

k_{ps} = the component cost of

w_{ce} = the weight of common equity

k_s = the component cost of common equity

For simplicity's sake, any preference shares were added to the ordinary shares and the equation were changed as follows:

$$WACC = w_d k_d (1-T) + w_{ce} k_s$$

Since the amount of assets is equal to the sum of debt and equity, this equation could also be written as (Brigham and Ehrhardt, 2002:634):

$$WACC = \left(\frac{D}{A}\right) k_d (1-T) + \left(\frac{E}{A}\right) k_s$$

where

D = amount of debt

E = amount of equity

A = amount of assets

To calculate the cost of debt, it could simply be equal to the interest rate on the debt. However, since interest is tax-deductible, there will be a tax saving on the cost of debt. The after-tax component cost of debt can be determined by (Brigham and Ehrhardt, 2002:423):

$$\begin{aligned} After-tax\ component\ cost\ of\ debt &= Interest\ rate - Tax\ savings \\ &= k_d - k_d T \\ &= k_d (1-T) \end{aligned}$$

The tax rate was determined from the income statement of the company for each of the four years of the research. The interest rate of debt was obtained from the current coupon rate of a 10-year US treasury note (Brigham and Ehrhardt, 2002:422), and is indicated in Annexure E.

The component cost of equity was calculated by making use of the Capital Asset Pricing Model (CAPM), which is an important tool to analyse the relationships between risk and rates of return. There is always an element of risk involved when investing in a company, and as

Brigham and Ehrhardt (2002:202) argue, "no investment should be undertaken unless the expected rate of return is high enough to compensate the investor for the perceived risk of the investment."

Brigham and Ehrhardt (2002:219) state that the primary conclusion of the CAPM is that the relevant risk of an individual share is its contribution to the risk of a well-diversified portfolio of shares. The benchmark for a well-diversified share portfolio is the market portfolio, which is a portfolio of all shares on the market. The relevant risk of a share, also called the beta coefficient of the share, is defined under CAPM as the amount of risk that the share contributes to the market portfolio (Brigham and Ehrhardt, 2002:261).

For this research, an annual historical beta value was calculated from a company's shares for each of the following years: 1999, 2000, 2001 and 2002. This was performed by calculating a monthly average of closing share prices for the company. A similar calculation was performed for the total market, by using the composite index from the Nasdaq stock exchange. A return was calculated for the company's shares for each month by deducting the average monthly share price of the previous month from the average monthly share price of the current month and dividing this figure by the average share price of the current month. A similar calculation was performed to determine the monthly market return. Thereafter, the beta was determined from the regression analysis of the average monthly returns of the share and the average monthly returns of the market.

The relationship between the required return and risk is called the Security Market Line (SML), and by using the SML, the required rate of return of a share can be determined as follows (Brigham and Ehrhardt, 2002:230):

$$k_i = k_{RF} + (k_M - k_{RF})b_i$$
$$= k_{RF} + (RP_M)b_i$$

where

k_i = required return of share i

k_{RF} = risk-free rate

k_M = required return of the market

RP_M = market risk premium

b_i = share i's beta coefficient

The component cost of equity (k_s) is equal to the required return of the company's share (k_i), and therefore the equation to determine the cost of equity can be written as (Brigham and Ehrhardt, 2002:425):

$$k_s = k_{RF} + (RP_M)b_i$$

The risk-free rate can be equal to the rate of a long-term treasury bond, since this is deemed to be the closest indicator to a true theoretical risk-free asset (Brigham and Ehrhardt, 2002:426). The average annual rate of the US 10-year T-bond was used to specify the risk for each of the four years of the research, which is indicated in Annexure E.

The required return of the market was determined by the sum of the average monthly returns for each of the four years (1999 to 2002.)

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