

# Valuation of Intellectual Capital in South African Companies:

A comparative study of three valuation methods

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# CHAPTER ONE

## INTRODUCTION

### 1.1 The problem and its setting

The book value of any enterprise, whether it is constituted in the form of a company, close corporation, partnership, sole trader or other form of enterprise, comprises the total value of its assets less the total value of its liabilities. The term “value” has a wide range of possible interpretations. From an accounting perspective, value is interpreted in economic rather than philosophical terms, and assets and liabilities are interpreted in the same way. The need to place a value on the enterprise arises for various reasons, depending on the perspective of the user of the information. The potential users of financial statements and their particular needs are discussed in chapter 2 of this study. The financial statements and more particularly the annual financial statements, are drawn up in order to satisfy these needs as far as is possible within the limitations of value as expressed in monetary terms.

For the purposes of this study, reference is made to companies, although the underlying principles apply to other forms of the enterprise as well.

Corporate balance sheets, prepared using historical cost accounting methods, have in the past

reflected comprehensive detail regarding tangible assets and very little regarding intangible assets. Where intangible assets have been recorded, they have comprised mainly brand names, trademarks and other purchased intangible assets for which the company has been able to arrive at a carrying value with relative ease. In the majority of cases the carrying value is arrived at by simply using the purchase price of the asset or actual costs incurred in developing the asset and bringing it to its present state.

Another intangible asset which regularly appears on corporate balance sheets is goodwill. Goodwill arises when a purchasing company acquires a shareholding in another company at a value in excess of the attributable underlying net asset value of the company being acquired. Once again the carrying value of the intangible asset, goodwill, is simply recorded as the amount paid in excess of the underlying net asset value acquired. At present, international and South African statements of generally accepted accounting practice issued by the standard setting bodies do not permit the capitalisation of internally generated goodwill.

The underlying historical cost of the assets of an enterprise, less its liabilities, seldom gives a true measure of the value of the enterprise and more and more companies as well as the users of the financial statements are beginning to realise that an intangible asset, intellectual capital, exists within their structures. Intellectual capital which is defined below, is seen as



a combination of positive facets of an enterprise which, when operating together as a unit, produce synergies for the company which give it an advantage over its competitors. These synergies typically bring about an additional element of value in the enterprise, but as yet not all of this value is recorded as an asset on the enterprise's balance sheet. Some attempts have indeed been made to record the overall intellectual capital value of an enterprise. Certainly items such as patents and trade marks have been valued in the past and placed on the balance sheet as assets of the enterprise. These intangible assets are seen as contributors to the future success and profitability of the company and thereby add to its current value. A company which owns a patent over a unique product or service would certainly be viewed as being more valuable than a company in the same field which does not yet possess the necessary know-how or expertise to produce a product or service of equivalent quality.

Value is clearly then not only that which can be measured based on the presence of currently existing tangible and intangible assets but also includes the potential of future success and profitability of the company. In other words a company with lucrative future prospects would be viewed as a far more valuable investment prospect than one whose future profitability appears uncertain or unstable. Edvinson and Malone pose the following question regarding value: "What, then, should we value? What perspective shall we take? Certainly revenues, profits, and earnings cannot be ignored. They are the ultimate measure of a company's success" (Edvinson and Malone, 1997: 31). Taking the argument further, if value is

determined not only by assets but also future prospects then clearly a company's value is also dependent on astute management and a committed labour force which is able to harness the potential that exists in the tangible and intangible assets of the company and to convert that into future successes. Problems associated with the measurement of this value become more apparent as one moves away from the simple tangible assets contained within the enterprise.

Evidence of this additional element of value is however borne out through a company's share price which is often far above the underlying net asset value of the share. Edvinson and Malone in their book titled *Intellectual Capital* note that according to Morgan Stanley's World Index, the average value of companies on the world's stock exchanges is two times the underlying net asset value. They also note that in the United States, the market values of companies typically range from two to nine times the underlying net asset values of the companies (Edvinson and Malone, 1997). Morgan Stanley's World Index is a data base of indices calculated using financial data from companies operating all over the world. The Morgan Stanley indices are highly reputable and are extensively used by international investment corporations involved in financial and fund management.

Company shares are widely traded on what is commonly referred to as a stock exchange. A stock exchange is simply a market where the shares of companies can be traded between willing buyers and sellers. In South Africa the relevant stock exchange is known as the

Johannesburg Securities Exchange. The shares of all companies listed on the stock exchange are quoted at prices which are continually being updated as a result of share transactions taking place, the prices being established by the general principles of supply and demand for the shares of each company. Bearing this in mind it becomes clear that the price of a share is significantly influenced by the perception of investors in the market place. An increase in the demand for a share, coupled with limited availability will result in the share price being driven upwards. Likewise, a decrease in demand for a share coupled with a surplus of those shares being available for sale will cause the share price to fall.

The value which investors attribute to a share will be based on what they perceive the return on the investment to be in the future. The investor would expect this anticipated return to be realised in one or both of the following ways. Firstly, through dividend income from the company concerned and secondly through a potential profit being realised when the share is ultimately disposed of. In other words investors need to consider several factors regarding the investment they are considering making and, based on their evaluation, make a prediction as to the future prospects of the company. The investors' perceptions of a share could be influenced by several factors such as the company's product, its market share, the emergence or existence of competitors, its business model, the state of the local economy and even the state of the international economy. With due consideration of these factors and conditions, investors will attempt to make an informed decision as to the future success of the company

and this in turn will allow them to arrive at what they believe to be a fair value for the share. The market price of a share or indeed the market value of the company as a whole, driven by demand based on the investment decisions mentioned above, will in most cases then be very different to the underlying net book value of the share or the company. Where investors are prepared to pay more for a share than its underlying net asset value it is because they believe that the share carries an additional element of value over and above that recorded in the balance sheet. This additional element of value may be related to the intellectual capital value of the enterprise.

Studies conducted in the United States revealed that companies were trading at market values which represented, on average, four times their corresponding book values. Of greater interest though was the discovery that companies in the information technology sector were trading at market values which represented, on average, ten times their corresponding book values (Edvinson and Malone, 1997). This in particular illustrates the value of the existing synergies as perceived by investors in the market place.

This “additional” value is not only being recognised by investors, though, and Edvinson and Malone in their book on intellectual capital note that a survey conducted by the Institute of Management Accounting found that 64% of corporate controllers in the United States said that their companies were actively experimenting with new ways of measuring performance.

They continue by adding : “When nearly two-thirds of the companies in the world’s largest economy have accepted the need for change, we no longer have an interesting new trend, but a revolution” (Edvinson and Malone, 1997:6).

Much research is currently being conducted into the subject of intellectual capital, with questions being raised as to how the value of this asset can be harnessed, developed, managed and ultimately expressed in monetary terms for purposes of its inclusion as an asset in the enterprise’s balance sheet. Thomas Stewart wrote : “Intellectual capital is intellectual material - knowledge, information, intellectual property, experience - that can be put to use to create wealth. It is collective brainpower. It’s hard to identify and harder still to deploy effectively. But once you find it and exploit it, you win” (Stewart, 1999:xx).

Methods of harnessing, developing and managing this asset are being researched by managers from all reaches of their discipline. The problem of valuation though would seem to fall squarely on the shoulders of the accountant and ultimately the enterprise’s auditors who would have to indicate whether or not in their opinion the intangible asset, intellectual capital, is fairly presented at the carrying value reflected in the balance sheet.

International accounting standards are clear in the requirements to be satisfied before an asset may be recognised in an enterprise’s balance sheet. The South African accounting statement,

AC000, sets out the framework for financial statement reporting in South Africa. This statement defines an asset as : “A resource controlled by the enterprise as a result of past events and from which future economic benefits are expected to flow to the enterprise” (AC000, 1990 : para 49(a)). This statement also sets out the recognition criteria of an asset, stating that : “An asset is recognised in the balance sheet when it is probable that the future economic benefits will flow to the enterprise and the asset has a cost or value that can be measured reliably” (AC000, 1990: para 89). A reliable measure of value is therefore of cardinal importance.

AC129 which is closely based on the international accounting standard, IAS 38, and which deals specifically with accounting for intangible assets, lays down its own ground rules regarding the recognition and measurement of these assets. Firstly, there is the requirement that for an intangible asset to be recognised on the balance sheet of an enterprise it should be separately identifiable. In terms of AC129 an asset is separately identifiable if the economic benefits which flow from it can be rented, sold, exchanged or distributed without affecting the future economic benefits derived from other assets. (AC129, 1990: para.12). Secondly, the enterprise should also have a certain measure of control over the asset. Deciding on whether control is sufficient to warrant recognition of the asset is usually considered from the point of view of the legal rights which the enterprise has over the use of the asset. It is however contended in paragraph 14 of AC129 that legal rights to ownership

are certainly not the only measure of control and although control may be more difficult to prove in the absence of enforceable legal rights, the enterprise may still enjoy sufficient control to warrant recognition of the intangible asset on the balance sheet. A preliminary look at intellectual capital and its components could certainly raise heated debate simply around whether or not it satisfies the above criteria. However this argument is pursued in chapter 3.

AC129 continues in its quest of setting out the recognition and measurement criteria of intangible assets by also stating:

An intangible asset should be recognised if, and only if :

- (a) it is probable that the future economic benefits that are attributable to the asset will flow to the enterprise; and
- (b) the cost of the asset can be measured reliably.

An enterprise should assess the probability of future economic benefits using reasonable and supportable assumptions that represent management's best estimate of the set of economic conditions that will exist over the useful life of the asset

(AC129, 1999: para's 20 & 21).

Arguing the existence of the inflow of future economic benefits to the enterprise from its intellectual capital is not an unduly difficult task. However, being able to measure the value of the asset reliably is an entirely different challenge. It is this very point that prompted a

study group commissioned by the International Federation of Accountants to make the following comment: “ Given the potential for both complexity and diversity, developing intellectual capital measures and reporting practices that are comparable between firms remains one of the key challenges for the accounting profession” (International Federation of Accountants, 1998).

At the time of conducting this research, three possible broad measures of intellectual capital, namely, market-to-book, Tobin’s “q” and calculated intangible value (CIV) had been mooted by various authors and the purpose of this research is to apply them to companies listed in selected sectors on the Johannesburg Securities Exchange and to evaluate the soundness of the values established. In evaluating the results arrived at, consideration is given to the relationships which the values bear inter company as well as intra company. In particular, consideration is given to whether or not the values arrived at for intellectual capital are relevant, reliable and comparable.

## 1.2 The proposition

It is proposed that Tobin’s “q” and calculated intangible value (CIV) are acceptable methods of valuing intellectual capital for the purposes of recognition in the financial statements of companies and provide relevant, reliable and comparable values.



### 1.3 The definition of terms

Certain terms used in this chapter and which will be used extensively in the study are defined below. Other terms will be defined as and when required in later chapters.

1.3.1 Intellectual capital - “Intellectual capital is the intellectual material (knowledge) that has been formalised, captured and leveraged to produce an asset of higher value to the organisation” (Oliver, 1999).

Intellectual capital is seen to comprise elements of human capital, structural capital and customer capital as defined in points 1.3.2, 1.3.3 and 1.3.4 below and exists when an enterprise is able to utilise these in a way which produces additional value or competitive advantage for the enterprise.

1.3.2 Human capital - “Human capital refers to the know-how, capabilities, skills, and expertise of the human members of the organisation. It is the knowledge that each individual

generates” (Petrash, 1996).

1.3.3 Structural capital - “Structural capital includes the organisational capabilities developed to meet market requirements, such as patents” (International Federation of Accountants, 1998).

“That knowledge that has been captured / institutionalised within the structure, processes, and culture of an organisation” (Petrash, 1996).

1.3.4 Customer capital - “Customer capital includes connections outside the organisation such as customer loyalty, goodwill and supplier relations. It is the perception of value obtained by a customer from doing business with a supplier of goods and / or services” (Petrash, 1996).

1.3.5 Asset - “A resource controlled by the enterprise as a result of past events and from which future economic benefits are expected to flow to the enterprise.” (AC000, 1990: para 49(a)).

- 1.3.6 Intangible asset - “An intangible asset is an identifiable non-monetary asset without physical substance held for use in the production or supply of goods or services, for rental to others, or for administrative purposes” (AC129, 1999: para.08).
- 1.3.7 Balance sheet - “A report listing the assets, liabilities and owners’ equity and their respective monetary amounts of a business at a specific date” (Elliott and Rowlands, 1996: 12).
- 1.3.8 Carrying value - The value at which an asset or liability is reflected in the balance sheet.
- 1.3.9 Useful life - “The period of time over which an asset is expected to be used by the enterprise” (IAS38: para 7).
- 1.3.10 Goodwill - “An intangible asset representing resources such as special skills, reputation, established clientele and good labour relations. Goodwill represents expected

future benefits likely to flow from these resources.

Usually only accounted for on the acquisition of a going concern and calculated as the difference between the value of identifiable net assets and the value of the consideration paid” (Elliott and Rowlands, 1996: 44).

1.3.11 Historical cost accounting - “An accounting system in which profit is measured by matching revenues and expenses measured at historical cost. The balance sheet reflects elements measured at historical cost” (Elliott and Rowlands, 1996: 45).

1.3.12 Accounting concepts - “Broad basic assumptions which underlie the preparation of financial statements and the disclosure of financial information” (Elliott and Rowlands, 1996: 2).

1.3.13 Non distributable reserves - “Profits or gains of a company or close corporation which in terms of legal principles and generally

accepted accounting practice may not be distributed by way of dividends to shareholders or distribution to members” (Elliott and Rowlands, 1996: 60).

#### 1.4 Abbreviations employed in the dissertation

- 1.4.1 GAAP - Generally Accepted Accounting Practice - this refers to the Statements of Generally Accepted Accounting Practice as promulgated by accounting standard setting bodies.
- 1.4.2 CIV - Calculated Intangible Value - This is one of the proposed methods used to arrive at a value for intellectual capital. The mechanics of this method are explained in chapter 4 and the evaluation thereof can be found in the research findings set out in chapter 5.
- 1.4.3 FASB - Financial Accounting Standards Board - An American accounting standards board.
- 1.4.4 IASC - International Accounting Standards Committee - Committee responsible for setting international accounting standards.
- 1.4.5 IAS - International Accounting Statement - Statements setting out accepted international standards for accounting issues.

1.4.6 AC - The letters AC followed by a number indicate a particular South African statement of Generally Accepted Accounting Practice being referred to.

1.4.7 JSE - Johannesburg Securities Exchange

## 1.5 Synopsis of the research

As stated earlier, this study discusses three valuation methods for intellectual capital and considers two of these (Tobin's "q" and CIV) as suitable valuation methods. Ensuing chapters focus on the research as follows:

1.5.1 Chapter 2 discusses the accounting background and implications of recognising intellectual capital as an asset on the balance sheet. Due consideration is given to stringent measurement and recognition criteria imposed by relevant accounting standards.

1.5.2 Chapter 3 comprises a review of the related literature.

1.5.3 Chapter 4 details the nature of the data, the null hypothesis, calculations of the various values of intellectual capital using the methods referred to above and

statistical tests and comparisons made.

1.5.4 Chapter 5 provides a detailed discussion of the results of the comparisons and testing detailed in chapter 4.

1.5.5 Chapter 6 draws conclusions from the research and offers closing commentary.

## **CHAPTER TWO**

### **CONSIDERING THE ACCOUNTING PERSPECTIVE**

#### **2.1 Introduction**

As with most professions, accountants are governed by a multitude of codes, rules, statements of practice and guidelines which ensure equitable and consistent treatment of items of a similar nature across all financial statements both in relation to time and between different enterprises. If one were to find a suitable method for valuing intellectual capital to warrant the inclusion of this asset on the balance sheet it would need to be done in a way which satisfies existing accounting frameworks and guidelines. This chapter seeks to expound those frameworks and guidelines which would be applicable in the event of including intellectual capital as an asset on the balance sheet.

#### **2.2 The purpose of financial statements**

Enterprises conducting business on a day to day basis may incur several million transactions over a financial year. The purpose of the financial statements prepared at the end of the financial year is to summarise the results of business conducted during the year and to present the financial position of the enterprise at the year end. The financial data contained



in the financial statements is widely used by various users of financial statements in their decision making processes and needs to meet certain qualitative characteristics in order to be useful. These qualitative characteristics are discussed in more detail in paragraph 2.4. Faul and Everingham make the following statement in their book on financial accounting : “Accounting seeks to identify, measure and communicate information about economic entities that is intended to be useful in making economic decisions. Its primary focus is meeting the needs of external users” (Faul and Everingham, 1998:10).

Users of financial statements are generally stakeholders in the enterprise or persons or entities which may become stakeholders in the enterprise. Stakeholders in the enterprise could include the following:

- owners of the enterprise, through the holding of shares or in terms of other agreements
- lenders through the granting of long term or short term finance or trade credit
- employees looking for job security and satisfactory levels of remuneration
- trade unions acting on behalf of employees
- government to whom taxes and other levies may be payable
- management who would look to the financial information to assist them in the performance of their duties as stewards of the enterprise.

Each of these categories of stakeholder would have a particular interest in the various aspects illustrated by the annual financial statements. Aspects such as net asset value and capital structure as shown in the balance sheet, profitability indicated by the income statement, cash flows as detailed by the cash flow statement together with the plethora of explanatory notes to support this financial information will be of significant value to the stakeholders seeking to understand the financial position and performance of the enterprise.

### 2.3 The accounting background

As economies grew and financial data became more complex so the need arose for methods of financial statement preparation to be standardised and this in turn gave rise to the formation of standard setting bodies which set about constructing frameworks to give guidance in the preparation of financial statements. In 1959 the American Institute of Certified Public Accountants formed the Accounting Principles Board. This was replaced by The Financial Accounting Standards Board in 1973 which also saw the birth of the International Accounting Standards Board which set its aims as:

(a)...to formulate and publish in the public interest, accounting standards to be observed in the presentation of financial statements and to promote their world-wide acceptance and observance, and

(b) work generally for the improvement and harmonisation of regulations, accounting standards and procedures relating to presentation of financial statements (International Accounting Standards Committee, Preface to International Accounting Standards).

In line with international trends, the South African Accounting Practices Board was formed in 1973. The purpose of this board is to approve for issue, statements of GAAP prepared and circulated for approval by the South African Institute of Chartered Accountants. Statements of GAAP are designed in such a way as to satisfy the requirement of section 286(3) of the Companies Act No. 61 of 1973, which states that the annual financial statements of a company shall, in conformity with generally accepted accounting practice, fairly present the state of affairs of the company and its business as at the end of the financial year concerned.

As a result of the acceptance of South Africa back into the international community after the democratic elections of 1994, its financial reporting standards have undergone a major overhaul in order to harmonise their requirements with international statements and new statements of GAAP now closely follow the content of those promulgated by the IASC.

#### 2.4 Statement of accounting practice - AC000

In keeping with the international trend on disclosure requirements, an accounting framework

was developed in South Africa. This statement, AC000, sets out the objective of financial statements, underlying assumptions, qualitative characteristics and elements to be considered in the preparation of financial statements. “Qualitative characteristics are the attributes that make the information provided in financial statements useful to users” (AC000, 1990: para 24). AC000 explains these characteristics as follows:

2.4.1 Understandability - Financial statements should be readily understandable by users who are assumed to have a reasonable knowledge of business and economic activities and accounting.

2.4.2 Relevance - “Information has the quality of relevance when it influences the economic decisions of users by helping them evaluate past, present or future events or confirming, or correcting, their past evaluations” (AC000, 1990: para. 26). For information to be relevant it also needs to be conveyed to the users timeously. Information which is not available when needed obviously loses its relevance.

2.4.3 Reliability - “Information has the quality of reliability when it is free from material error and bias and can be depended upon by users to represent faithfully that which it either purports to represent or could reasonably be expected to represent” (AC000, 1990: para 31). While it has been stated that the information contained in financial

statements is used for decision making purposes by the various users, the information should not cause such decisions to be influenced in one way or another by virtue of the manner in which it is presented.

2.4.4 Comparability - Information contained in financial statements needs to be comparable from one year to the next for the enterprise and with the financial data of other enterprises in order to permit an evaluation of relative composition and performance. For information to have a high degree of comparability, the methods or approaches employed in deriving the information disclosed need to be consistent from one year to the next.

Taking the above characteristics into account and given the asset recognition criteria considered in chapter one, it is clear that the task of finding an acceptable valuation method or methods for arriving at a value for intellectual capital will not be a simple one. Not only will the method need to be capable of reliably measuring the value of intellectual capital in a particular year but such valuation would also need to give information which is understandable, relevant, reliable and perhaps most importantly, comparable.

Comparability would be an essential element particularly between enterprises and across industries. Arriving at a valuation method which allows comparability between different

enterprises and across industries will also be complicated by external factors and pressures peculiar to the different enterprises and industries within which they operate. Several factors such as legislation, exposure to international markets, competition, product life, financial structure of the enterprise and more could all impact on the perceived value of the intellectual capital of the enterprise.

It is at this point that one also needs to consider the cost of providing information regarding intellectual capital versus the benefits which such information will impart to the users, once included in the financial statements. The range of values arrived at by various methods of measurement is vast. On the one hand, certain measures allow one to calculate an intellectual capital value within a matter of minutes whilst on the other it would need a fully staffed department of the enterprise to be devoted solely to the function of calculating the value. The latter extreme is currently employed by Skandia, a Swedish insurance company, but for all intents and purposes it would not be practical or financially feasible to expect smaller companies to adopt the same approach. Skandia's approach to calculating intellectual capital is discussed in paragraph 3.8.4.

## **CHAPTER 3**

### **REVIEW OF THE RELATED LITERATURE**

#### **3.1 Introduction**

In order to understand the nature of intellectual capital and the history of the research conducted in this field to date, a comprehensive study was undertaken of related literature written by a number of different authors. While these authors sometimes held differing opinions on certain issues within the realm of intellectual capital, they were unanimous in the fact that this subject was not to be overlooked by companies and that the effective management of it was in fact critical to the future success of companies. This chapter details the development of thought on intellectual capital as expressed by the most influential writers on the subject.

#### **3.2 The human factor**

As its name suggests, intellectual capital is centered around humans and the value which they bring to the enterprise. Placing a value on the human element in the enterprise is a subject which has previously been placed under the spotlight by researchers. Much was written about the subject in the sixties and early seventies. In fact, in 1973 the American Accounting

Association formed a committee to investigate human resource accounting and to establish ways to successfully account for the work force of the enterprise (Shimerda and Pufahl, 1983). The committee defined human resource accounting as “the process of identifying and measuring data about human resources and communicating this information to interested parties” (American Accounting Association, 1973). In setting about its research, the committee established three main objectives of human resource accounting, being;

- to develop valid and reliable models for measuring cost and value of people
- to design systems which would allow for the implementation of the valuation methods established in terms of the first objective, and
- to determine the impact of the information on future business decisions and performance

(American Accounting Association, 1973).

The general feeling of researchers at the time was that information on human resources, whilst of value to investors external to the enterprise, would be particularly valuable as an internal management tool. Measuring such information and designing systems to monitor the human resource asset presented a major challenge though. This was borne out by statements like: “many believe that the nature of these assets is such that any attempt to quantify them may be unreliable, costly or fruitless” (American Accounting Association, 1973).



Nevertheless, the committee continued in its endeavours and considered the following different methods of measuring the human resource asset:

- *Historical or acquisition cost.* This involved capitalising all the costs associated with the acquisition of an employee and then attempting to amortise this value over the expected useful life of the asset. Subsequent adjustments were made for additional expenses incurred on the employee (eg. training costs) or in the instance of resignation.
- *Replacement cost.* In this case an estimation was made of expenses that would be incurred to replace a current member of staff with someone new, having the same qualifications and abilities as the incumbent. Once again the value arrived at was capitalised as an asset.
- *Opportunity cost.* This proposal considered valuing and capitalising only those employees which were considered to be a scarce resource. In other words if an employee could be easily replaced by someone new with similar skills he or she was not considered to be an asset to the enterprise.
- *Discounted future salaries.* As its name suggests this involved calculating the expected total future outlay in salaries expense on an employee and then discounting that back to a present value by using an appropriate discounting factor.

(American Accounting Association, 1973).

While all of the above methods had merit in the underlying assumptions adopted, the committee was at pains to point out that most of the data being used in the calculations was extremely subjective and, depending on the manner in which the data itself was calculated, resulted in widely diverse values being arrived at for the human resource assets of the enterprise. The research conducted by the committee also considered non-monetary measurement of human resources within the enterprise. This measurement focussed on issues such as inventories of skills and capabilities and while no conclusive values were determined the data served as valuable information in managing the human resources of the enterprise.

Also in 1973, Doug Mayman authored an article in *Personnel Management* which opened with the following: “What price people? Is probably the most important question facing society today” (Mayman, 1973: 35). However, balance sheets still don’t reflect an asset value for the human element of the enterprise. The reasons for this could be twofold, namely;

- i) a perception that the enterprise does not actually control the human element and therefore would not be entitled to recognise it as an asset in the balance sheet, and,
- ii) that trying to place a value on the human element of the enterprise is a task that is extremely difficult and the cost of which would significantly outweigh the benefits to the enterprise and the users of its financial statements.

Earlier in this study the author noted that the element of control played an important role in

determining whether or not an intangible asset could be recognised as an asset on the balance sheet. The extent of control which an enterprise may or may not enjoy over its human element is a subject which could be debated at length. More and more companies in so-called knowledge based industries are recognising the fact that the level of control which they are able to exercise over their employees is limited and that they need to be pro-active in their endeavours to ensure a stable work force that is as loyal to the enterprise as can possibly be expected. In 1999, CNN ran a news feature on an architectural engineering company operating in the United States of America. At the start of business one week every employee of the company was presented with the keys to his or her own brand new BMW motor vehicle. The only prerequisite for benefitting from this generous gesture by the company was that staff needed to have been in the employ of the company for at least one year. When the CNN reporter questioned the chief executive officer on the company's motivation for its actions his response was simple. The company had realised the value of the human element of its intellectual capital and was also acutely aware of the fact that it exercised limited control over the careers of its staff who were qualified in an area experiencing a shortage of skills. The gesture was made in an effort to "buy in" to the loyalty of its staff and to thereby hopefully secure a slightly greater measure of control over its work force. The company obviously considered that the future benefit to the company flowing from greater loyalty outweighed the cost of the vehicles.

Rose Di Carlo, in doing a synthesis of human resource accounting (HRA) in 1983 wrote the following:

Under a traditional accounting framework, all human resource expenditures are considered expenses and charged against the current period's income. Proponents of HRA agree that some or all of those expenditures should be capitalised to the extent that the benefits to be derived from them will be realised in future periods. Thus detailed accounts of human resource investments should be maintained (Di Carlo, 1983: 57).

The idea put forward by the proponents of human resource accounting mentioned above has merit but the suggestion of capitalising costs already incurred on the work force by way of salaries and other benefits falls squarely into the definition of an expense and does satisfy the asset recognition criteria discussed earlier. In terms of AC000 para. 95 an item is recognised as an expense when there is a direct association of that expense with income recognised in the income statement. The argument follows then that amounts paid to employees in any accounting period are really for services rendered within that accounting period and that services rendered by such employees in future periods will result in further amounts of remuneration being payable to them. In other words, the services of the employees of the organisation will result in the inflow of future economic benefits to the enterprise but they will also surely be appropriately remunerated for their services through the outlay of further resources of the enterprise when those benefits accrue. What should be considered as regards

the value of the work force to the enterprise is rather some measure of discounted future cash flow based on projected future benefits which the enterprise will enjoy. Sveiby supports this view by saying that individual competence is owned by the individuals and not the employers, and thus any money spent on those individuals, even if by way of training, should be recognised as an expense and not capitalised based on an expectation of future benefits which should flow from those employees. His view is reinforced by a later statement that competence cannot be owned by anyone but the person who possesses it (Sveiby, 1998).

Thomas Shimerda and Donald Pufahl in their article on the effects of human resource accounting take a similar view to that explained by Di Carlo above when they make the following statement: “Underlying the concept of human resource accounting are some theoretically sound assumptions. The benefits provided by human resources and the value of these benefits to the organisation are similar to those contributed by conventional assets” (Shimerda and Pufahl, 1983: 42). In other words they too are calling for the capitalisation of human resource costs. In the conclusion to their work they note that the results of human resource accounting will benefit not only internal management but also the users of financial statements external to the enterprise as well (Shimerda and Pufahl, 1983).

Although one still does not find an amount disclosed on the balance sheet for the human resource element of an enterprise, to question whether it represents an asset would certainly

be answered with an emphatic affirmative. Researchers in the field of management would undoubtedly be able to produce reams of data proving increased returns and productivity from a work force which is properly managed, trained and motivated. The human element of the enterprise can then be seen in the same light as any other asset, the better you maintain it and manage it, the better the returns you would expect from it.

From the above, it is noted how a growing interest in human resource accounting sparked an era of prolific writing on the subject as well as the formation of task teams to investigate the subject and make suitable recommendations of how to deal with the problems which it presented. In the same way, the present rise to prominence of intellectual capital has produced a similar trend. The 1980's saw research being conducted in the realm of knowledge management and knowledge capital as companies began to realise the importance of nurturing and carefully managing the knowledge resources which they owned. This in turn led to the formation of means to measure the effectiveness with which companies were managing their knowledge. Once again, several researchers from a variety of disciplines are delving into the subject of intellectual capital with a view to making recommendations as to how it should be managed, valued and accounted for. The volume of research in the area of intellectual capital has grown exponentially and is producing some very interesting results, some of which will be discussed in this study.

### 3.3 The growth in intangible value

Where is the subject of intellectual capital headed? Is it something which will merely end up as a topic of transitory interest or is there substance to this intangible asset which so many writers are excited about? The author believes that the answer lies in the trends in underlying net asset values recorded in corporate balance sheets versus the market values of those corporates. Research conducted by Professor Keith Bradley of the Open Business School in the United Kingdom revealed a significant widening of the gap between the book values and market values of companies. He noted the following: “The gap in 1992 indicates that roughly forty percent of market value of the median U.S. public corporation was missing from the balance sheet. For knowledge intensive corporations, the percentage assets missing from the balance sheet is over one hundred.” (Edvinson and Malone, 1997: 5). The study conducted by the International Federation of Accountants revealed that Microsoft’s market value in 1996 was 11,2 times its tangible asset value (International Federation of Accountants, 1998).

The early 1980's saw the Swedish coalition of service industries grappling with the problem of measuring value in the service sector and they soon noted an urgent need to find a new approach to measuring and recording the value of the enterprise (Edvinson and Malone, 1997).

The past five years have seen a world-wide explosion of information as the internet has changed and continues to change the face of commerce. Information is the latest “buzz word”. It is readily accessible, no matter where one is. All that is needed is access to a computer that can link one to the world wide web and the world is indeed your information “oyster”. Whether you’re looking for a catalogue on the latest kitchen appliances or making reservations for your next vacation, all this can be achieved without leaving the comfort of your home and, what’s more, it can be achieved instantaneously. The faces of companies are moving away from being the high rise buildings in the central business districts of international cities, or the plush departmental stores frequented by shoppers in search of the latest fashions. Rather the corporate identity is now becoming what you see as you download the home page of the company onto your personal computer. The shop window has moved from down the road, right into your home.

Together with this barrage of information comes the ability to offer services rarely encountered in the past. Companies are able to go the proverbial extra mile in making their product the most attractive option for the consumer. Services are offered which allow the consumer to gain the most benefit at least expense or effort. Companies offering professional services have been able to establish comprehensive data bases which are shared by their international offices to avoid duplicating work where similar projects are undertaken by their different offices on behalf of different clients. Considering the function of an audit firm with



specialised clients could provide a simple illustration of the application of such a data base. Assume, for example, that the audit firm's client base includes corporate clients in the specialist fields of banking or mining. Audit approaches or experience thereof gained by the South African offices of the audit firm could be made available on the company data base for use by other offices in conducting audits of a similar nature in other countries. Doing this allows knowledge to be freely shared, which in turn allows a more efficient and cost-effective service to be provided to the client. What is clear is that such a data base obviously adds tremendous value to the organisation and the question which this study will consider is whether that value can be measured reliably for the purposes of inclusion as an asset on the balance sheet of the audit firm in question.

There can be no doubt then that knowledge and the availability and effective management thereof has created opportunities for companies to increase their value considerably through the improvement of products, services and delivery. What is tremendously exciting albeit humbling is that it is also patently clear that we have only just begun to scratch the surface of opportunities that have come into existence with the volume of knowledge available as it is today. As a consequence, the value of the intangible asset, intellectual capital, is seen to have grown significantly over the last decade, as revealed in the widening gap between book value and market value which Professor Keith Bradley spoke about in the results of his research. One can only expect that gap to widen even further as the availability of

information and the efficiency with which it is managed continues to be refined.

In recognition of this value and the growing need to investigate both its components as well as possible means of measuring and recording it, the International Federation of Accountants (IFAC) commissioned their Financial and Management Accounting Committee to produce an international management accounting study on the subject in 1998 (International Federation of Accountants, 1998). IFAC states its mission as: “the worldwide development and enhancement of an accountancy profession with harmonised standards, able to provide services of consistently high quality in the public interest” (International Federation of Accountants, 1998: 4). The results of the study simply confirmed what many researchers and accountants were already beginning to encounter; that the current accounting model cannot adequately encapsulate the value of an asset like intellectual capital. The study group noted the following challenges that faced those companies wishing to value and record their intellectual capital:

- i) the need for better tools to manage investment in people skills, information bases, and technological capabilities;
- ii) the need for some form of accounting measurement that can differentiate between firms in which intellectual capital is appreciating versus firms in which it is depreciating;
- iii) the need to be able to measure, over the long run, return on investment in people skills, information bases, and the organisation’s technological

Perhaps one of the most pertinent points raised by the IFAC study was the distinction made between the views held of individuals in a knowledge organisation versus those in an industrial organisation. Within the knowledge organisation, people are seen as revenue generators converting knowledge into intangible assets whereas in the industrial organisation, people are simply seen as cost factors (International Federation of Accountants, 1998). Industrial organisations are more concerned with the outputs that can be generated by the tangible assets employed on the factory floor and simply view people as part of the management process ensuring that the machinery is run at optimum output. In the knowledge organisation, people are seen as the very assets that produce the outputs of the company.

With the above principles firmly entrenched, the study established that several methods of managing and measuring intellectual capital had emerged and that while some were very different in their approach, they all appeared to stem from the same “value platform” (International Federation of Accountants, 1998). The components of this value platform were human capital, customer capital and organisational capital. The formulation of these components of intellectual capital is discussed in depth in paragraph 3.5 below.

### 3.4 Measuring intangible value

Discussion in this chapter so far has served to illustrate that the value of intellectual capital centres around humans and the management of knowledge. This knowledge is both that which exists within the documented knowledge data bases of an organisation as well as the personal knowledge and skills of the employees of the organisation.

In 1986 and 1987, Sveiby introduced concepts to be considered as part of a measurement tool for intangible assets. These concepts were employed by company managers across Sweden and the mechanisms were soon recognised as a valuable tool for assisting with internal management decisions. Sveiby formalised the concepts into what he called the Intangible Assets Monitor (Sveiby, 1998). The monitor recognised that the market value of the enterprise comprised both tangible and intangible elements. Whilst the tangible element was considered self explanatory, the intangible element was said to comprise individual competence, internal structure and external structure. Sveiby explained these concepts as follows (Sveiby, 1998):

3.4.1 Individual competence is the capacity of employees to act under different circumstances. Whilst Sveiby is noted as someone who opposes the capitalisation of

a portion of current employment costs to recognise expected future benefits that will flow from the employees he does concede the point that employees tend to be loyal if treated properly and therefore certainly do represent an asset of an enterprise.

3.4.2 Internal structure, as its name suggests, consists of the range of items generally owned by the enterprise and includes networks and the organisational culture which exists. These items are either acquired or developed by the enterprise.

3.4.3 External structure refers to relationships that exist with people or other entities outside of the enterprise. In these instances the enterprise does not have the same level of ownership or control over the assets or relationships as those referred to as components of the internal structure.

While Sveiby's intangible assets monitor was finding favour with managers in Swedish companies, Kaplan and Norton were performing similar research on companies in the United States. In 1990, they formulated the Balanced Scorecard Approach. According to Sveiby, though, this approach is not designed with the measurement of intangible assets in mind but rather simply for use as an internal evaluation tool. The balanced scorecard approach focussed on financial, customer, process and learning aspects of the enterprise (Sveiby, 1998). Whereas Sveiby's intangible assets monitor sought to assist with measurement to

some degree, Kaplan and Norton's balanced scorecard simply sought to encourage managers to look beyond the bricks and mortar and to take a more balanced approach in managing the enterprise, by giving adequate recognition to the intangible assets that exist.

The study conducted by IFAC and referred to earlier in this chapter raised a similar approach to the internal measurement of indicators tracked in the monitoring process of intellectual capital. The approach was called Value Chain Analysis and its objective was to identify elements of processes and activities and to link them to the creation of value within the organisation (International Federation of Accountants, 1998). This approach was based on very similar fundamentals to those promulgated by Sveiby and Kaplan and Norton.

### 3.5 Deconstructing the components of intellectual capital

The existence of value in intellectual capital arises when the knowledge which exists within an organisation is managed in a formalised way to the benefit of the organisation, its customers and its staff. Thomas Stewart had this to say about this knowledge : "By intellectual capital I don't mean a clutch of Ph.D.s locked up in a lab somewhere. Nor do I mean intellectual property (such as patents and copyrights), though that is one part of intellectual capital. Intellectual capital is the sum of everything everybody in a company knows that gives it a competitive edge" (Stewart, 1999: xix).

Hubert Saint-Onge of the Canadian Imperial Bank of Commerce and Leif Edvinson, Director of Intellectual Capital at Skandia are leading researchers in the field of intellectual capital and have put forward the notion that intellectual capital consists of three major components, namely, human capital, structural capital and customer capital (Stewart, 1999). These are seen to be the factors which, when properly managed and co-ordinated, produce the synergies which bring additional value to the enterprise. Research conducted under the guidance of Leif Edvinson at Skandia, resulted in a list of over fifty items which contributed to additional value within an organisation, over and above the normal tangible asset structures. Developments in terms of this research are discussed in more detail as part of the discussion on the Skandia Navigator in paragraph 3.8.4 below. The list was condensed substantially and initially split into two main components namely, human capital and structural capital. The first equation then for intellectual capital was presented as:

$$\text{HUMAN CAPITAL} + \text{STRUCTURAL CAPITAL} = \text{INTELLECTUAL CAPITAL}$$

(Edvinson and Malone, 1997).

Further research by Edvinson and his teams resulted in a third element being added to the equation. Recognition was given to the fact that while the organisation had additional intrinsic value in its staff and structures that value could really only exist if there were customers in search of that which the organisation had to offer. Consequently, customer

capital was added, resulting in the following equation:

$$\text{HUMAN CAPITAL} + \text{STRUCTURAL CAPITAL} + \text{CUSTOMER CAPITAL} = \\ \text{INTELLECTUAL CAPITAL (Edvinson and Malone, 1997).}$$

In attempting to describe the role and importance of intellectual capital in an organisation , Edvinson and Malone suggest using the analogy of a fruit-bearing tree. Investors would look at the quality and abundance of the fruit of the tree in making their investment decision. In other words the investor would consider that which he could see in making his decision. The tree, its trunk, branches, leaves and fruit are likened to the physical attributes of the company which are visible to the investor. These would be the physical structures of the organisation, its assets, projects, products and results. However, they contend that of even more importance to the investor would be the intangible attributes which he may not be able to see, like the roots of the tree. Certainly the state of health of the root system will determine the quality and quantity of future fruit produced by the tree. Likewise, certain key, intangible attributes of the organisation could have a significant bearing on the future profitability and sustainability of the organisation.

The components of intellectual capital are defined in paragraphs 1.3.2, 1.3.3 and 1.3.4 as part of the list of definitions and a more in-depth view of them is offered here.



### 3.5.1 Human capital

Thomas Stewart refers to human capital as : “...the capabilities of the individuals required to provide solutions to customers” (Stewart, 1999: 76). It was mentioned earlier that knowledge is seen to comprise both that which is documented by the enterprise as well as the personal knowledge and skills of each employee. It must be recognised from the outset that while the enterprise can lay claim to ownership of knowledge contained in its data bases, the same ownership does not exist as regards the knowledge and skills of the individual employees. This is where enlightened management begins to play a vital role, firstly in ensuring that documented knowledge bases are as comprehensive as possible without becoming too cumbersome and unwieldy and secondly by looking after the interests of employees and thereby ensuring that the knowledge and skills which they possess remains with the enterprise. This will at least allow the enterprise a measure of effective ownership or control of the resource even though true ownership could never be achieved. The latter part of the challenge to management is by far the most complex to address. Ensuring employee satisfaction and a resulting loyal work force involves a number of psychological as well as sociological issues and management could find themselves continually on a knife edge, trying to keep the balance. In the current day and age it is commonplace to find key individuals being lured from one organisation

to another at the stroke of a pen in a company cheque book. Companies wishing to increase the knowledge and skills component of their intellectual capital are seldom afraid to acquire such knowledge and skills regardless of cost. A cover story run by the Financial Mail in 2000 stated the following : “Business analysts now say that the efficiency with which a company can identify and retain its most talented and skilled staff will define its ability to compete in the fast-paced global environment” (Financial Mail, May 5, 2000). Little wonder then that companies are prepared to pay for the services of talented and skilled staff. The same article suggests a global shortage of individuals with the necessary talents and abilities to give companies strategic advantages over their competitors and alludes to an international war for talent. Companies which fail to recognise the value of their employees and in particular those having the necessary skills to take the company forward do so at their own peril and could well find themselves being swallowed up by the competition. Just as companies place their focus on mission statements and corporate direction, they also need to keep a very sensitive finger on the pulse of their management and indeed the entire work force. The process needs to begin even earlier though and companies should be acutely aware of the need to attract new staff who will contribute to the successful future of the organisation. Derrick Boshard, a partner at Heidrick and Struggles, an executive search firm, is quoted as saying : “Great companies attract great people to great jobs” (Financial Mail, May 5, 2000).

Creating an organisation which people want to work for lays the foundation. The influence of a good corporate identity coupled with a track record of employee satisfaction and success is borne out annually at graduate recruitment weeks conducted at universities. Potential graduates are not only in search of a good job, but a good job with the right company. Often, a better financial package is forgone in the light of an opportunity with the 'right' company.

Microsoft is a company several graduates and indeed employees from other companies would love to be associated with. It conjures up images of vision, success, strength, being part of a winning team with a winning recipe. Microsoft's view of intellectual capital is patently clear. It wants to be the first company 'to go where no man has gone before' to quote the mission of the crew of the starship, Voyager in their quest for trekking into the unknown. Randall Stross did some research into what Microsoft was researching in 1997 and discovered that they had hired a team of statistical physicists. These are professionals who command exorbitant salaries. Statistical physicists observe the states of matter from microscopic points of view. They're interested in molecules, electrons and atoms. (Stross, 1997). What a peculiar field to be doing research in, one might feel, but such is the intent of Microsoft to explore future opportunities that the cost of a few top researchers pales into

insignificance when one considers the possible results of the studies being done. The company's approach to investment in intellectual capital is an aggressive one.

Research however, is often an area where companies live in fear of over-capitalisation. What if all the money and effort comes to nought? Directors are far more interested in tangible investments that produce a firm return rather than throwing money at the unknown. After all, the directors of the company are the ones charged with the responsibility of maximising returns for the investors in the company and so they prefer the immediacy of returns on tangible investments rather than the delayed benefits of an investment in human intellectual capital.

### 3.5.2 Structural capital

According to Edvinson and Malone, structural capital is : "...the embodiment, empowerment, and supportive infrastructure of human capital" (Edvinson and Malone, 1997: 35). Thomas Stewart uses the following illustration to explain it : "Structural capital is what turns a monk who can do elegant calligraphy into the smiling star of a Xerox television commercial, who can make many copies of a document" (Stewart, 1997: 76). Structural capital is the web or network which links human capital and customer capital. It supplies the structure on which the

organisation operates and manages its intellectual capital. This structure includes things like the enterprise's computer network, its relationships with suppliers, its corporate image and mission. As Stewart's illustration serves to point out, the application of advancements and improvements in technology, approaches, processes and product quality as a result of human capital ultimately benefit the consumer by being introduced into the enterprise's structures, processes and networks; in other words its structural capital. As opposed to human capital discussed earlier, structural capital *is* all owned by the enterprise. Thomas Stewart in alluding to this ownership called it the knowledge that doesn't go home at night (Stewart, 1999).

Structural capital also needs to be seen as a living organism; one which needs to be constantly managed, monitored, refined and improved on. Failing to keep one's structural capital as relevant as possible will soon result in competitors overtaking one's company.

### 3.5.3 Customer capital

The concept of customer capital is a simple one. Without customers or clients the future of any business is doomed. These are the people or organisations which give meaning to the very existence of a company. One of the basic elements of market

research is to establish what level of demand exists for your product or service. Who out there needs the product or service and who is going to support it? One must also understand that customers or clients are a very fluid group of people or organisations that can in most cases easily move between different suppliers. Tastes change and interest is easily diverted when it comes to the fickle mind of the consumer. It is vital then that companies concentrate their efforts on customer satisfaction and most importantly, customer retention. Thomas Stewart wrote: “Of the three broad categories of intellectual assets - human, structural, and customer capital - customers are the most obviously valuable. They pay the bills” (Stewart, 1999: 143). To disregard the importance of customer capital and to adopt a like it or lump it attitude would be short sighted and foolish.

Although accountants do not yet record intellectual capital as an asset on the balance sheets of companies, certainly the component of customer capital has found its way there under the guise of goodwill. One of the factors considered by an investor when purchasing a company would be the customer base which that company services and investors have often in the past paid sums of money vastly in excess of the underlying net asset value being acquired, simply to have access to the existing customer base. This is particularly true in the case of service organisations or professional practices like those of lawyers, doctors and accountants. These are

organisations which by their nature have very low tangible asset bases and which in most cases simply consist of desks, chairs, computers and a few other items of office equipment. It is obvious that investors in such organisations want to get their hands on far more than the assets mentioned above. The primary product of these organisations is knowledge and investors or purchasers want to secure a block of future fee income which attaches to the client base being serviced. Often the value of securing and maintaining such an acquired client base is underlined by the fact that the seller or key management of the selling company are required to stay on with the purchaser or company for an agreed upon period of time to ensure that client loyalty is not disrupted, resulting in them moving elsewhere because of the change in ownership. In certain cases, restraint of trade agreements are employed to prevent the seller simply starting up a similar business and luring his old customer or client base back to him in the form of his new enterprise. A restraint of trade agreement would incorporate certain provisions preventing or limiting the seller from becoming involved in a business of a similar nature to that which he has just sold. Limitations could include the seller not being able to trade in a similar business for a certain period of time or within a certain kilometre radius of the location of the business sold. In making restraint of trade payments, companies are acknowledging and placing a definite value on intellectual capital.

As discussed in paragraph 3.3, a feature which is having a revolutionary affect on the way customers are courted and treated is the internet. Customers are continually being introduced to better services and better products coupled with ever improving ease of acquiring those services or products. In the case of customer dissatisfaction, access to the customer relations department can be immediate with problems being resolved timeously and amicably. All of this allows the customer to enjoy a sense of importance to the company which is as it should be. A personal experience illustrates this point. The experience, involving a pair of faulty sports shoes manufactured by a leading sports brand left the author feeling aggrieved when the sports outlet from which the shoes were purchased indicated that the manufacturer would not be interested in the problem. However, a simple electronic mail message to the manufacturer's headquarters highlighting the problem was immediately responded to and a brand new pair of shoes was delivered within a week. All of this was achieved electronically. At no point was physical contact made with the supplier and the author was no more to them than an electronic message on a terminal screen. However, the company recognised a dissatisfied customer and their priority was to restore customer loyalty which was about to be damaged. The response of this company gave a clear indication of the value which they place on maintaining their customer capital and indeed instilled a level of brand loyalty which whilst already there before is now at the point where it will not be easily swayed.



### 3.6 Value and the efficient markets theory

The value of a company was considered briefly, by way of introduction, at the beginning of chapter one of this study. Mention was made of how share prices are affected by the perceptions of investors in the market place. The market value of a company is calculated simply by multiplying the number of shares which it has in issue, by the market price per share. This is also referred to as the market capitalisation of the company. In most instances the total number of shares issued by a company remains constant unless the company undertakes a further issue or alters the par value of its shares or buys back some of its shares already in issue. As it is based on two distinct variables, one of which moves totally outside of the control of the company, the total market value of a company will be in a constant state of flux. The primary cause of the fluctuations in total market value will be movements in the share price.

Whilst chapter one discussed the factors which would influence the perceptions of investors, it did not consider imperfections in the market place which could skew those perceptions. In order for an investor to arrive at an investment decision, he needs to have relevant information at his disposal. It is the very nature and timing of such information which determines its relevance and which could sway the investor's decision either way. Based on research conducted by Professor Eugene Fama in 1965, the efficient market hypothesis was

formulated (Francis 1991). Fama proposed three levels of market efficiency, being;

- weakly efficient market hypothesis
- semi-strong efficient market hypothesis
- strongly efficient market hypothesis

“Weakly efficient markets were defined as markets where past prices provide no information that would allow a trader to earn a return above what could be attained with a naive buy-and-hold strategy” (Francis, 1991: 545). This assumes that investors would not alter their investment decisions in any way based on the information at their disposal and that the undiluted impact of new, relevant information would be seen in share price adjustments occurring after the release of such new information.

“The semi-strong efficient markets hypothesis requires more evidence of market efficiency than the weakly efficient markets hypothesis” (Francis, 1991: 550). This hypothesis puts forward the notion that while share prices are influenced by new information which becomes available to the investors, very often that information has been anticipated and has already been taken into account in the decisions made by investors prior to the information officially being released. Consequently, share price adjustments after the release of the information may not be as pronounced as they would have been if the new information came totally as a surprise to the investors.

“The strongly efficient markets hypothesis suggests that all information, public or not, is fully reflected in security prices” (Francis, 1991: 558). This assumes that all information which may affect an investment decision is readily available to all investors simultaneously and that no single investor would be able to profit from a situation where he had access to information before anyone else. In other words no investor would be in a position to have prior knowledge of information which would cause an imminent increase or decrease in the price of a particular share and consequently buy or sell the share prior to the price being affected by the information as it becomes available to all other investors. The existence of such a market is however too much to expect. Information by its very nature stems from a source and as a result will be available sooner to those closer to the source. Countries around the globe have battled for years with what is commonly known as insider trading. Insider trading is can be simply defined as trading in shares based on price-sensitive information which is not yet public knowledge and which has been obtained through a relationship of trust or by some illegal means. Insiders are defined as “...directors, officers, consultants, significant shareholders, and any other persons who have access to material, nonpublic information about a firm” (Francis, 1991: 558). For information to be public knowledge it must have been made available to the public through the printed or electronic media.

The Companies Act of South Africa prohibits insider trading in terms of section 440F and warns that anyone using such price-sensitive, unpublished information shall be guilty of a

criminal offence and will be punishable by law. Unfortunately, certain insider trades can not be detected as easily as others and as a consequence there will always be material, price-sensitive information which is utilised by certain investors prior to becoming public knowledge. If markets were indeed perfect and information was available to all investors simultaneously then there would not be a need for measures to prevent and restrict insider trading because in terms of the strongly efficient markets hypothesis this information would be of no investment value.

### 3.7 Measuring the value of intellectual capital

Karl-Erik Sveiby authored an article in January 2001 in which he categorises methods of measuring intangible assets. He proposed the following four categories after having considered twenty-one different approaches (Sveiby, 2001):

#### 3.7.1 Direct Intellectual Capital Methods (DIC).

These methods seek to identify the underlying components of the intangible asset and attempt to place values on each component which when aggregated will give a value for the intangible asset.

### 3.7.2 Market Capitalisation Methods (MCM)

In this instance the intellectual capital or intangible assets of an enterprise are valued at the difference between the market value and book value of the enterprise.

### 3.7.3 Return on Assets Methods (ROA)

This method divides average pre-tax income into average assets employed over a period in order to establish the rate of return achieved by the enterprise. This rate of return is then compared to the industry average to establish the performance of the enterprise in relation to its peers. Where the return generated by the enterprise is higher than the industry average, this is deemed to be as a result of the intellectual capital of the enterprise and the excess return is discounted using an appropriate discount factor in order to arrive at a present value for intellectual capital or the intangible asset value of the enterprise.

### 3.7.4 Scorecard Methods (SC)

These methods follow a process very similar to that adopted under the direct intellectual capital methods in that intangible assets are valued by considering their

respective components and placing values on these. The process involves the creation of a series of indicators which are monitored and valued. As regards this method, Sveiby notes that designing the indicators that may allude to the presence of intellectual capital is not a problem but interpreting the results of the indicators can be an extremely difficult task (Sveiby, 1998).

The above categories comprise methods that may be significantly different in their approach and as a consequence will arrive at values that also differ significantly. Determining which method or category of method to use will depend on the needs of the user and the purpose for which he or she wishes to use the value arrived at. Clearly the direct intellectual capital methods and scorecard methods would require more input data and would provide results more for internal management use. As opposed to this, external users of the financial statements of the enterprise would be more likely to use market capitalisation methods or return on assets methods to value intellectual capital.

Whilst it is not the intention of this study to consider the direct intellectual capital methods or scorecard methods of valuing intellectual capital, leading research on these types of measures is discussed under paragraph 3.8.4 below.

### 3.8 Measuring the value for this study

This study focusses on a comparison of three general methods being mooted for arriving at a valuation of intellectual capital. Essentially these indicators are all based on expected future profitability of the company. In the first two instances this anticipated future profitability is based on the expectations of investors as evidenced by movements in the share price whilst the third measure projects future profitability based on past performance in relation to competitors in the same industry. According to a study conducted by the International Federation of Accountants in 1998, the need to make comparisons of intellectual capital between organisations has led to the development of the three broad indicators (International Federation of Accountants, 1998).

#### 3.8.1 Market-to-Book Values

This indicator is by far the simplest of the three methods of valuing intellectual capital. In this case the value of intellectual capital is arrived at by simply comparing the market value of the enterprise (ie. the share price as listed on the appropriate stock exchange multiplied by the number of shares in issue) with the book value of the enterprise (ie. the net asset value according to the balance sheet) at the reporting date. However, coupled with its simplicity, this indicator has several shortcomings.

These are considered by looking at the two components used in the comparison, namely market value and book value, individually.

Firstly, while the market value of the enterprise is influenced by several factors within the control of the enterprise it can also be influenced by several factors outside of the control of the enterprise and this in turn would influence the value of intellectual capital arrived at by using this method of valuation. Factors outside of the control of the enterprise but which could influence its share price include international and local investor sentiment, interest rates, the sector or industry within which the enterprise operates, underlying stock market problems such as scarcity factors, liquidity problems and lack of efficiency, import and export controls, taxes and international trade relations. This list is by no means exhaustive but does serve to illustrate that the share price could be driven up or down based on these factors and the enterprise would not always be in a position to counter or mitigate the effects thereof. In other words companies have no control over this essential element used to arrive at the value of their intellectual capital.

The simple availability of data as discussed in paragraph 3.6 can have significant influence over share prices traded in imperfect market conditions.



Secondly, as discussed in chapter one of this study, the financial statements of organisations are based on historical cost accounting and balance sheets thus often include assets at carrying amounts which no longer bear any resemblance to their true replacement cost or market value. These carrying amounts are also significantly influenced by differing accounting policies adopted by different companies. According to AC101, para. 22, accounting policies are the specific principles, bases, conventions, rules and practices adopted by an enterprise in preparing and presenting financial statements (AC101, 1998). The onus is on the company to prepare financial statements which fairly present the financial position and performance which it has achieved, using generally accepted accounting practice. Whilst this does seemingly suggest a measure of uniformity in the preparation of financial statements, various methods of measurement can be used which will satisfy preparation in terms of generally accepted accounting practice but which may differ from one company to the next and thus influence the carrying amounts of assets and liabilities or performance results.

### 3.8.2 Tobin's "q"

Dr. James Tobin was awarded the Nobel prize in 1981 for his contributions towards the analysis of financial markets and their relations to expenditure decisions,

employment, production and prices. Tobin arrived at what is commonly known among economists as the “q” ratio after research conducted on monetary theory and investment decisions. His research focused on capital accounts of economic units, sectors of the economy and the economy as a whole (Tobin, 1969). In essence the “q” ratio is an investment decision tool and according to Tobin should be constantly monitored when considering investment decisions (Tobin, 1998). The “q” ratio simply measures the ratio between the market value of an asset and its replacement cost. Tobin draws attention to the fact that the market value of an asset is driven by its replacement cost and cites an example of how prices of existing homes would increase in times of rising building costs (Tobin, 1998).

One of the key focuses of managers of companies is and always has been to maximise profitability and returns for the shareholders or owners of the company. Before any investment is made in an asset or venture, careful financial planning must be undertaken to consider the returns expected on the investment. Clearly assets or ventures that will produce a return in excess of the costs involved in securing or establishing them are what a company would wish to invest in. In other words where the market value of the investment exceeds its replacement cost. This is the “q” ratio, the differential by which market value exceeds replacement cost of the asset or venture.

The underlying arguments of the “q” ratio have been suggested as another measure of intellectual capital and this essentially takes the market-to-book indicator one step further in that it compares the market value of the enterprise to the replacement cost of its assets. In other words book value is replaced by replacement cost and this assists in eliminating distortions which may arise in the valuation of intellectual capital as a result of the historic nature of the data which is contained in financial statements, as well as different accounting policies adopted. However, this measure is still subject to the influences on share prices as discussed in point 3.8.1 above.

### 3.8.3 Calculated Intangible Value (CIV)

According to the abovementioned study conducted by the International Federation of Accountants in 1998, CIV calculates the excess return on hard assets and then uses this figure as a basis for determining the proportion of return attributable to intangible assets. Essentially, a comparison is made of the company’s performance or return on its asset base over the most recent three year period with that of its competitors in the industry within which it operates. When measuring a company’s return on assets a simple ratio is used where the profit of the company per the income statement is divided by the total assets of the company. This ratio is expressed as a percentage and illustrates the effectiveness with which a company is using the asset

base at its disposal to generate profits. This can be illustrated simply by using an example of a fixed interest investment placed with a financial institution. Assume an investor had R10 000 to invest and was informed by the financial institution handling the investment that at the expiration of a twelve month period an amount of R11 500 would be received on maturity of the investment. This would represent a return of the original asset of R10 000 plus a gain or profit of R1 500 received by way of interest. To establish the rate of return the interest of R1 500 would be divided by the asset base of R10 000 thus arriving at a return on investment of .15 or 15%.

Where the comparison of the ratio of profit to total assets reveals that the company has performed at a level which exceeds the industry average return on assets this is deemed to be as a result of the intellectual capital of the company. In other words the company is benefitting from synergies within itself which give it an edge over its competitors and allow it to perform at a level in excess of the industry average. The amount by which a company's profits exceed the industry average is called its super profit element. These are the profits above what would normally be expected using the assets employed by the company. This super profit element is then discounted using the weighted average cost of capital (WACC) of the company.

While CIV is mathematically the most technical of the three indicators, it too has certain limitations. As mentioned above, CIV calculates intellectual capital based on a company's past performance over and above the average performance of all companies in the relevant industry. A look at the theoretical life cycle of a company highlights one such limitation in the application of CIV. As a new company starts out it has expectations of low profitability in its early years as it establishes itself and finds its market niche. For successful companies, this is usually followed by a period of growth in profitability and profile as they become recognised as market leaders in their field or industry. The third stage is one where growth is tempered and profitability tends to level off as the company reaches maturity and simply maintains its profile and reputation in the industry while trying to stay ahead of its competitors and the newcomers beginning the same journey which it has already travelled. Something as simple as the stage of a company's life cycle could influence whether or not it manages to generate a return on its assets employed in excess of the industry average return on assets and as a consequence whether using CIV attaches a value to its intellectual capital. A company in stage one or two of its life cycle could find itself with a wealth of intellectual capital but because its return is not in excess of the industry average, no value would be attributed to its intellectual capital in terms of the CIV method.

The mechanics of CIV are best illustrated by means of a worked example. The format of this example follows that used by IFAC in their study conducted into the measurement and management of intellectual capital in 1998 but the results of Nampak Ltd, a listed company operating in the packaging and printing industry, have been used as part of the workings in order to be more relevant to this study being conducted on South African companies.

Illustrative example:

(Note: All amounts shown are based on the results of Nampak Ltd and the Packaging and Printing sector of the Johannesburg Securities Exchange for the years 1997, 1998 and 1999.)

- Calculate average pre-tax earnings of the company for the past three years : R837 533 000.

The reason why pre-tax earnings are used is to eliminate any distortions which may arise as a result of the differences in tax status between companies. These differences in tax status are not necessarily as a result of different rules applying to similar companies but rather as a result of the age from a tax point of view of the asset base employed. Long term assets employed in the production of income of a company may be written off for tax purposes over their deemed useful lives. Once the full cost of an asset has

been written off for tax purposes, it will not attract any further deductions even though still in use in the production of income.

- Calculate the book value of the average year end assets of the company for the same three year period : R4 881 100 000

This is simply establishing the average asset base used to generate the pre-tax return discussed above.

- Calculate the average return on assets for the company over this period : 17.16%.
- Calculate the industry average return on assets for the same three year period: 13.95%. As the CIV method of valuing intellectual capital is based on super profits generated over and above the industry average, IFAC contend that, should the company's return on assets be below the industry average, CIV cannot be used to arrive at a value of intellectual capital for that company as the result will be negative and would be meaningless.
- Multiply the industry average return on assets by the company's average assets employed : R680 913 000. This is done to estimate what return which the average company in the industry would have generated using the asset base employed by the company for which intellectual capital is being calculated.
- Calculate the excess return or super profits generated : R156 620 000

(R837 533 000- R680 913 000). This gives an indication of how much more efficient the company has been in generating a return on its asset base than the average company in the industry.

- Arrive at the after tax return : R101 803 000 ( $R156\,620\,000 \times 0.7$ ). As all profits are subjected to tax, the super profit benefit would attract tax as well, and as a result the real benefit to the company would be the after tax amount.
- Calculate the company's cost of capital : 19.70%. What is being sought here is a suitable discounting factor to use in finding the present value of the projected after tax super profits. IFAC suggest that the company's cost of capital would be one such suitable discounting factor.
- Calculate the net present value of the premium : R516 766 000. To arrive at this value the after tax super profit element of R101 803 000 calculated above is divided by the cost of capital of 19.70%. This is said to be the present value of the projected after tax super profits and represents the intellectual capital of the company.

Of interest at this point is a comparison of this value for intellectual capital with the asset base already recorded in the company's balance sheet. The average total recorded asset base used in the calculation above amounted to R4 881 100 000. The above calculation has suggested an intellectual capital value of R516 766 000. This



would amount to the inclusion of a new asset on the balance sheet which represents 10.6% of the asset base already recorded and would certainly serve to strengthen the apparent financial position of the company.

#### 3.8.4 The Skandia Navigator

Whilst it is not the intention of this study to evaluate the mechanics of the complicated and intensive methods adopted by Skandia to value its intellectual capital, a brief summary of these methods will add to an appreciation of the range of calculations being employed in an attempt to arrive at a satisfactory value of the asset. Skandia is the largest insurance and financial services company in Sweden and in 1991 appointed Leif Edvinson to the position of director of intellectual capital. Skandia was driven to this appointment as its directors and senior management began to realise more and more that traditional management theory no longer seemed to sit well with service type or knowledge based organisations. What was becoming patently clear was the fact that the business was moving away from strength in traditional, tangible assets and was beginning to find strength in the areas of customers, service quality, infrastructure and perhaps most importantly its management and staff.

The directors' beliefs were borne out by their actions and one of Edvinson's first projects was to form a team of financial specialists to investigate and develop means of measuring and disclosing intellectual capital in the company's financial statements. Edvinson was obviously the man for the job as he confessed to having long been troubled by what he called the essential paradox of modern business investment. This paradox was: "that if a company invests in those things that will make it competitive, like human capital and information technology, it will suffer a short term deterioration of its profit and loss statement, which in turn reduces the value of the balance sheet, thereby reducing the book value of the organisation" (Edvinson and Malone, 1997: 42). This comment corroborated a suggestion made to the Committee of the American Accounting Association which carried out research for its report on human resource accounting in 1973. It was suggested to that committee that it was possible for an enterprise to increase short term profitability by reducing its investment in human assets. The downside of such a move however was potentially reduced profitability in the longer term (American Accounting Association, 1973).

Edvinson and his teams at Skandia then set about researching the characteristics of intellectual capital and in 1992 suggested the following three fundamental principles:

1. Intellectual capital is supplementary, not subordinate, information to financial information.
2. Intellectual capital is nonfinancial capital, and represents the hidden gap between market value and book value.
3. Intellectual capital is a debt issue, not an asset issue.

(Edvinson and Malone, 1997: 43)

The third principle arrived at simply meant that intellectual capital was to be viewed as part of the equity of the company.

What was significant in the research conducted by Skandia was the level of importance given to the new intellectual capital function. Edvinson quotes Jan Carendi, vice president of Skandia as saying: “I was convinced that we needed an intellectual capital function that was the equivalent of our existing functions such as finance and marketing” (Edvinson and Malone, 1997: 42). Skandia was not interested in following a possible new fad. They recognised the enormity of the challenge together with the intrinsic value which it contained and realised the benefits that could be harvested if they approached it professionally.

According to Edvinson and Malone in their book titled *Intellectual capital* the research done by the team revealed certain success factors within the company which

had to be maximised. “These success factors could in turn be grouped into four distinct areas of focus:

- Financial
- Customer
- Process
- Renewal and development

as well as one commonly shared fifth area:

- Human”

(Edvinson and Malone, 1997: 17).

Each of the abovementioned focus areas were seen to comprise several key indicators which could be used to measure performance. The indicators measured results in anything from financial value measured in currency to ratios, efficiency measures based on time, workload and quality and developmental measures concentrating on training, research and development aspects. This was seemingly the simple task; establishing key indicators which contributed to the company’s success. Of far greater difficulty was attempting to measure the extent of value contributed by each indicator. This led to the birth of what became known as the Skandia navigator. This was a system developed to track performance by monitoring the key indicators identified above. “The indicators the Navigator tracked ranged from the

commonsensical - fund assets, income per employee, marketing expense per customer - to the unexpected - telephone accessibility, days spent visiting customers, information technology literacy, even laptop computers per employee” (Edvinson and Malone, 1997: 18). Skandia, in their annual report describe the Navigator as a mechanism which provides a balanced picture of the enterprise by linking the past, the present and the future. The focus of the past is on financial results while the present has a customer focus, process focus and human focus and the future focus is on renewal and development (1998 Skandia Annual Report). While the Navigator set about tracking the indicators, it became necessary to evaluate the results and a number of different methods of valuation were devised including what became known as the IC-Index. Results of the indicators tracked by the Navigator appeared in what was the first public Intellectual Capital annual report produced by Skandia in 1995 as an appendix to their annual financial statements. At a symposium on Intellectual Capital held in Washington DC in 1996, Commissioner Wallman made the following prediction: “...Intellectual Capital and the Skandia supplement approach in particular, would one day become the heart of the modern corporate annual report - to which today’s financial statements would be added as appendices” (Edvinson and Malone, 1997: 18).

As mentioned before though, the Skandia approach is extremely intensive, involving

an entire department devoted to evaluating and measuring intellectual capital and as a consequence is a costly exercise. Not all companies could be expected to embark on an exercise of such magnitude and a suitable alternative would need to be established.

## **CHAPTER 4**

### **METHODOLOGY**

#### **4.1 Introduction**

This chapter details the research approach undertaken in the study, explaining how the data was obtained and which statistical tests were performed. It may be worth noting again that the aim of the research is to investigate whether Tobin's "q" and CIV are acceptable methods of valuing intellectual capital for the purposes of recognition in the financial statements of companies and provide values that satisfy the asset recognition criteria discussed in chapter two of this study.

#### **4.2 The nature of the data**

The data used in this study were mainly of a historical nature and in some cases a statistical nature. These two forms of data were subjected to various tests detailed in this chapter which sought to compare historical with historical, statistical with statistical and combinations of the two giving rise to experimental data. Leedy defines these different forms of data as follows:

- historical data - "Written records and accounts of past happenings and

events”

- statistical data - “Observations that are quantified and exist in the form of numerical concepts”, and
- experimental data - “Observations of certain differences and likenesses that arise from comparison or contrast of one set of observations with another set of similar observations.” (Leedy, 1993: 122).

The primary data used were obtained from the Bureau of Financial Analysis. This bureau contains a large data base consisting of historical data obtained from the annual financial statements of companies listed on the JSE.

In terms of section 19 of the Companies Act No. 61 of 1973 (the Companies Act) a company may take the form of either a company having a share capital, or a company limited by guarantee. Companies having a share capital may be either public companies or private companies. It is not the intention of this study to consider companies limited by guarantee, private companies and public companies not listed on the JSE and so the focus has been on a selection of public companies having a share capital and whose shares are being traded on the JSE.

The selection of companies included those listed in the following sectors of the JSE:



- Beverages
- Clothing and textiles
- Food
- Furniture and appliances
- Retail
- Building, construction and engineering
- Diversified industry
- Electronics and electrical
- Hotels and leisure
- Information Technology
- Media
- Packaging and printing
- Service
- Telecommunications
- Transport
- Chemicals, oils and plastics
- Banks
- Financial services
- Property

The sectors omitted from this study included:

- Education and staffing
- Healthcare
- Redevelopment
- All mining sectors
- Investment trusts
- Private equity funds
- Assurance and insurance sectors
- Property loan stock and unit trusts
- Venture capital
- Development capital
- Cash companies

The reasons for omitting the abovementioned sectors from this study included lack of sufficient historical data, inappropriate company structures or peculiar industry types

The Companies Act, in terms of section 286, places a requirement on all companies to produce annual financial statements and in the case of public companies these are deemed to be public documents to which any party with a vested or other interest in the company may

have access. Consequently, the data obtained from the Bureau of Financial Analysis are of a public nature and the use thereof does not contravene any ethical standards. Because the underlying data originate in public financial statements, the integrity of the data need not be established.

#### 4.3 The methodology

Leedy in his book titled *Practical Research* explains that research methodology can be either of a qualitative or quantitative nature. He goes on to say : “Quantitative methodologies manipulate variables and control natural phenomena.” (Leedy,1993: 143). As the data used in this research was numerical in nature and was tested by manipulation discussed later on in this chapter, the research methodology was of a quantitative nature. The statistical tests performed on the data sought to establish whether any significant relationships existed between the three measures.

#### 4.4 The data

Leedy suggests that the characteristics of data need to be carefully analysed before attempting to apply statistical methods to it and gives the following criteria to be considered:

- The kind of data

- The scale of measurement of data
- The number of groups from which data arises
- Variables

(Leedy, 1993: 249)

When considering the data used in this study and the criteria mentioned above, the following was noted:

4.4.1 The kind of data used in this study consisted of discrete companies with independent data. The data within each company though was continuous and of a dependent nature.

4.4.2 The scale of measurement of the data used was deemed to consist of both:

- Nominal data in that each line item of data per company has a specifically assigned name, and
- Ratio data which is data expressed in terms of other components of data. An example of this kind of data would be the earnings per share ratio which is detailed in point 4.5.2 below.

4.4.3 The data used in this study was classified as one-group data as it consisted of data

relating specifically to the financial information of public companies listed on the JSE.

4.4.4 Finally, the data used was considered to be multivariate in nature.

The analysis of the data was deemed to be both of a descriptive nature where the statistics describe the nature of the data in relation to its own parameters as well as its relationships with other data and also an inferential nature from which conclusions were drawn regarding the proposal.

#### 4.5 A description of the data

The data obtained from the Bureau of Financial Analysis comprised specific values for certain companies listed on the JSE for each of the years from 1993 to 1999 and consisted of the following:

##### 4.5.1 Number of ordinary shares issued

Company ownership is effected through the holding of shares which have been issued by the company. While a company may have various classes of shares in issue, it is

the ordinary shares which represent true ownership. The reason for obtaining this information for the research was to be able to calculate the total market value of the companies. Total market value is arrived at by multiplying the number of ordinary shares in issue by the market price per share. This is also referred to as the market capitalisation of the company.

#### 4.5.2 Earnings per share (EPS)

Earnings per share is a ratio used by financial analysts and investors alike to make judgements on the performance of a company over a financial year. The ratio is arrived at by dividing the company's earnings for the year by an appropriately weighted average number of shares in issue during the year. This ratio is an indicator of the amount of earnings attributable to each share in issue. According to AC104 earnings is defined as the net profit or loss for the period attributable to ordinary shareholders after deducting preference dividends (AC104, 1998).

AC104 requires that all companies whose shares are publically traded disclose their earnings per share figure in the financial statements. For the purposes of this study, the EPS figure was used to calculate the Price Earnings ratio which is discussed in more detail in paragraph 4.7.2.

#### 4.5.3 Year end share price (per JSE)

This is the share price per ordinary share as quoted on the JSE at the end of the year.

This was used to calculate the year end market value of each company as mentioned in point 4.5.1 above.

#### 4.5.4 Ordinary shareholders interests

Ordinary shareholders interest consists of ordinary share capital and reserves. Reserves can be either distributable to shareholders or non-distributable and represent an accumulation of profits that have been retained in the company. Ordinary shareholders interests represent the book value of what is attributable to the true owners of the company and is consequently representative of the net asset value of the company as disclosed in the financial statements. This amount was used as the book value of the company to be compared to the market value at the same date.

#### 4.5.5 Total assets

This represents the total asset base employed by the company in its income generation activities. Total assets was used as the denominator in the equation to

arrive at return on assets which is described in more detail below.

#### 4.5.6 Replacement cost of assets

This is a value calculated by the Bureau of Financial Analysis to estimate the cost of having to replace a company's asset base. The amounts were used in calculating intellectual capital using Tobin's q.

#### 4.5.7 Profit before tax

This is a calculation of the profit generated by the company over its financial year after taking into account all related expenses but before considering the tax expense which would be payable thereon.

#### 4.5.8 Cost of capital

This is the weighted average cost of a company's capital employed. Capital employed represents the sources of finance from both owners and lenders from which the asset base of the company is financed. Cost of capital is calculated by multiplying the cost of a company's equity by its equity base and multiplying its cost of debt by the debt



base. These costs are appropriately weighted by the ratio of debt to equity and result in what is commonly known as the weighted average cost of capital. The cost of capital percentages used in this study were obtained from a data base established by Dr Philip Court of Rhodes University in doing research into economic value added.

#### 4.6 Calculating intellectual capital using the three valuation methods mooted in this study.

##### 4.6.1 Market-to-Book values

The first of the measures for valuing intellectual capital considers a simple comparison of the market value of a company with the net asset value or book value of that company. Where market value exceeds book value, the excess is deemed to be the intellectual capital of the company.

In order to make this comparison, the market value had to be calculated for each company. This was done by multiplying the number of shares in issue at year end by the year end share price of the company.

Having established the market value, this was then compared to the book value which was represented by ordinary shareholders' interests and the resultant value taken to

represent intellectual capital. These intellectual capital values are contained in Appendix 1 of this study.

#### 4.6.2 Tobin's "q"

This measure is very similar to the Market-to-Book values measure but updates the book value of the company by restating the assets at replacement cost. Asset replacement cost information is data that is not publically disclosed by companies as it may be of a confidential nature. It was considered unlikely that such information would be made available by companies and so, for the purposes of this study, it was decided to use an amount calculated by the Bureau of Financial Analysis. The Bureau of Financial Analysis uses a standard formula for arriving at what they deem to be an additional amount to be added to the to the book value of the company in order to adjust the asset base from book value to replacement cost.

For purposes of calculating intellectual capital values using Tobin's "q", market values for each company were arrived at in the same way as for the Market-to-Book values calculation above. In order to arrive at the replacement cost of assets the amount derived by the Bureau of Financial Analysis was added to ordinary shareholders' interests.

At this point the market values for each company were compared to the book value of the company taking into account the premium added to represent the replacement cost of assets. Where market values were greater the difference was deemed to be the intellectual capital element. These intellectual capital values are contained in Appendix 2 of this study.

#### 4.6.3 Calculated Intangible Value (CIV)

In order to arrive at the value for intellectual capital using CIV it was necessary to calculate additional data. The process undertaken for each company was as follows:

- The average pre-tax earnings for each of the years 1995 to 1999, inclusive, were calculated by adding the pre-tax earnings of the most recent three years and dividing the total by three to arrive at the average pre-tax earnings over the respective three year period.
- The average year end total assets for the years 1995 to 1999, inclusive, were calculated by adding the book value of the total assets at the end of each of the most recent three years and dividing the total by three to arrive at the average total assets over the respective three year period.
- The average pre-tax earnings were then divided by the average total assets for

each of the years 1995 to 1999 respectively to arrive at the average return on assets generated by the company in each of the years.

- In order to continue with the calculation of CIV it was necessary to calculate the average three year return on assets generated by all companies operating within each of the relevant sectors of the JSE. This was done by adding the return on assets of all companies within each sector and then dividing that by the number of companies in the sector.
- The next step involved multiplying the average total asset base of each company by the average return on assets of the sector within which it operated.
- This gave an indication of the profitability of the company using its asset base in relation to what profits would have been generated if the company had experienced a return on assets equal to the industry average.
- Where the actual average pre-tax profits generated by the company exceeded those which it would have earned had it operated at the industry average, the excess was deemed to be as a result of the intellectual capital capabilities of the company.
- The excess profits calculated were derived from pre-tax data and at this point an after-tax excess profit amount was arrived at by multiplying the excess profit figure by 70%. The corporate tax rate in South Africa, whilst having

been as high as 50% in the late 1980's, gradually declined to 30% in 2000.

As the after tax excess profits were discounted to forecast an intellectual capital value it was deemed fitting to use the tax rate of 30%.

- The after tax excess profits were then discounted as a perpetuity using each company's cost of capital percentage.

These intellectual capital values are contained in Appendix 3 to this study.

#### 4.7 Comparisons of calculated intellectual capital values

After calculating the intellectual capital values of all companies using the three methods, the data was run through the statistical software program called Statistica and the following statistical tests were performed in an attempt to explore relationships between the three calculated values of intellectual capital and to establish whether any or all of the values were in fact providing relevant, reliable and comparable information. In an attempt to explore the relationships still further, the Market-to-book and Tobin's "q" values were converted to ratios by using the market value as a numerator and book value and replacement cost as the relevant denominators. This data was subjected to the same tests as described below and provided only fractionally different results in each case. The ratios arrived at are

contained in Appendices 4 and 5.

#### 4.7.1 Correlation analysis (Pearson correlation coefficient)

The data used in this test were the intellectual capital values calculated using Market-to-Book, Tobin's "q" and CIV. The purpose of the test was to measure the degree of relationship between the variables in order to establish whether they reflected similar trends in the values arrived at for intellectual capital. The correlation tests were performed yearly and across all sectors separately. If the results of these tests showed any two of the valuation methods to be highly correlated then one could assume that they were establishing similar conclusions regarding the value of intellectual capital.

#### 4.7.2 Multiple regression analysis

For these tests the price earnings ratios of the companies in the sample were introduced to act as dependent variables in the regression equation. The price earnings ratio of a company is calculated by dividing the market price per share by the earnings per share. This is also commonly known as the pay-back period and theoretically illustrates the number of years it would take for

the share to pay for its market price, or buy itself, by using its current level of earnings.

The purpose of this test was to establish whether any of the intellectual capital valuation methods produced results that supported trends in the price earnings ratios of the companies used in this study.

As with the correlation tests performed above, the other data used in the multiple regression analysis testing were once again the intellectual capital values calculated using Market-to-Book, Tobin's "q" and CIV. These values were used as the independent variables in attempting to solve the following linear regression equation:

$$\text{P/E ratio} = \$_0 + \$_1\text{MB} + \$_2\text{Q} + \$_3\text{CIV}$$

Key to above equation:

MB = Intellectual capital value calculated using Market to book

Q = Intellectual capital value calculated using Tobin's "q"

CIV = Intellectual capital value calculated using CIV

$\$_0$  = Intercept constant

$$\beta_1, \beta_2, \beta_3 = \text{Parameters}$$

#### 4.7.3 Logistic regression analysis

In addition to the multiple regression analysis carried out above, logistic regression analysis was performed in which the dependent P/E ratio was coded as either 1, predicting success, or 0, predicting failure and an attempt was made to establish whether the coded P/E ratio was a function of the calculated intellectual capital values by solving the following formula:

$$\text{P/E ratio (coded)} = 1/(1 + e^{-x})$$

$$\text{where } x = \beta_0 + \beta_1\text{MB} + \beta_2\text{Q} + \beta_3\text{CIV}$$

The key to this equation is the same as for the equation detailed in paragraph 4.7.2 above.

#### 4.7.4 Chi-squared test

In earlier chapters it was noted that the presence of intellectual capital in a company was recognition of the fact that the company enjoyed certain



synergies which enabled it to perform at superior levels to its competitors or the industry as a whole.

In an attempt to consider the extent to which the intellectual capital value calculated using CIV represented a recognition of synergies within a company and the probability therefore of future success of that company, a chi-squared test was performed using the coded CIV values and coded P/E ratios. The test sought to establish the frequency with which both CIV and the P/E ratio agreed in predicting potential future success or failure of each company and also to explore the degree of association between the two coded values. The reason why this test was only performed on the intellectual capital values established using CIV was due to them being earnings based, which is the same basis used for calculating the price earnings ratios.

As mentioned above the P/E ratio is determined by dividing market price by earnings. Market price is driven by supply and demand which is based on investors' perceptions of the future profitability or returns of a share and its risk profile. It follows then that higher demand for a share would result in higher market prices which in turn would result in higher P/E ratios. The P/E ratio is therefore often used as an indicator of market perception of a share.

Increases in the P/E ratio of a company would allude to it being considered favourably by investors and the opposite would be true for a company with a decreasing P/E ratio.

For purposes of this test both the CIV values and P/E ratios were coded as either 1, predicting future success, or 0, predicting future failure.

In order to allocate the coded values, each company's CIV value and P/E ratio was considered in relation to the industry average CIV value and P/E ratio. Where the company's CIV value was greater than the industry average, it was deemed to be successful and was allocated a code of 1. If the company's CIV value was below the industry average it was allocated a code of 0. The same process was carried out in allocating either a 1 or 0 when considering the P/E ratios.

## **CHAPTER 5**

### **RESEARCH FINDINGS**

#### **5.1 Introduction**

Results of the comparisons and statistical testing carried out are detailed in this chapter. A preliminary interpretation of the results is also made.

#### **5.2 Correlation analysis (Pearson correlation coefficient)**

The results of the Pearson correlation coefficient analysis are reflected in the table below. The content of the table includes correlations, population sizes and significance levels achieved across all groups within each of the five years 1995 to 1999. Correlations are deemed to be significant at the level  $p < .05$ .

	MB to Q	MB to CIV	Q to CIV
1999	.9984 N = 552 p = 0.00	.3434 N = 508 p = 0.00	.3358 N = 507 p = 0.00
1998	.9770 N = 471 p = 0.00	.2389 N = 425 p = 0.00	.2212 N = 426 p = 0.00
1997	.9928 N = 415 p = 0.00	.4288 N = 373 p = 0.00	.4257 N = 373 p = 0.00
1996	.9930 N = 398 p = 0.00	.3918 N = 356 p = 0.00	.3777 N = 356 p = 0.00
1995	.9857 N = 370 p = 0.00	.3366 N = 326 p = 0.00	.3088 N = 326 p = 0.00

Key to the table:

Eg. .9915 = degree of correlation (1 = strong correlation)

N = population size

p = level of significance

From the table it is clear that all relationships between the values of calculated intellectual capital were deemed to be significant.

The correlation between the values of intellectual capital calculated using Market-to-Book and Tobin's "q" was particularly strong, ranging from 0.9770 to 0.9984. This indicated very similar values being achieved by the application of the two methods. Unfortunately this result cannot be interpreted as having any real meaning for the following reasons:

Firstly, as discussed in earlier chapters of this study, the two methods involved here employ the same basic principles in comparing the market value of the company with its book value. The only difference being that Tobin's "q" seeks to update the book value to current replacement value. Secondly, it was also pointed out earlier that it was not possible to obtain true replacement costs for assets of the companies in this study and that book values were simply adjusted to estimated replacement value by adding an amount calculated by the Bureau for Financial Analysis. While this amount may have been calculated as accurately as possible, in all of the cases it constituted a very small percentage of the book value of the assets of each company. As a consequence, the difference between book value and replacement cost of the assets was very slight and one would therefore expect the results to be highly correlated.

The correlations between Market-to-Book and CIV were a lot weaker, ranging from 0.2389 to 0.4288. This reflected a significant difference in the values calculated for intellectual capital using these two methods. A further problem encountered in this comparison however was the fact that the correlation differences were not consistent when considered within each of the sectors on the JSE. These results can be viewed in appendix 6. The results obtained when considering the sectors in isolation reflect a range of correlations which extend from positively correlated to negatively correlated outcomes. As a result no positive conclusions could be drawn from this test other than the fact that one could not determine whether any of the methods employed were producing a meaningful value for intellectual capital.

### 5.3 Multiple regression analysis

The multiple regression testing was performed on all sectors for each of the five years. The coefficients arrived at for Market-to-Book, Tobin's "q" and CIV were in all cases very close to zero and therefore insignificant. Only the intercept term was significant. The intercept term is the constant that would exist if all other variables in the equation were equal to zero. The intercept term being significant thus confirmed the insignificance of the relationships with all other variables used in the equation. This indicated that the three values, Market-to-Book, Tobin's "q" and CIV were not good predictors for the dependent variable, the price-earnings ratio.

This means that no linear relationship exists between the dependent variable, P/E and the independent variables MB, Q and CIV and the multiple regression equation could therefore not be solved.

#### 5.4 Logistic regression analysis

As the multiple regression analysis revealed no linear relationship between the price earnings ratio and the intellectual capital values calculated using Market-to-Book, Tobin's "q" and CIV, logistic regression analysis was considered to establish whether Market-to-Book, Tobin's "q" and CIV could be used to predict whether P/E was successful or not. The results achieved were as follows:

	Observed	Predict 0	Predict 1	% correct
1999	0	131	147	47.1%
	1	55	173	75.9%
1998	0	94	113	45.4%
	1	38	180	82.6%
1997	0	66	84	44.0%
	1	27	196	87.9%

1996	0	51	109	31.9%
	1	19	177	90.3%
1995	0	49	63	43.8%
	1	27	187	87.4%

The above table reflects correct predictions for success ranging between 75.9% and 90.3%

These percentages while reasonably high are tempered by the fact that correctly predicting the failures ranged from only 31.2% to 47.1%.

## 5.5 Chi-squared test

The Chi-squared test produced the following rate of correct classification matrices.

	P/E ratio	CIV	
		0	1
1999	0	168 (56.8%)	128 (43.2%)
	1	92 (40.4%)	136 (59.7%)



1998	0	215 (70.3%)	91 (29.8%)
	1	102 (46.8%)	116 (53.2%)
1997	0	241 (80.1%)	60 (19.9%)
	1	100 (44.9%)	123 (55.2%)
1996	0	262 (79.9%)	66 (20.1%)
	1	99 (50.5%)	97 (49.5%)
1995	0	275 (88.7%)	35 (11.3%)
	1	101 (47.2%)	113 (52.8%)

The percentage of correct classification of success ranged from 49.5% to 59.7% while correct classification of failure ranged higher from 56.8% to 88.7%. Once again though there was little consistency in the results and too many incorrect classifications for any positive conclusions to be drawn from the results.

## CHAPTER 6

### SUMMARY AND CONCLUSIONS

#### 6.1 Introduction

The purpose of this study was to consider the proposal which sought to compare the Market-to-Book, Tobin's "q" and Calculated Intangible Value methods of calculating intellectual capital to establish whether any of these methods were acceptable for valuing intellectual capital for the purposes of recognition in the financial statements and whether they provide values that comply with the qualitative characteristics and recognition criteria outlined in AC000.

#### 6.2 Interpreting the values arrived at in appendices 1, 2 and 3

The underlying assumptions used to calculate intellectual capital in each of the three methods considered in this study are all consistent with, or hybrids of valuation methods that have been applied extensively in the past by both company management and investors. The true value of an organisation has always been construed as the market value indicated by the share price multiplied by the number of shares in issue. In other words it has always been recognised that the balance sheet of a company certainly does not represent the current value

of an enterprise and may in fact reflect a net asset value far removed from actual market value.

In the same way, determining the value of a company by using ‘return-on-asset’ methods has also been common practice among investors for many years and is still used today, even though other more scientific methods have evolved.

With this in mind, it becomes clear that the methods mooted in this study certainly have popular merit in the assumptions and processes that they adopt. They do however have some significant shortfalls as discussed in earlier chapters. In the light of this and bearing in mind that valuing intellectual capital is a relatively new concept, these methods should not simply be discarded as potential evaluation methods but evaluated further as is the intention of this study, and then possible refinement sought which would lead to the advancement of research on this subject.

A look at the values arrived at in appendices 1, 2 and 3 which reflect intellectual capital values calculated using the three methods introduced in this study reveals a range of differing results. Besides the lack of any correlation or relationships between the methods, as discussed in chapter 5 which considered the results of statistical testing done on the values, one also finds a lack of consistency in trends within some company results over the five year

period considered. Certain companies do reveal trends that appear to be superficially acceptable or normal whilst others have no apparent trend in the value of intellectual capital from one year to the next. This is possibly as a result of the influence of factors external to the company, being considered in the calculation of the values being arrived at. Clearly the effect of such external influences on the share price of a company will also affect the intellectual capital value in different ways. Share prices of some companies may be particularly susceptible to certain market pressures while others may hold up better under similar conditions.

### 6.3 Introducing the value in the financial statements

As discussed in chapters 1 and 2, in order for an item to be recognised as an asset in the balance sheet of a company it should satisfy the definition of an asset as offered by AC000 and the information given about it should also satisfy the prerequisite characteristics outlined in those chapters. The essence of these characteristics is that the information included in the annual financial statements of companies should be meaningful and be of use to those who read and analyse the financial statements.

The definition of an asset states that it should be a resource controlled by the enterprise as a result of past events and from which it is expected that future economic benefits will flow.

Regarding the issue of whether intellectual capital satisfies the definition of an asset, the author is of the opinion that this study and indeed the research of many others before have shown that there is undoubtedly a realistic expectation that future economic benefits will flow to the enterprise from a properly managed intellectual capital base. The only element that could be debated is whether or not the entire composition of what the enterprise views as its intellectual capital is actually controlled by it. Chapter three of this study considered the problem of controlling the human element of the organisation and noted that while companies sought to build loyalty among their work force, employees were still free to leave at any stage and could thus not be seen to be controlled by the employer in the absolute sense of the word. In the opinion of the author, for the purposes of deciding whether or not intellectual capital falls within the definition of an asset, the element of control should not be considered in absolute terms. Bearing in mind that intellectual capital fits snugly into the definition of an asset in all aspects except the element of control it is the opinion of the author that it would be incorrect to exclude it from being considered as an asset for not meeting the consideration of absolute control. It is not uncommon for assets to be the servants of more than one master, in other words, for control to be shared or to be less than absolute in the case of the majority stake holder. When one considers intellectual capital in this light, it falls squarely into the definition of an asset. There will certainly be components of the intellectual capital base which are controlled solely by the enterprise as well as other components over which the enterprise enjoys a lesser degree of control but where control

nevertheless exists by implication, particularly when those components are viewed as part of the greater whole. The contention of this study is then that intellectual capital as discussed here does satisfy the definition of an asset in full.

The next element to consider is the qualitative characteristics of the data being disclosed. Even though the measurement of intangible assets and in essence intellectual capital has been around in various stages of development since the 1960's it is still very much in the research and development phase. As can be seen from the content of this study, the subject of measuring intangibles brings with it a host of contentious issues, many of which can be debated at length. In paragraph 2.4 it was mentioned that the qualitative characteristics of information is what makes it useful to the users of financial statements. Taking the needs of the users into consideration however has a bearing on the way in which that information should be prepared and presented. In other words the needs of the users should be borne in mind when deciding on appropriate methods of valuing intellectual capital. The simple distinction between internal versus external users supports the use of direct intellectual capital and scorecard methods for internal use while external users would look more to using market capitalisation or return on asset methods.

Considering the characteristics of understandability, relevance, reliability and comparability the following conclusions can be drawn from the results of this research:

### 6.3.1 Understandability

Information provided in the financial statements of the enterprise should be understandable to a reader who has a reasonable knowledge of business and economic principles and practices. The author does not believe that the concept of intellectual capital would be an issue that leads to undue confusion in the minds of the users of the financial statements. After all, the majority of the users of the financial statements are investors or potential investors who by paying a price for a share which includes a premium over and above the net book value of that share, are acknowledging the fact that the value of the enterprise consists of more than simply the net book value reflected in the financial statements. In other words this demonstrates an awareness on the part of investors as to the existence of an intangible value within certain companies and this is supported by their willingness to pay that price for a share.

What would be critical in the instance of including a value for intellectual capital in the financial statements of the enterprise would be a clear and concise description of the methodologies, assumptions, components, and data evaluated and manipulated in arriving at the calculated intellectual value. This would mean a statement regarding the policies adopted by the enterprise in the valuation of its intellectual capital. South

African accounting statement AC101 requires that companies include details about appropriate accounting policies adopted and explanatory notes in their financial statements, to enable the reader to gain a full appreciation of the information contained therein. The statement adds that these accounting policies should be relevant and reliable in that they;

- i) fairly present the results and financial position
- ii) reflect the economic substance of events and transactions
- iii) are neutral and free from bias
- iv) are prudent
- v) are complete in all material respects

An appropriate statement satisfying the above requirements would certainly assist even the reader who does not necessarily possess a reasonable understanding of business and economic practices in understanding what intellectual capital is and how it is being monitored and measured by the particular enterprise. The accounting policies and explanatory notes would also be essential in allowing the user of the financial statements to make comparisons between intellectual capital values arrived at by different companies operating in the same sector and by companies operating in different sectors. In the same way as the method of valuing intellectual capital can



depend on the needs of the user of the information, so companies with different asset structures and operating environments would choose to value the asset differently. Companies that are capital intensive and offer products that are tangible would inevitably utilise different criteria and valuation methods to those with low tangible asset bases and whose products are mainly in the form of services or the provision of intangibles.

### 6.3.2 Relevance

As mentioned in paragraph 2.4.2, information is relevant when it influences the decisions of the users of the financial statements. Certainly having information about the intellectual capital of an enterprise could in most cases influence the decision of the user of the financial statements. This would be the case particularly where the information highlights aspects of the company that the user would not otherwise have been aware of. Users have in the past made estimates of the intangible and intellectual capital value of enterprises and then confirmed these estimates through the prices they are willing to pay to acquire the shares of the enterprise. Such estimates however have always been based on information available to the public together with the perceptions that the investor may have regarding the particular company. These decisions could well be enhanced by the inclusion of the company's

own analysis and calculation of its intellectual capital value. Such information would allow the users to make more informed investment decisions and may even lead to a more stable investment climate with fewer extreme fluctuations based on market 'hype'.

From Sveiby's study of methods of measuring intellectual capital it was noted that certain methods rely on the use of external and expected data, for example, share prices and expected returns on assets. On the other hand other methods rely on the monitoring and evaluation of internal data. The methods relying on the use of internal data are obviously more intensive in their approach and one would expect to gain more meaningful results from them regarding the valuation of intellectual capital. Detailing the results of these internal measures in the financial statements would in the opinion of the author be of far greater use to the external user of the financial statements than any values that he or she may calculate using external data such as share prices and expected returns on assets.

### 6.3.3 Reliability

Information is regarded as reliable when it is free from material error and bias. As regards the reliability of the intellectual capital values calculated in this study, it is

clear that the diversity thereof, especially intra-company, brings the reliability of the values into question. While some companies reflect values that may appear reasonably stable over the five year period there are others that have values that vary dramatically, in some cases interchanging between positive and negative values from one year to the next.

The reliability of the values is also brought into question due to the variables employed in calculating them. Two of the methods used to calculate intellectual capital in this study rely on the share price as one of the determinants of the value. As discussed earlier, the share price is under the influence of so many external factors which are totally outside of the control of the enterprise and to use this as a variable for determining a value managed and driven from a position internal to the enterprise appears paradoxical. In addition, the situation is complicated further in the instance of South Africa where market efficiency is weak and the Johannesburg Securities Exchange does not enjoy the liquidity and diversity of its larger and stronger counterparts in the United States of America and Europe. The local securities exchange tends to be dominated by the few larger role players and sectors and indices can often be distorted as a result of their actions. This again can have undue influence on share prices and the availability and distribution of information to all role players involved in the market. Sectors dominated by such larger companies will also see the

sector results influenced and distorted by a large company. This in turn may well result in a conclusion that a company does not generate returns which are higher than the sector norm and, in the case of valuing intellectual capital using the calculated intangible value method, that company may have little or no value attributed to its intellectual capital.

#### 6.3.4 Comparability

Information needs to be comparable to permit an evaluation thereof. For the information calculated in this study to be comparable it would be desirable to establish a uniform method of computing the intellectual capital values across all sectors and all companies within those sectors. However, just as companies are permitted to use different accounting policies to arrive at information disclosed in their financial statements, one would not be able to prescribe one single uniform method of valuing intellectual capital. Different methods may be more suitable for different business sectors.

The results of this study also did not single out any of the valuation methods as a preferred alternative. In fact with the values varying as they did intra-company and even more so inter company, what became patently clear was the fact that comparing

the values arrived at was practically impossible. The results of the statistical tests performed all point to inconsistencies and diverse correlations between the values calculated for intellectual capital. A simple inspection of trends in the intellectual capital values noted in appendices 1, 2 and 3 also reveals inconsistencies and intellectual capital values which vary dramatically.

The result of this is that firstly, as mentioned above, comparability is brought into question not only inter company but also intra company and this in turn automatically places a question mark over the reliability of the values achieved due to the apparent instability in the values.

It would appear then from the results of this study that arriving at a method of valuing intellectual capital for purposes of its inclusion as an asset on the balance sheet is not an easy task. It is the opinion of the author that we will see an increase in the number of companies like Skandia, spending large sums of money plotting their intellectual capital. For companies at the other end of the spectrum though, finding a simple valuation method that satisfies the asset recognition criteria and also provides information that meets the qualitative characteristics may indeed still be far off.

Being able to devise indicators to track components of a company's intellectual capital is

definitely possible and will no doubt contribute significantly to decision making processes within the enterprise itself. Placing values on the results determined from the indicators is a process which will, however, be very subjective. In the opinion of the author companies will disagree in two principle ways regarding the values placed on the individual indicators. Firstly, companies could disagree on which indicators to be tracked in evaluating the intellectual capital that exists within their structures. It is obvious that companies operating in different industries will seek to monitor different sets of indicators, and indicators that provide valuable feedback in the retail sector may not be as meaningful when used by companies operating in the information technology sector. Secondly, companies will also surely differ on the relative weightings to be attributed to the values attained from monitoring the indicators. In this instance disagreement may not only arise between companies operating in different sectors but also companies in the same sector having different internal structures and ideologies.

What becomes evident at this juncture is that intellectual capital is not like tangible assets which are distinct by their nature and can be valued based on similar attributes and capabilities. It is also not like those intangible assets that have already found their way onto the balance sheet in the form of brands, trade marks and similar assets. Though intangible, even these assets have discernible attributes and capabilities and this again allows for a fairly uniform approach to be adopted in placing a value on them. In contrast to all this, intellectual

capital whilst implying the same thing in different companies, may comprise of a host of different components in its sub-structures and as a result of this no single valuation method or approach could hope to attach a value which is consistently meaningful and a fair reflection of the value of intellectual capital. To quote Nick Bontis, director of the Institute of Intellectual Capital Research: “Intellectual capital will never be measured in the dollar terms that we are accustomed. Whoever is promising this is out to lunch. By definition knowledge cannot be measured. It is true that we can come up with proxy measures to tap into some sub-phenomena of intellectual capital but that’s it” (Bontis, 1998). It is in these proxy measures though, that the most acceptable measures may be sought.

#### 6.4 Recommendations

As regards the present, it would certainly be beneficial to see companies not only using intellectual capital indicators for internal management purposes, but also disclosing some information about their intellectual capital in published financial statements. This could include details on how it is monitored, what variables are measured and perhaps even an estimate of the value they believe it to have. As the measures are unlikely to meet the requirements for disclosure on the balance sheet, this would need to be by way of annexures to the annual financial statements. With such information at their disposal, external users would be able to gain a clearer picture of the intellectual assets of the company and be able

to place a more informed value on the market value of a company's shares.

The author is of the opinion that the answer for now is for companies to give information about the results of their own internal monitoring processes governing intellectual capital and for external users to continue to value the shares of the company as before but now with more extensive information at their disposal.

#### 6.5 Opportunities for further research

Further research should be done of companies currently valuing intellectual capital for internal management purposes using direct intellectual capital methods or scorecards and comparisons drawn between these values or indices and the values derived by applying market capitalisation methods and return on asset methods to establish whether or not any relationships exist between the values arrived at under the different valuation methods.

Research could be done to isolate factors other than intellectual capital which affect the market value of shares. Once these factors have been isolated, it may be possible to calculate an intellectual capital value or indicator. Examples of other factors would include factors affecting the economy as a whole, factors affecting particular sectors and factors influencing individual companies, such as mergers, management changes, large bad debts, profitable new



projects. All of these influence the market value of a share or the earnings of a company, which are used as independent variables in the models discussed in this study.

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## **APPENDIX 1**

### INTELLECTUAL CAPITAL VALUE CALCULATED USING MARKET-TO-BOOK

(all values '000)

GROUP	1999	1998	1997	1996	1995
ABI	4621570	4381176	1693237	1379124	1656178
AWETHU	518	35506	0	0	0
DISTIL	80284	262068	1189065	922841	552419
FORTUNE	70334	27304	33701	40480	54344
KWV-BEL	-126133	-23340	368875	274983	44203
SABPLC	29946080	40336600	33667530	32968400	22010543
SFW	-470333	168422	649189	258688	-163747
BEVERAGES					
ADONIS	-6881	-2125	-3745	-3295	-2803
AMMGROUP	-136662	-48674	0	0	0
BOLWEAR	-78954	-65416	-61062	-38000	-42384
BURLINGTN	-2589	19509	-2763	-3634	-5817
COASTAL	213388	130511	109252	86359	1394
FRAME	-715749	-438768	-544366	-441204	-371487
GLODINA	-49749	-52779	-46664	-40080	-22461
GUBINGS	-55882	-44648	-40119	-39038	-28074
NINIAN	-74142	-80504	-55119	-45797	-18983
PALS	-8543	-8409	-6935	-5538	-447
SEARDEL	-342401	-291783	-270819	-262974	-47593
TOLARAM	10012	-115	-6637	-9805	417
CLOTHING AND TEXTIL					
A-V-I	-2053840	-1816680	1149290	3603304	5294120
AFBRAND	-91852	355766	0	0	0
CADSWEP	1815783	2043698	2521351	2104537	1862860
CGSMITH	3892457	909052	6900780	7118820	6979580
CONAFEX	80794	103428	24722	21100	6783
CROOKES	-119353	-76961	4626	4159	-3198
DELCORP	1648010	1073618	1036606	2065823	1950602
DELFOOD	1241788	228662	872796	1299414	1479270
DELHOLD	1956138	1639550	1146265	2419569	2223983

HLH	-355707	418028	42058	992195	824916
I-&-J	-460933	-370786	222625	406426	764949
ILLOVO	596015	512936	1716189	564275	349484
INTRADING	39996	0	0	0	0
KOLOSUS	-104843	132939	-21660	27652	103729
LIFESTYLE	319257	567374	363371	0	0
NAMFISH	34083	-13337	7048	-1555	26969
NAMSEA	-20064	-17742	-13081	2134	79489
NATCHIX	-31650	-27677	6008	34718	0
OCEANA	64835	223336	336773	303003	249583
OTK	-175465	550578	989965	0	0
RAINBOW	-289451	-508712	57402	148997	353323
SEAHARV	52516	78807	92345	324937	266968
SOVFOOD	-36931	5022	62818	165206	0
TIGBRANDS	5092306	3214745	7069304	6228350	5527439
TONGAAT	282157	-331622	3663427	2641611	1324512
WBHOLD	-20731	-19366	-11530	-8439	-12891
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FOOD					
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AMAPS	0	150399	158375	0	0
ANBEECO	-11068	-3949	-7376	4540	-8333
CEDARGRO	-3048	34134	0	0	0
DAEWOO	87447	64710	57570	94210	77798
FRIDGEM	-41065	2323	564443	143682	0
NUWORLD	53992	405660	401430	187107	93468
OMEGA	-94217	202611	59282	66993	15172
STEINHOFF	1330928	0	0	0	0
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FURNITURE & APPLIAN					
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AF-&-OVER	-20611	-18846	-37430	9119	-21057
AFGLASS	-30213	0	0	0	0
AMLAC	0	1950	8269	23748	0
AUTOQIP	3681	27875	3997	2646	-2572
BEARMAN	-45351	-14000	200646	242275	280453
IMPERIOLOG	-65943	-130371	-39147	262817	192739
BRANDCO	-81991	298291	7522	19217	10807
BUSBY	31267	295384	0	0	0
CASHBIL	4284	20010	10366	42649	247123
CHET	-894	21128	0	0	0
CMH	11415	433	29200	149605	35964
DAWN	71156	0	14417	45944	44631
DYNAMO	-108443	138305	0	23252	42546
EDCON	-295624	2660095	4526944	6890139	5398501
ELLERINE	501186	244675	1962314	650320	579050
FASHAF	77782	783587	211502	169639	15775
FOSCHINI	1281340	2907156	2333598	4940146	3730792

GLOHOLD	-62746	-8624	67917	1001970	242351
HEAVEN	36428	120994	137374	0	0
HOMECHOIC	768994	244510	347720	154453	0
HUDACO	-17638	-65267	297553	428092	554970
ILIAD	14804	6620	0	0	0
INMINS	-17455	-18424	13043	14416	11187
INVICTA	-96185	256818	258772	143825	73891
ITLTILE	268892	274612	171804	73061	17574
JDGROUP	2420600	3447240	1759070	1180695	269732
LA-STORE	223147	395144	287744	33212	37
MATHOMO	-95293	24969	221323	65633	0
MCRTAIL	-88382	973301	1284092	1593071	1912069
METCASH	5462991	4272202	2750177	2526810	1475072
MIDAS	69339	35957	37006	16833	104585
NICTUS	-833	-692	-5198	-835	-56
NUCLICKS	1654835	1033316	1087283	470253	538494
PEPGRO	1130670	1624222	1991684	1501219	1444993
PEPKOR	2866301	3472471	3412443	2580323	2472096
PICKNPAY	2678134	3092930	1936244	1683630	1010925
PIKWIK	1284950	1555916	1145694	965390	646260
PRIMATOY	0	32738	0	0	0
PROFURN	5114872	952245	1035818	203803	197548
RAG	-173000	755788	-417393	0	0
RELYANT	-250172	33861	-157758	-148626	-131492
RENAISAN	0	9098	0	0	0
RETCORP	34297	289998	152932	86632	1904
REX-TRUE	-42740	-24265	-57208	15267	-38026
SHOPRIT	3291011	4703065	2820066	1551198	959633
SPECLTY	685941	784644	369681	1033553	415206
SPORT	117634	0	0	0	0
STORECO	423892	492508	246058	615994	273004
TILEAFRIK	59865	0	0	0	0
TRUWTHS	2012225	1836127	0	0	0
UNIGRO	10677	53004	8367	560	4434
VALAUTO	-6337	-4801	-2561	-2932	-4060
VALCAR	-2704	1998	-134	-1050	-1149
WETHLYS	150463	183454	0	0	0
WINBEL	-21159	-17301	17517	5673	5040
WINHOLD	-35478	-27251	33903	10422	3025
WOOLIES	2243855	3411106	-1126550	0	0
WOOLTRU	2703582	1975512	6857356	4537550	6461442
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RETAIL					
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ALEXNDR	-104949	13427	6723	52667	63445
ARGENT	-69725	-39092	0	65953	245755
BASREAD	113017	77116	166134	81868	62703
BATEPRO	8010	27325	54012	88974	2807



BUILDMAX	-22755	3234	26621	0	0
CEMENCO	-9174	-34155	-27843	-37501	-52466
CERAMIC	231363	289685	108944	20205	-7229
CLYDE	-17760	-15577	-13768	-12302	-5367
CONCOR	-29983	66360	150129	115240	113490
ED-LBATE	-167144	-156340	-54179	89571	209052
G5HOLD	-120060	-102470	11435	74825	14146
GOLDSTEIN	-56556	-38877	5943	42436	17566
GROUP-5	-340192	-249612	102366	174149	83684
HOWDEN	0	-69424	147874	-66098	0
L-T-A	797607	184730	494474	386782	421765
M&R-HLD	-1692980	-878980	1087620	2993500	4568460
MASONITE	-85793	-88197	-57067	-19022	30547
MINGRAN	-21055	-31135	-21458	4060	-8314
OZZ	-141522	27037	338075	371496	222380
PORTHLD	-743587	-526964	-91337	-312104	-238672
PPC	591500	-70345	2290258	1885185	2655796
S&SHOLD	43033	-129920	-126125	94793	38470
STOCKS	89481	-138752	-134356	201734	83244
TOCO	22504	236537	262259	208427	65042
WBHO	-68968	89668	75038	32320	-4026
YORKCOR	-12912	-19844	-8888	-3091	6796

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#### BLD, CONSTR & ENGIN

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BARLOWS	-371100	-1051000	6340802	3967816	3745015
CORPGRO	457102	1073648	442275	5199	200594
FASIC	-7449	-203	-12793	47094	-836
KAIROS	14831	0	-18782	66629	-11292
LENCO	22509	-21826	131036	468829	530431
LONAFRIC	563080	770024	0	0	0
METJE-&-Z	-12271	-11975	-12312	-1010	-15139
MT-EAGLE	17069	67688	32679	43046	10153
REMBR-BEH	1618400	1490400	5580600	4451200	2955400
REMGRO	8736520	5857420	13049640	10076520	7519160
RICHEMONT	50969520	32713080	30042700	28938760	17993640
SABVEST	-73976	-71682	-100014	-65993	-4949
TEGKOR	308060	-15140	1936960	1695200	1012320
TIB	216920	118600	1688760	1211520	829240

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#### DIVERSIFIED INDUSTR

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ALTECH	489977	601252	-49059	567880	209676
ALTRON	-1101374	-121034	-282070	416397	54390
BICAF	-190656	-163510	-136017	-117308	-67619
CONLOG	0	422762	55755	16962	13963
CONTROL	-4158	-25645	63780	254679	97534
DELTA	790537	610863	608300	455966	430859

DIGICOR	80869	0	0	0	0
ELSEC	37954	0	0	0	0
PASDEC	48282	26707	-6051	-6367	-19032
GRINTEK	211382	144680	315843	326315	288631
IST	253983	0	0	0	0
MACADAM	-52354	-34580	251820	92764	10062
NEI-AFR	-88706	-96901	-25466	100078	99167
NEIHOLD	-47838	-55057	37116	70715	56011
POWTECH	-153431	624788	404282	1084950	711489
REUNERT	913270	-33884	1983704	2244890	3179604
SEARTEC	-45957	72218	-3762	23647	26257
SETHOLD	324036	900235	0	0	0
STANTRN	86239	137576	29589	85492	102477
UNI HOLD	117089	366994	0	10065	16793
VENTRON	-236438	155368	-75352	543758	265788
VOLTEX	-141088	10087	429758	787280	468123

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#### ELECTRONICS & ELECT

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CITYLDG	-3194	139459	335122	732629	459599
CULLINAN	-4911	116367	271084	-6247	-5909
DON	-61293	-4296	-41277	101661	49797
GOLDREEF	-200988	12879	20696	12490	-430
KERSAF	-327083	-512252	1096428	2166891	1056368
KING	9534	86671	61779	0	0
LESRNET	-116781	119659	413562	436445	72930
MONEX	-152386	603434	101854	64234	30988
MORIBO	-8598	122086	321892	163326	213787
NANDOS	87686	203714	1154	0	0
OAKFLDS	3239	19768	44004	25358	70028
SAIL	297340	202559	0	0	0
SEKUNJALO	23355	0	0	0	0
SISA	-500637	-433011	40050	2040501	988607
STEERS	34761	69490	88472	96636	57852
STOCHOT	-117528	-62658	76327	0	0
TEREXKO	-47367	34061	-39132	0	0
TOURVST	1281087	734321	455734	0	0

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#### HOTELS & LEISURE

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ASTA	-197601	0	0	0	0
BRNWARE	269537	944643	0	0	0
C-TECH	0	0	0	30271	29635
CCH	2191358	1638978	0	0	0
COMPAREX	9898677	15153592	6320288	2525310	662393
CONNECT	150358	578343	0	0	0
CRUX	278793	0	0	0	0

CSHOLDING	165921	0	0	0	0
DATATEC	9176336	3812950	836133	199873	34328
DCENTRIX	267481	0	0	0	0
DIDATA	16025037	11629695	8861501	3680226	1066382
ELEXIR	32779	298577	0	0	0
EOH	142167	0	0	0	0
FARITEC	550949	0	0	0	0
FINTECH	392113	688503	489360	704604	454787
GLOTEC	214075	0	0	0	0
HICORL	10675	-11163	10042	0	19308
IFUSION	166004	240598	0	503904	228410
IDION	175929	0	0	0	0
ITECH	0	42180	-272	0	0
ITITECH	232413	146424	0	0	0
XCHANGE	2430587	1167477	0	0	0
KTL	74240	69454	102460	305335	273937
MAXTEC	161605	0	0	0	0
MBTECH	411274	13341	0	0	0
MGX	1170291	1439771	465013	122477	0
MMWTECH	-9419	264478	0	0	0
MUSTEK	634770	770190	1348376	0	0
OSI	45778	0	0	0	0
PARACON	366128	0	0	0	0
PINNACLE	-29368	0	0	0	0
PTH	550365	0	76687	0	0
RECTRON	78892	0	0	0	0
SILTEK	192550	102290	557531	698565	626246
SOFTLINE	3046045	876419	16455	0	0
SPESCOM	272310	259144	187894	54261	21185
SPICER	848870	0	15386	43253	35277
TOP-TECH	185423	0	0	0	0
UCS	531133	238618	0	0	0
USKO	0	1019803	435512	142641	180819
VESTA	104937	0	0	0	0
YTHRK	2903	59241	0	0	0

#### INFORMATION TECHNOL

ABACUS	64602	285434	98740	0	0
AME	137970	411008	108307	92322	80845
BILBOARD	159573	0	0	0	0
CAXTON	981195	1277284	15079277	808090	86472
CORPCOM	576190	761955	0	0	0
CTP	647861	1370271	1327218	1124533	354835
KGMEDIA	68060	529175	17018	30622	3047
MIHH	4741687	4560824	2941369	4481265	-371459
M-NETSS	1088471	1493037	1498921	1242207	2596896
NASPERS	2900360	3291445	3876268	3464406	1276383

JOHNCOM	3036827	3009082	2933294	3827560	1344310
PRIME	1708511	7942656	3899914	1320257	576556
SASANI	52319	399116	585763	97650	913
<hr/> MEDIA <hr/>					
ALEXWYT	-1370	-17994	-11941	-11426	-5123
ARIES	0	1508	10543	5049	22192
ASTRAPAK	128548	386108	0	0	0
BOWCALF	17578	30738	57740	59121	62254
COATES	-22571	-35636	2218	16019	29001
COPI	517790	565010	709974	581945	402842
GUNDLE	-36520	-19739	52237	5605	-2569
HARWILL	138656	162088	72092	43492	20211
MALBAK	198800	573700	989540	2849860	4311900
NAMPAK	3684392	897504	6414532	7601992	6215598
PARAGON	5991	78850	0	0	0
PLASGRP	34838	0	0	0	0
PROSPUR	19295	30285	0	0	0
TRNPACO	28554	41572	-1400	2439	-6662
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BIDVEST	11598104	9781880	4843469	2314936	1614654
DNASUP	0	38698	116235	247704	319552
ENSERVE	-59452	-202	0	169096	0
FEDICS	288338	364218	0	0	0
GLOVIL	0	0	0	-25670	0
GRAY	378066	0	0	0	0
MOLOPE	852180	1201017	0	0	0
REBHOLD	2970054	3785199	1327420	0	0
SENTRY	527007	195713	0	0	0
SERVEST	275020	3145	22134	23670	6425
TERFIN	342743	0	0	0	0
WACO	-308785	-187323	-177607	-34674	-74646
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ACCORD	275113	0	0	0	0
AUTOPGE	70017	107112	44733	98309	19590
JASCO	276151	74162	48609	103067	74717
PARADIGM	304267	1611214	0	0	0
RADIOSPR	128861	491735	0	0	0
SHAWCELL	958726	0	0	0	0
TELJOY	464505	831356	235295	265964	254805
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AVIS	1093652	1143178	-147948	-102781	0
BELL	-69117	-40543	-15091	131853	-124930
BOLTONS	-100516	-87448	-76943	-59350	-56633
CARGO	-79996	-69720	-55437	-19796	-36257
COMAIR	498222	-142545	0	0	0
DORBYL	-295201	-126169	521858	962799	0
DUNLOP	-127419	-260896	-302656	131847	454668
GRINCOR	-288394	-407442	-205103	23798	72004
IMPERIAL	6566752	7714059	7036415	4562429	2761820
IVS	212451	0	0	0	0
LASER	28093	29385	-5179	-13047	-34113
MAXTYRES	75703	98233	0	0	0
METAIR	-242595	-267958	-167337	-113550	80377
METKOR	-196911	-171517	133449	317359	0
MICOR	-7324	149599	147791	35522	21533
MOBILE	-203793	780785	906920	1137175	845301
PUTCO	-62643	-70241	-208109	-129641	-99424
ROADCOR	69933	209054	43958	48691	35158
SAFREN	37871	-585904	2488749	3635154	3170892
SUPRGRP	2581853	2928590	1503528	127572	-889
TIWHEEL	1430754	1522982	701579	474114	208050
TOYOTA	-1744970	-1778963	-1369265	-998696	-447510
TRENCOR	-480671	1287692	1732700	2325454	1628119
UNISERV	502712	469782	296316	153631	165472
UNITRAN	159822	526071	584867	798782	468895
VALUE	10181	0	0	0	0
VENTEL	-2741	-17205	-15184	-7715	-10211
WESCO	-1004409	-1115724	-845410	-563761	-290296
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TRANSPORT					
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AECI	-934850	-1834500	-812650	540900	492150
AFROX	1969857	829192	3475610	3245147	2735901
CHEMSERVE	497268	311879	666072	399594	-126477
ENERGY	1054981	451361	1403231	356373	0
FRANSAF	0	57471	36855	58787	26480
OMNIA	6048	-25902	140186	353072	240624
SASOL	8990120	7016960	20866000	16718300	11553012
SONDOR	-16643	12707	23199	27095	23235
SPANJAARD	13922	18597	9283	2104	-834
STRAND	-13514	5932	-8109	17502	57305
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CHEMICALS, OILS & P					
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ABIL	5261060	5684841	985765	212334	-30066
ABSA	6093150	14087000	6559500	4316100	-172326
BOE	-1136400	-1439800	3604848	763125	508553
BOECORP	-3259170	-3291110	1808516	399682	288716

FIRSTRAND	21868944	40497043	8069162	2822349	1696840
INHOLD	6554920	7388160	2886818	1482244	1095839
INVSTEC	14993400	12247000	6510263	2883091	1844119
MRCANTIL	-44666	-323642	0	0	0
NEDCOR	18208167	12875650	14257080	7094520	4329400
REGAL	350405	0	0	0	0
RMBH	3741527	8492156	7569040	2923014	1750367
SAAMBOU	568212	1310290	565458	340169	74162
SIB	188936	310008	1328143	355290	79452
SBIC	12964407	3071710	12302800	10054000	12314200
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BANKS					
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ALEXFBS	4268400	3064466	1719317	-122995	0
AMB	615395	2131108	0	0	0
ARCAY	3780	-866	28698	48003	0
BJM	596449	420514	0	0	0
BRAIT	2270760	2696358	55504	72284	81234
CADIZ	634434	0	0	0	0
COROHL	5753536	1888502	4638968	1224943	242236
CREDCOR	291313	0	0	0	0
DECILLION	330491	0	0	0	0
EQUINOX	176420	0	0	0	0
FURNCAP	-602849	-404375	-371290	-297510	-233832
GENSEC	4607153	3368450	4288606	2319780	0
GLENMIB	527775	1151342	0	0	0
GLOBAL	-413123	0	0	0	0
GREENWICH	891510	0	0	0	0
HEDGE	-149852	0	0	0	0
IOTA	331354	420888	5115	-2101	1465
NAIL	4486608	5423873	858585	244576	25682
NIBH	2625764	0	0	0	0
OUTSORS	817810	1463823	406335	0	0
PERGRIN	3294986	0	0	0	0
PSG	313228	600519	173955	50677	19335
QUYN	290643	0	0	0	0
RA-HOLD	2765742	3566503	962835	92911	155014
RAD	2364107	4256194	0	0	0
RAI	972163	1187425	400037	41578	78478
SASFIN	90653	379293	112989	41957	23381
TBBH	-403082	0	0	0	0
TIGON	1974981	1445135	1431484	18054	0
TISEC	225469	0	0	0	0
UNIFER	1881947	0	0	0	0
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FINANCIAL SERVICES					
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AMAPROP	-163663	-403890	-399175	-361866	-323644

BONATLA	-15084	1299	0	0	0
COMPASS	29969	-5731	36671	-49367	-47990
CONFED	36163	36116	38960	32773	30688
FORIM	82	28296	66028	43599	7629
GOODCAP	-14788	0	0	0	0
IPROP	-147353	-116232	-126948	32224	120762
LIBINT	-2220600	0	0	0	0
MARCONS	-52128	-44780	-41662	24875	20734
MAWENZI	-195158	-5992	51680	4679	3210
OVBEL	-4570	-2488	-11013	-13650	-31540
PROPFIN	72024	-18845	61481	-20752	49374
PUTPROP	-53090	-48211	-51043	-24467	-40344
SABLE	-50717	-31286	-59014	24701	12392
SAMRAND	-79581	0	-62805	-11219	-1093
WESCAP	5054	-10241	54164	-467	-359

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PROPERTY

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## APPENDIX 2

### INTELLECTUAL CAPITAL VALUE CALCULATED USING TOBIN'S Q

(all values '000)

GROUP	1999	1998	1997	1996	1995
ABI	4511470	4350376	1655037	1318788	1591678
AWETHU	-810	33997	0	0	0
DISTIL	25711	227356	1189065	922841	552419
FORTUNE	65304	25733	32730	39741	53435
KWV-BEL	-126133	-23340	368875	274983	44203
SABPLC	28408080	39024700	31813630	31603300	20516243
SFW	-537469	112707	649189	258688	-163747
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BEVERAGES					
ADONIS	-9094	-4941	-6156	-5590	-11000
AMMGROUP	-138731	-49483	0	0	0
BOLWEAR	-83165	-68547	-64554	-41055	-44253
BURLINGTN	-4684	17700	-5522	-5965	-6846
COASTAL	132091	63595	93637	86353	1394
FRAME	-900248	-599831	-823271	-604344	-513360
GLODINA	-61215	-65851	-60653	-57510	-48429
GUBINGS	-74415	-59331	-57480	-58909	-53483
NINIAN	-87050	-97641	-68651	-64893	-42253
PALS	-9973	-9890	-8003	-6418	-1012
SEARDEL	-365131	-312846	-493684	-422377	-73707
TOLARAM	-404	-10262	-27368	-22407	-12178
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CLOTHING AND TEXTIL					
A-V-I	-2450040	-2182380	643290	2996204	4703520
AFBRAND	-106606	353349	0	0	0
CADSWEP	1754040	1964554	2434428	2031512	1801729
CGSMITH	2274457	-783548	5264780	5648520	5422980
CONAFEX	80672	103350	24199	20824	5844
CROOKES	-129214	-87041	-6142	-5715	-11479
DELCORP	1484365	484593	772054	1401181	1701086
DELFOOD	1078143	-360363	569229	634772	1229898
DELHOLD	1792493	1050525	842698	1754927	1974467



HLH	-594702	343528	-245611	810690	607123
I-&-J	-622794	-505519	78526	280633	646017
ILLOVO	-261438	113168	1221659	282280	-7501
INTRADING	39996	0	0	0	0
KOLOSUS	-126632	105799	-56488	-5756	38577
LIFESTYLE	282262	562424	356221	0	0
NAMFISH	29141	-16487	1380	-5736	20607
NAMSEA	-26275	-26639	-22134	-5010	73000
NATCHIX	-37771	-33023	1332	29159	0
OCEANA	33483	201363	311421	279026	230641
OTK	-232811	518633	944367	0	0
RAINBOW	-382038	-600870	-43644	75180	248158
SEAHARV	23867	49417	63304	285527	237151
SOVFOOD	-42950	1940	59962	163364	0
TIGBRANDS	4795506	2692845	6719804	5870150	5160339
TONGAAT	-648259	-1213895	3127130	1785055	586314
WBHOLD	-21443	-20636	-11575	-9462	-13529
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FOOD					
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AMAPS	0	148485	157113	0	0
ANBEECO	-11200	-4173	-7652	4145	-8661
CEDARGRO	-3353	33942	0	0	0
DAEWOO	87222	64418	56819	93549	76677
FRIDGEM	-47037	-4072	559817	140943	0
NUWORLD	49108	401797	397044	183570	90540
OMEGA	-94849	202098	58454	66993	14440
STEINHOFF	1136285	0	0	0	0
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FURNITURE & APPLIAN					
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AF-&-OVER	-25140	-26697	-46438	-3775	-40140
AFGLASS	-33442	0	0	0	0
AMLAC	0	1304	7898	23539	0
AUTOQIP	3333	27600	3652	2376	-3214
BEARMAN	-49182	-16962	197039	238824	277493
IMPERIOLOG	-66099	-135546	-50018	250206	180414
BRANDCO	-82655	298042	7522	19217	10807
BUSBY	30152	295244	0	0	0
CASHBIL	-750	15662	5271	39735	243459
CHET	-1854	20670	0	0	0
CMH	10666	-530	28002	148377	35099
DAWN	67367	0	11097	34108	40198
DYNAMO	-112371	137626	0	23129	42100
EDCON	-439224	2533595	4393744	6786439	5295701
ELLERINE	486476	231532	1951562	639777	568990
FASHAF	72353	769715	197080	162294	4544

FOSCHINI	1223140	2861556	2286798	4895646	3692573
GLOHOLD	-63636	-8722	66518	1000415	240278
HEAVEN	35950	120381	137188	0	0
HOMECHOIC	767786	242607	346872	153525	0
HUDACO	-27288	-71956	286037	416869	537722
ILIAD	14056	6200	0	0	0
INMINS	-18315	-19725	12096	13320	9272
INVICTA	-97345	256308	257092	143277	73490
ITLTILE	267278	273981	170600	71482	16152
JDGROUP	2412600	3437240	1746070	1169639	256207
LA-STORE	222505	395057	287488	33166	34
MATHOMO	-96344	23881	220652	65221	0
MCRTAIL	-92436	953952	1260704	1574760	1887387
METCASH	5377138	4191306	2680450	2457932	1397791
MIDAS	64482	34458	35616	14771	102372
NICTUS	-1023	-962	-5668	-1094	-444
NUCLICKS	1635026	1011965	1076434	465890	515629
PEPGRO	1130670	1624222	1991684	1501219	1444993
PEPKOR	2672744	3316184	3242436	2408480	2325544
PICKNPAY	2581634	3045330	1885044	1618430	839225
PIKWIK	1284950	1555916	1145694	965390	646260
PRIMATOY	0	32545	0	0	0
PROFURN	5094749	935318	1032106	201060	195548
RAG	-177911	754612	-417393	0	0
RELYANT	-260420	22972	-170672	-157497	-157186
RENAISAN	0	8590	0	0	0
RETCORP	33030	288533	151590	85682	904
REX-TRUE	-47270	-32044	-66216	2373	-57109
SHOPRIT	3079423	4474648	2743908	1462640	880060
SPECLTY	666229	773040	354028	1020448	404528
SPORT	114427	0	0	0	0
STORECO	423892	492508	246058	615994	273004
TILEAFRIK	59599	0	0	0	0
TRUWTHS	1945966	1769171	0	0	0
UNIGRO	10236	47147	7587	170	4134
VALAUTO	-6607	-5034	-2976	-3416	-4777
VALCAR	-2974	1765	-549	-1534	-1866
WETHLYS	149666	182792	0	0	0
WINBEL	-28901	-29532	9235	-1122	-1377
WINHOLD	-43220	-39482	25621	3627	-3392
WOOLIES	2152925	3328923	-1211123	0	0
WOOLTRU	2592282	1930012	6670156	4400950	6310242
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RETAIL					
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ALEXNDR	-122357	-247	-6722	-5940	8025
ARGENT	-74821	-41731	0	62621	244600
BASREAD	113017	64726	156051	70672	51127

BATEPRO	1820	21584	47555	83432	1340
BUILDMAX	-24624	1970	25415	0	0
CEMENCO	-25217	-55139	-57288	-73534	-89547
CERAMIC	217372	276235	88700	8404	-12636
CLYDE	-18425	-16612	-16621	-13517	-7178
CONCOR	-43325	55864	137214	103473	91979
ED-LBATE	-182540	-164754	-63155	78989	197526
G5HOLD	-176536	-157118	-53136	-278	-56864
GOLDSTEIN	-56556	-38877	5943	42436	17566
GROUP-5	-396668	-304260	37795	99046	12674
HOWDEN	0	-73806	144630	-70623	0
L-T-A	665384	61814	380994	255793	331499
M&R-HLD	-1911180	-1089480	593120	2259900	3812460
MASONITE	-108920	-112620	-86460	-49445	-7707
MINGRAN	-24417	-34293	-22831	-549	-10976
OZZ	-156898	11548	321934	356443	204271
PORTHLD	-744840	-689777	-259357	-408612	-309686
PPC	243700	-593745	1599958	1090598	2078017
S&SHOLD	26208	-148835	-148507	76415	15343
STOCKS	72656	-157667	-156738	183356	60117
TOCO	21798	236404	260231	188953	33628
WBHO	-88502	74918	58679	14326	-6469
YORKCOR	-17835	-23997	-12791	-8090	2012

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#### BLD, CONSTR & ENGIN

BARLOWS	-985100	-2068100	5551602	3118316	2960415
CORPGRO	447908	1069749	439301	5199	200594
FASIC	-19133	-11542	-24710	33714	-17278
KAIROS	14110	0	-20018	55959	-16727
LENCO	17536	-53464	89463	449672	503755
LONAFRIC	559400	764824	0	0	0
METJE-&-Z	-13626	-13203	-13694	-2405	-16977
MT-EAGLE	16808	67254	32156	42770	9214
REMBR-BEH	1120400	1166400	5099600	4171200	2661400
REMGRO	8238520	5533420	12568640	9796520	7225160
RICHEMONT	50800420	32576080	29861200	28661960	17726340
SABVEST	-74154	-71783	-100107	-66111	-4949
TEGKOR	-189940	-339140	1455960	1415200	718320
TIB	-281080	-205400	1207760	931520	535240

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#### DIVERSIFIED INDUSTR

ALTECH	470583	573436	-81897	531672	165301
ALTRON	-1307205	-217762	-387674	333177	-86647
BICAF	-214267	-176076	-143816	-123841	-68970
CONLOG	0	420384	54796	15763	12973
CONTROL	-7966	-26777	60913	251311	94532

DELTA	756699	574116	581038	407925	402984
DIGICOR	80278	0	0	0	0
ELSEC	37869	0	0	0	0
PASDEC	45458	23947	-10553	-9053	-23281
GRINTEK	201328	141107	303187	313802	264512
IST	253211	0	0	0	0
MACADAM	-53225	-35387	251054	92234	9665
NEI-AFR	-100566	-111072	-40340	72798	79884
NEIHOLD	-59168	-69228	22242	43435	36728
POWTECH	-350847	542480	322755	995292	601611
REUNERT	877070	-111284	1897104	2117090	2994735
SEARTEC	-46912	71766	-4193	23356	26055
SETHOLD	319990	898887	0	0	0
STANTRN	84607	136750	29589	81233	96311
UNIHOLD	103866	351439	0	-2875	4547
VENTRON	-442269	58640	-180956	436324	124751
VOLTEX	-147419	5295	360935	717055	387427

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#### ELECTRONICS & ELECT

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CITYLDG	-9423	133737	329265	727309	453865
CULLINAN	-9478	107173	243868	-28449	-27512
DON	-63739	-5930	-44918	99642	48144
GOLDREEF	-200998	12856	19704	11841	-2278
KERSAF	-528594	-709341	858658	1954092	836482
KING	8977	86551	61666	0	0
LESRNET	-139251	101294	404155	425666	66020
MONEX	-165582	601138	101630	63570	29829
MORIBO	-8791	120944	321412	162832	213415
NANDOS	77123	196587	-5305	0	0
OAKFLDS	3175	19675	43915	25229	69947
SAIL	297030	202339	0	0	0
SEKUNJALO	1536	0	0	0	0
SISA	-672212	-598009	-172264	1846059	900328
STEERS	33010	68455	87711	95925	57483
STOCHOT	-118242	-63115	75515	0	0
TEREXKO	-47735	33997	-39837	0	0
TOURVST	1277571	733472	455094	0	0

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#### HOTELS & LEISURE

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ASTA	-198007	0	0	0	0
BRNWARE	268579	943549	0	0	0
C-TECH	0	0	0	29599	28764
CCH	2188291	1638703	0	0	0
COMPAREX	9865313	15143843	6312342	2522737	660574

CONNECT	148085	577255	0	0	0
CRUX	278457	0	0	0	0
CSHOLDING	165249	0	0	0	0
DATATEC	9162996	3811927	834421	199391	34117
DCENTRIX	267440	0	0	0	0
DIDATA	15995363	11600557	8844397	3671056	1054125
ELEXIR	32512	298468	0	0	0
EOH	142144	0	0	0	0
FARITEC	550715	0	0	0	0
FINTECH	384479	681602	483231	699019	449368
GLOTEC	212281	0	0	0	0
HICORL	10675	-13360	7718	0	17658
IFUSION	165701	240112	0	503904	228410
IDION	175825	0	0	0	0
ITECH	0	42006	-294	0	0
ITITECH	231605	145900	0	0	0
XCHANGE	2429129	1167389	0	0	0
KTL	74189	69420	89762	251041	205274
MAXTEC	161287	0	0	0	0
MBTECH	410852	13095	0	0	0
MGX	1166705	1437250	463511	121316	0
MMWTECH	-9687	264420	0	0	0
MUSTEK	633934	769921	1347498	0	0
OSI	45649	0	0	0	0
PARACON	365924	0	0	0	0
PINNACLE	-30356	0	0	0	0
PTH	549153	0	76479	0	0
RECTRON	78684	0	0	0	0
SILTEK	188217	98842	553738	694888	613141
SOFTLINE	3044504	876176	16228	0	0
SPESCOM	269398	255978	186741	52269	20686
SPICER	848444	0	12066	29104	27241
TOP-TECH	184768	0	0	0	0
UCS	530579	237891	0	0	0
USKO	0	1017754	422767	107677	157313
VESTA	104780	0	0	0	0
YTHRK	2896	59096	0	0	0
INFORMATION TECHNOL					
ABACUS	53967	267073	97209	0	0
AME	136822	408614	108307	92322	80845
BILBOARD	155936	0	0	0	0
CAXTON	916037	1234809	15010176	748153	30593
CORPCOM	575091	761661	0	0	0
CTP	581741	1312497	1255125	1037566	289934
KGMEDIA	67631	528891	15754	29228	1451
MIHH	4575667	4540681	2930364	4437707	-430973

M-NETSS	1078396	1483122	1485169	1231951	2589403
NASPERS	2734437	3211404	3757213	3412951	1224043
JOHNCOM	2823530	2997166	2865309	3777908	1297832
PRIME	1665244	7904563	3894200	1319148	575857
SASANI	45176	396915	583035	97650	913
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MEDIA					
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ALEXWYT	-7475	-24093	-18696	-18691	-10946
ARIES	0	280	9180	2761	21029
ASTRAPAK	106742	370633	0	0	0
BOWCALF	9071	22815	51434	53361	55652
COATES	-33079	-45674	-6899	7479	21306
COPI	505971	551392	694808	566793	383797
GUNDLE	-42999	-30751	44867	-117	-6796
HARWILL	133014	158767	68823	40198	18299
MALBAK	5800	366700	747540	2453860	3924900
NAMPAK	3022392	216504	5787232	7176892	5670298
PARAGON	3686	77289	0	0	0
PLASGRP	32534	0	0	0	0
PROSPUR	17249	29933	0	0	0
TRNPACO	20836	36414	-6726	-2293	-10866
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PACKAGING & PRINTIN					
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BIDVEST	11337149	9723841	4740495	2278554	1588632
DNASUP	0	38698	116235	247704	319552
ENSERVE	-77489	-17636	0	162402	0
FEDICS	281965	359462	0	0	0
GLOVIL	0	0	0	-25945	0
GRAY	376386	0	0	0	0
MOLOPE	843169	1197627	0	0	0
REBOLD	2964980	3781993	1324912	0	0
SENTRY	519178	194928	0	0	0
SERVEST	273668	3145	20870	22276	4829
TERFIN	342653	0	0	0	0
WACO	-455110	-452464	-432058	-141137	-176527
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SERVICE					
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ACCORD	274810	0	0	0	0
AUTOPGE	69326	106078	41355	94415	14128
JASCO	274404	73224	46845	101442	73907
PARADIGM	303627	1610975	0	0	0
RADIOSPR	127964	491477	0	0	0
SHAWCELL	958502	0	0	0	0
TELJOY	433915	814652	212249	238005	218229

## TELECOMMUNICATIONS

AVIS	1039265	1112133	-191963	-131050	0
BELL	-78935	-50715	-29012	119050	-136368
BOLTONS	-158231	-140654	-164209	-148162	-169293
CARGO	-134209	-119010	-141371	-104017	-128453
COMAIR	472539	-149725	0	0	0
DORBYL	-409826	-233051	381451	792286	0
DUNLOP	-231757	-370030	-411424	-157883	292300
GRINCOR	-449494	-575314	-388850	-150760	-72359
IMPERIAL	6145941	7503194	6843235	4407048	2628548
IVS	152871	0	0	0	0
LASER	26153	11442	-24031	-26794	-63246
MAXTYRES	69595	93444	0	0	0
METAIR	-264616	-290268	-182831	-132859	61918
METKOR	-323750	-284015	-28821	141536	0
MICOR	-7961	144414	141260	33560	19604
MOBILE	-203800	780777	906918	1137143	845268
PUTCO	-113510	-126786	-212954	-135795	-105665
ROADCOR	54104	184626	41946	47444	34737
SAFREN	37871	-2555304	737749	1846854	1970992
SUPRGRP	2531934	2883163	1451430	126988	-889
TIWHEEL	1401761	1508628	693818	468784	201246
TOYOTA	-1744970	-1778963	-1369265	-998696	-487370
TRENCOR	-643701	1104162	1688919	2290854	1601148
UNISERV	502712	469782	296316	153631	161672
UNITRAN	79451	445780	524200	732317	402938
VALUE	-2788	0	0	0	0
VENTEL	-5382	-20202	-18271	-9288	-11689
WESCO	-1004409	-1115724	-845410	-563761	-330879

## TRANSPORT

AECI	-1206122	-2664500	-1762650	-496100	-590850
AFROX	1651667	829192	3475610	3245147	2735901
CHEMSERVE	469895	277279	648872	374094	-145965
ENERGY	1054593	173902	1330991	270201	0
FRANSAF	0	54208	33887	45941	23223
OMNIA	-102743	-141422	58365	267116	145508
SASOL	2923120	998960	12586000	9445300	3770512
SONDOR	-19193	9969	20225	25004	21070
SPANJAARD	12525	17814	8154	1047	-1375
STRAND	-19212	571	-9412	15931	54406

## CHEMICALS, OILS & P

ABIL	5257360	5682855	985765	212334	-30066
ABSA	5671150	13693000	6245500	3840100	-603226

BOE	-1207400	-1495800	3602103	760365	505727
BOECORP	-3259170	-3291110	1808516	399682	288716
FIRSTRAND	21524844	38982043	8055391	2805504	1684340
INHOLD	6554920	7388160	2843388	1463680	1074182
INVSTEC	14937400	12200000	6466833	2864527	1822462
MRCANTIL	-56242	-332830	0	0	0
NEDCOR	18081471	12697650	14053080	6930520	4156400
REGAL	349937	0	0	0	0
RMBH	3740927	8492156	7552819	2906159	1735909
SAAMBOU	560812	1307390	542658	314569	51662
SIB	187508	310008	1328143	353443	79074
SBIC	12763732	2881710	12170800	9845000	12157200

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#### BANKS

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ALEXFBS	4240400	3046734	1704059	-134283	0
AMB	614840	2130846	0	0	0
ARCAY	3755	-867	28698	48002	0
BJM	595866	420202	0	0	0
BRAIT	2269960	2695458	55504	72284	81234
CADIZ	634308	0	0	0	0
COROHL	5752536	1888102	4638868	1224876	242229
CREDCOR	290064	0	0	0	0
DECILLION	329826	0	0	0	0
EQUINOX	176420	0	0	0	0
FURNCAP	-787348	-565438	-650195	-460650	-375705
GENSEC	4602645	3364450	4287606	2318780	0
GLENMIB	524788	1149015	0	0	0
GLOBAL	-413123	0	0	0	0
GREENWICH	891312	0	0	0	0
HEDGE	-149852	0	0	0	0
IOTA	330798	420888	4639	-2457	758
NAIL	4463536	5396143	854374	244069	25231
NIBH	2620173	0	0	0	0
OUTSORS	817601	1463393	406300	0	0
PERGRIN	3294803	0	0	0	0
PSG	312031	599202	172342	50407	18952
QUYN	290322	0	0	0	0
RA-HOLD	2765630	3566405	962767	92876	154330
RAD	2362858	4256075	0	0	0
RAI	972051	1187327	399969	41543	77794
SASFIN	89827	378481	112781	41695	23072
TBBH	-404311	0	0	0	0
TIGON	1974360	1444934	1430551	18052	0
TISEC	223655	0	0	0	0
UNIFER	1875749	0	0	0	0

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## FINANCIAL SERVICES

AMAPROP	-163663	-403890	-402069	-365927	-328889
BONATLA	-15084	1299	0	0	0
COMPASS	29969	-5731	36671	-49367	-47990
CONFED	36055	36067	38878	32640	30528
FORIM	-1350	27136	65091	42837	6293
GOODCAP	-14788	0	0	0	0
IPROP	-147561	-116482	-127305	-6739	60550
LIBINT	-2221681	0	0	0	0
MARCONS	-52667	-45344	-42002	24875	20734
MAWENZI	-197811	-6543	51248	4149	2683
OVBEL	-4570	-2488	-11031	-13764	-31705
PROPFIN	72024	-18870	61290	-20890	49374
PUTPROP	-53095	-48220	-51045	-24489	-40357
SABLE	-51170	-31714	-59355	24486	12199
SAMRAND	-79650	0	-63023	-11558	-1093
WESCAP	4907	-10244	54123	-467	-359

## PROPERTY

### **APPENDIX 3**

#### INTELLECTUAL CAPITAL VALUE CALCULATED USING CIV

(all value '000)

GROUP	1999	1998	1997	1996	1995
ABI	342047	193785	129081	160978	199818
AWETHU	-2175	2339	0	0	0
DISTIL	189249	216590	167330	166780	197347
FORTUNE	3840	15012	16868	11767	5572
KWV-BEL	-114690	-121973	-145811	-131537	-117869
SABPLC	-515653	-477139	-198668	-135253	-195346
SFW	-51886	30837	9740	-17582	-69616
BEVERAGES					
ADONIS	-571	1411	3489	2420	-108
AMMGROUP	38320	15596	0	0	0
BOLWEAR	13101	10573	24574	20176	22466
BURLINGTN	-8746	-7227	-4625	-3850	-1966
COASTAL	-75406	-9259	-2595	-10153	-7598
FRAME	125757	37179	7469	-6930	-63850
GLODINA	-25588	-25777	-8784	-9226	-1755
GUBINGS	-35295	-74718	-63938	-66511	-17617
NINIAN	23245	13666	28539	22673	27021
PALS	338	3767	7312	7537	4102
SEARDEL	-20364	60890	10447	41378	37563
TOLARAM	-49639	-44699	-24106	-10008	-601
CLOTHING AND TEXTIL					
A-V-I	-1693736	-594871	-128163	549072	697948
AFBRAND	15578	3671	0	0	0
CADSWEP	1538269	142217	130072	98873	85432
CGSMITH	2239816	2399470	2098088	1312877	800578
CONAFEX	-11008	-13457	-16237	-10279	-7651
CROOKES	12287	29046	13970	4326	-6846
DELCORP	-333443	-531215	-520121	-325547	-118516
DELFOOD	-198123	-373835	-361189	-295836	-22995
DELHOLD	-301575	-504360	-493268	-330567	-118522

HLH	-525514	-684985	-774992	-625389	-395703
I-&-J	-310561	-193319	-157115	-133695	-66396
ILLOVO	278137	232702	36499	-93985	-215756
INTRADING	7926	0	0	0	0
KOLOSUS	-495752	-475305	-343085	-129580	-27348
LIFESTYLE	56608	36901	2569	0	0
NAMFISH	4340	-21004	-56486	-33349	-7144
NAMSEA	-110680	-95053	-56640	-31438	9225
NATCHIX	-11001	-4669	-3264	1163	0
OCEANA	279911	273101	230146	167563	138882
OTK	-39040	1183	-12333	0	0
RAINBOW	-1125684	-1243138	-953476	-705590	-579209
SEAHARV	236268	223974	209523	180481	166131
SOVFOOD	-25652	-7322	-6513	4908	0
TIGBRANDS	1230381	1119009	878843	473092	110063
TONGAAT	-581699	421730	445096	118711	-309228
WBHOLD	-25651	-17550	-13001	-1851	-8945
<hr/>					
FOOD					
<hr/>					
AMAPS	28970	39194	14339	0	0
ANBEECO	-5878	15443	11006	10038	8451
CEDARGRO	18286	20201	0	0	0
DAEWOO	-164185	-118271	-68797	-11013	-473
FRIDGEM	-64379	-10447	30519	11725	0
NUWORLD	68116	73701	20502	3857	5843
OMEGA	-152616	-37841	-7644	-11316	-13752
STEINHOFF	270474	0	0	0	0
<hr/>					
FURNITURE & APPLIAN					
<hr/>					
AF-&-OVER	11840	5559	-1495	-4323	-10221
AFGLASS	5102	0	0	0	0
AMLAC	-8645	-6235	3525	3049	0
AUTOQIP	2537	2361	-1311	-3524	-6356
BEARMAN	5644	37110	52007	54275	40081
IMPERIOLOG	-419517	-291693	-214360	-175358	-123528
BRANDCO	9646	21484	24214	4869	4329
BUSBY	18434	7979	0	0	0
CASHBIL	-55073	-69220	-57822	-28008	-2416
CHET	-3218	-6802	0	0	0
CMH	44093	29596	30764	22590	3429
DAWN	-32965	-44328	-43089	-14476	801
DYNAMO	-53081	-12627	-12651	-12426	-6528
EDCON	-213266	312907	544664	611768	593611
ELLERINE	275349	277701	236894	206504	170195
FASHAF	732262	-30318	-32451	-37526	-54229
FOSCHINI	287904	333755	382834	468428	397314

GLOHOLD	-286489	-252079	17960	36621	13063
HEAVEN	-16832	12263	4741	0	0
HOMECHOIC	93793	47104	21260	6527	0
HUDACO	49525	76410	82528	71234	69113
ILIAD	14410	301	0	0	0
INMINS	11611	9864	4932	-16570	-14205
INVICTA	32365	38063	21993	10111	-6249
ITLTILE	64344	36179	16662	1280	-15371
JDGROUP	200115	70381	-109822	-121910	-85163
LA-STORE	108555	67110	17058	-1222	-16329
MATHOMO	-137950	-75937	9191	6128	0
MCRTAIL	-698119	-1123536	-104332	93707	42607
METCASH	-205692	-11883	-162177	-183710	-189471
MIDAS	-19335	-1400	-13718	-19596	-46498
NICTUS	-25381	-19019	-11929	-7170	-5715
NUCLICKS	6941	-30104	-34978	-32439	-5184
PEPGRO	40554	-2109	-51373	-85697	-48167
PEPKOR	-1310442	-1044146	-656941	-625161	-263901
PICKNPAY	63265	-56736	-145080	-116382	-43662
PIKWIK	184742	147295	115621	87538	81309
PRIMATOY	2957	2229	0	0	0
PROFURN	463122	226032	75001	15250	-22335
RAG	-121864	-11196	-6125	0	0
RELYANT	-414265	-250911	-251913	-293463	-409612
RENAISAN	5842	5252	0	0	0
RETCORP	39176	30065	17163	-8908	-16554
REX-TRUE	6149	321	-6844	-9311	-15045
SHOPRIT	-676094	-417674	-336204	-456584	-389478
SPECLTY	38560	14432	3475	27064	8653
SPORT	9777	0	0	0	0
STORECO	8480	4416	3226	5228	4758
TILEAFRIK	7433	0	0	0	0
TRUWTHS	244233	135590	0	0	0
UNIGRO	-11036	-1888	-1236	-1835	-5145
VALAUTO	-12883	-13244	-13004	-9585	-10697
VALCAR	-12719	-13120	-12874	-9457	-10734
WETHLYS	35344	11623	0	0	0
WINBEL	-6777	5017	10812	-23387	-24094
WINHOLD	-7068	4720	10684	-23378	-24084
WOOLIES	646202	533067	118030	0	0
WOOLTRU	769430	1035106	450821	564115	419949
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RETAIL					
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ALEXNDR	212108	212431	208038	74189	41650
ARGENT	27993	38474	34929	33537	13323
BASREAD	84170	49245	-13827	-70975	-126160
BATEPRO	92937	-19739	-23857	-20336	-900

BUILDMAX	-11324	-6797	2959	0	0
CEMENCO	-89955	-75857	-48988	-44071	-33797
CERAMIC	77803	43350	28357	10364	586
CLYDE	-1057	-4308	-3841	-5292	-537
CONCOR	77645	59433	40695	10552	4483
ED-LBATE	23213	-106929	-67665	-72277	4012
G5HOLD	29078	-101980	-140369	-212382	-206543
GOLDSTEIN	-1573	5363	9229	858	-7402
GROUP-5	28792	-98660	-136271	-206568	-208852
HOWDEN	50493	58229	39832	13889	0
L-T-A	309704	78450	33838	-54916	-35417
M&R-HLD	-297039	-54004	-207147	108197	161894
MASONITE	7751	10105	25614	19418	18756
MINGRAN	-55728	-44331	-37749	-40764	-43806
OZZ	151424	100627	103082	55270	42027
PORTHLD	485856	205457	223127	179452	144636
PPC	597781	576786	563000	467488	450688
S&SHOLD	-661049	-203984	-73950	-119513	-116751
STOCKS	-706013	-240716	-93401	-148733	-134779
TOCO	-595363	-577887	-530765	13483	20268
WBHO	99603	40498	7133	-11246	-3452
YORKCOR	-8087	-14215	-9469	-12309	-6440

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#### BLD, CONSTR & ENGIN

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BARLOWS	-17376	-497580	-676949	-1098719	-1108573
CORPGRO	-126428	-24638	6096	26558	71766
FASIC	63188	55224	31734	113813	104332
KAIROS	-49462	-75131	-140159	-237087	-250015
LENCO	-62456	-112116	-110789	-93801	-24926
LONAFRIC	-141021	-58117	0	0	0
METJE-&-Z	-26232	-31991	-28172	-27972	-20025
MT-EAGLE	-12454	-14565	-15710	-11822	-11353
REMBR-BEH	-452949	-638477	-466067	-84875	350050
REMGRO	-322452	-510728	-366254	-50728	293921
RICHEMONT	2514225	3570132	3015528	1779456	-151828
SABVEST	-67958	-26138	-20393	-5421	-21079
TEGKOR	-499169	-656317	-486331	-98210	345732
TIB	-505510	-660150	-488834	-99942	345282

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#### DIVERSIFIED INDUSTR

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ALTECH	241125	41368	-3732	-69996	148414
ALTRON	35400	-40479	42997	-41835	120295
BICAF	-63735	-81438	-67429	-25667	16478
CONLOG	-14847	-11129	-828	-1417	-11264
CONTROL	-51725	-22384	1687	5729	-7254
DELTA	107489	113628	121880	92036	62850

DIGICOR	16685	0	0	0	0
ELSEC	-450	0	0	0	0
PASDEC	-127343	-83357	-58254	-35365	-41539
GRINTEK	-90497	146424	178432	227974	10335
IST	7042	0	0	0	0
MACADAM	-1162	17856	26394	12228	-386
NEI-AFR	-88062	-55377	-33078	-24195	-114540
NEIHOLD	-80222	-50864	-30409	-22230	-105265
POWTECH	-165	-12080	1659	-10062	17559
REUNERT	-216114	-328643	-164644	58195	71932
SEARTEC	-56652	5186	18994	15629	4102
SETHOLD	15308	16835	0	0	0
STANTRN	-26418	-94858	-137400	-115638	-57759
UNIHOLD	-76564	-31496	13734	18469	-4627
VENTRON	41779	-36005	38211	-48784	79699
VOLTEX	593243	679718	51771	-50962	-268495

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#### ELECTRONICS & ELECT

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CITYLDG	-30061	-10165	20961	20457	11324
CULLINAN	-200571	-216923	-247375	-211172	-211604
DON	-138766	-150306	-74428	-28686	-15676
GOLDREEF	-135683	-97938	-49076	-34533	-15364
KERSAF	424080	635786	150224	221423	226903
KING	-5123	2729	4465	0	0
LESRNET	-49446	-58679	10603	2049	11454
MONEX	-111285	-95890	-62060	-64261	-46564
MORIBO	-43759	-23338	-12897	-6914	-4588
NANDOS	562	7093	4419	0	0
OAKFLDS	-29329	-21054	-22501	-27910	-23124
SAIL	-9988	-9220	0	0	0
SEKUNJALO	-58492	0	0	0	0
SISA	196839	-115351	193462	84710	12107
STEERS	36070	27933	23731	13155	4784
STOCHOT	-103564	-56226	-24803	0	0
TEREXKO	26273	31278	-14135	0	0
TOURVST	74872	35720	13854	0	0

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#### HOTELS & LEISURE

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ASTA	167211	0	0	0	0
BRNWARE	13805	3796	0	0	0
C-TECH	0	-21363	-24990	-62225	-74434
CCH	54455	-6425	0	0	0
COMPAREX	1150697	1369853	-118825	-43132	22699
CONNECT	-101517	-5679	0	0	0
CRUX	10938	0	0	0	0

CSHOLDING	-2824	0	0	0	0
DATATEC	-746937	-160468	-33077	-3120	193
DCENTRIX	377	0	0	0	0
DIDATA	12576	-11664	148152	68199	56272
ELEXIR	-58786	-8442	0	0	0
EOH	4184	0	0	0	0
FARITEC	7064	0	0	0	0
FINTECH	-192687	-184142	-22853	-10821	2878
GLOTEC	35347	0	0	0	0
HICORL	-57925	-38109	-15615	-13351	-13603
IFUSION	6080	-35980	-29746	-29786	-2262
IDION	3784	0	0	0	0
ITECH	-2634	-3207	-4551	0	0
ITITECH	6698	-2402	0	0	0
XCHANGE	-13702	-6635	0	0	0
KTL	-96644	-223614	-82545	-41240	-63497
MAXTEC	-130	0	0	0	0
MBTECH	-72832	-38809	0	0	0
MGX	-211212	-4375	19324	16196	0
MMWTECH	-28081	-14348	0	0	0
MUSTEK	16870	10135	14238	0	0
OSI	854	0	0	0	0
PARACON	3313	0	0	0	0
PINNACLE	-18082	0	0	0	0
PTH	10923	-302	35	0	0
RECTRON	-2507	0	0	0	0
SILTEK	-208100	-23055	136394	168734	54849
SOFTLINE	25696	-9726	-1051	0	0
SPESCOM	-96554	-103089	-61434	-26856	6658
SPICER	-8350	-59240	-56084	-29537	-10134
TOP-TECH	1794	0	0	0	0
UCS	22491	-4736	0	0	0
USKO	18140	10405	79275	31531	32303
VESTA	5256	0	0	0	0
YTHRK	-6278	323	0	0	0
INFORMATION TECHNOL					
ABACUS	-83939	-41657	-2889	0	0
AME	1127	6743	506	-7607	-10387
BILBOARD	20746	0	0	0	0
CAXTON	-240841	-357729	-244441	-26688	-126110
CORPCOM	-29858	-18399	0	0	0
CTP	23608	-41334	-167169	14659	-41559
KGMEDIA	-156797	-89602	-16203	-4563	-3418
MIHH	999471	898376	1552238	-96831	313304
M-NETSS	701492	580832	-213230	72983	45611
NASPERS	-1152683	-462052	-251771	247349	95973

JOHNCOM	-496673	-540097	-610911	-118319	-178707
PRIME	-115334	-70860	-185781	-96547	-77078
SASANI	-1135	-8323	11730	-17702	-34769
<hr/> MEDIA <hr/>					
ALEXWYT	-45590	-43463	-31972	-24503	-16783
ARIES	6884	9967	12358	10652	9649
ASTRAPAK	6509	2146	0	0	0
BOWCALF	22217	16904	11715	11120	11436
COATES	25705	39051	45250	10026	10922
COPI	-124282	-107250	-90296	-52635	-32281
GUNDLE	-43706	-24904	-10800	-8302	-11205
HARWILL	-77247	-39249	-13006	-3559	-338
MALBAK	-299079	-499549	-629622	-667418	-588167
NAMPAK	516766	649914	739329	745207	637067
PARAGON	6818	5829	0	0	0
PLASGRP	-17217	0	0	0	0
PROSPUR	-8710	-2115	0	0	0
TRNPACO	6241	-4982	-8317	-9031	-9534
<hr/> PACKAGING & PRINTIN <hr/>					
BIDVEST	-307827	146407	340389	340597	415563
DNASUP	-28952	-28592	-3720	157	20643
ENSERVE	-36833	-18855	13307	14402	0
FEDICS	57163	29187	0	0	0
GLOVIL	0	9913	11753	12143	0
GRAY	26008	0	0	0	0
MOLOPE	42764	63887	0	0	0
REBHOLD	540027	78594	32810	0	0
SENTRY	28315	12345	0	0	0
SERVEST	9740	553	6147	5697	9971
TERFIN	9981	0	0	0	0
WACO	-204431	-201030	-306432	-320585	-445963
<hr/> SERVICE <hr/>					
ACCORD	10341	0	0	0	0
AUTOPGE	-18146	12761	27805	29803	18813
JASCO	7507	45813	59151	43842	13282
PARADIGM	79287	68519	0	0	0
RADIOSPR	-61988	16787	0	0	0
SHAWCELL	47151	0	0	0	0
TELJOY	-46504	-72713	-66025	-73602	-32143
<hr/> TELECOMMUNICATIONS <hr/>					



AVIS	134965	45677	-4175	-4079	0
BELL	-114242	-144390	-63597	-11474	-4389
BOLTONS	-17221	-20573	-8343	511	1816
CARGO	-18471	-20844	-20912	-11148	-9478
COMAIR	183349	76685	0	0	0
DORBYL	76718	141615	58391	-156296	-348613
DUNLOP	-73762	-74828	-740	132574	170735
GRINCOR	-437388	-185514	-145095	-71727	-101093
IMPERIAL	282825	87132	-65162	-27224	73299
IVS	52961	0	0	0	0
LASER	-69846	-71841	-125145	-138869	-72564
MAXTYRES	57305	19287	0	0	0
METAIR	102203	105311	107367	74513	80025
METKOR	59210	126572	67312	-211282	-435450
MICOR	-19269	31679	30502	-2199	-10623
MOBILE	-136576	-138266	-132210	-109257	-83712
PUTCO	-14900	-39769	-50329	-7558	22984
ROADCOR	-10408	-1758	-10084	-4955	2890
SAFREN	588451	-10051	214759	444203	488726
SUPRGRP	134801	-1181	-5503	8038	1158
TIWHEEL	47258	20171	22242	14776	13191
TOYOTA	-389081	-206317	-52003	2514	27290
TRENCOR	-161627	420555	226023	124417	198718
UNISERV	-33134	-24695	-3904	7835	8978
UNITRAN	40251	7902	6457	32217	53017
VALUE	28286	0	0	0	0
VENTEL	-20218	-10042	-11826	-8408	-1277
WESCO	-407306	-225077	-127871	-98078	-89999
TRANSPORT					
AECI	-1338648	-2219900	-1817675	-1259209	-1010672
AFROX	-304825	-218250	-310789	-228474	-88541
CHEMSERVE	66058	25245	9345	-11449	2860
ENERGY	-587880	-163098	224868	386040	0
FRANSAF	-4251	-7075	2154	807	12538
OMNIA	-238150	-161755	-172536	-174818	-95809
SASOL	2155761	2555807	1995135	1302761	1125936
SONDOR	3177	5546	4945	1569	478
SPANJAARD	-4919	-4323	-6122	-5813	-4686
STRAND	-28053	-44816	-39862	-50693	-47572
CHEMICALS, OILS & P					
ABIL	1336124	316530	10467	7820	9096
ABSA	8049167	7128333	4033865	1930048	-352712
BOE	3589730	2996323	182322	99808	-1374
BOECORP	81108	49853	39005	25291	-38702

FIRSTRAND	4697548	683990	-374861	-200117	-139119
INHOLD	13003	-902944	-1027929	-682472	-122683
INVSTEC	-54886	-1705577	-994625	-637810	-104085
MRCANTIL	2894	-25301	0	0	0
NEDCOR	6801260	3499890	1070210	671548	180988
REGAL	45010	0	0	0	0
RMBH	1349406	1202124	355107	-491682	-527056
SAAMBOU	-236244	-101493	-77019	-46001	-70806
SIB	-187094	-128594	120139	20441	-22691
SBIC	12977130	8258611	7092222	4712032	2799252

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#### BANKS

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ALEXFBS	90373	-57668	97392	31724	0
AMB	-85320	-61378	0	0	0
ARCAY	-45374	-47122	-15140	-7834	0
BJM	-23936	-9892	0	0	0
BRAIT	101858	56038	-513	-5744	-3156
CADIZ	34712	0	0	0	0
COROHL	139778	-53716	-20704	49607	42439
CREDCOR	56226	0	0	0	0
DECILLION	62835	0	0	0	0
EQUINOX	23191	0	0	0	0
FURNCAP	20208	11996	-3597	8244	-22579
GENSEC	-110486	-90860	-105386	-21010	0
GLENMIB	-65034	-30616	0	0	0
GLOBAL	-94111	0	0	0	0
GREENWICH	52232	0	0	0	0
HEDGE	97020	0	0	0	0
IOTA	24704	-13830	-1469	-1803	-548
NAIL	-201499	-234583	101430	68544	3210
NIBH	-880633	0	0	0	0
OUTSORS	275004	63528	7583	0	0
PERGRIN	57775	0	0	0	0
PSG	303256	305842	3877	3907	-782
QUYN	16881	0	0	0	0
RA-HOLD	108619	38949	-55207	-42032	1156
RAD	57830	23624	0	0	0
RAI	103490	22982	-64950	-52104	-8449
SASFIN	2848	1243	1645	2696	4510
TBBH	-15115	0	0	0	0
TIGON	173935	66347	39587	8682	0
TISEC	1840	0	0	0	0
UNIFER	-166217	0	0	0	0

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#### FINANCIAL SERVICES

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AMAPROP	-144383	-175249	-144622	-128176	-94177
BONATLA	-16721	-11415	0	0	0

COMPASS	-113193	-105840	-159501	-64089	-65642
CONFED	22309	28345	24946	22067	12838
FORIM	61148	50391	23536	4771	1196
GOODCAP	2582	0	0	0	0
IPROP	212043	226407	247845	138723	114382
LIBINT	-67559	0	0	0	0
MARCONS	10306	3347	1220	4136	3520
MAWENZI	21457	35945	31239	36967	28975
OVBEL	-11776	-17794	-17464	-13906	-13642
PROPFIN	-5454	-8160	-8694	-7787	-5356
PUTPROP	52761	32747	21154	17943	10635
SABLE	-36430	-29707	21412	26697	27837
SAMRAND	-24276	-28082	-38691	-18166	-1221
WESCAP	19595	2113	-2035	-19244	-19538

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PROPERTY

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## **APPENDIX 4**

### **MARKET TO BOOK**

#### **RATIO**

GROUP	1999	1998	1997	1996	1995
<hr/>					
ABI	6.51	5.85	3.35	3.06	3.93
AWETHU	1.04	4.00			
DISTIL	1.09	1.32	2.28	2.12	1.73
FORTUNE	1.71	1.65	1.90	2.31	3.15
KWV-BEL	0.76	0.95	1.67	1.56	1.10
SABPLC	3.72	5.25	4.46	5.94	4.58
SFW	0.49	1.21	1.68	1.31	0.78
<hr/>					
BEVERAGES					
<hr/>					
ADONIS	0.30	0.80	0.62	0.65	0.68
AMMGROUP	0.23	0.68			
BOLWEAR	0.15	0.28	0.27	0.53	0.44
BURLINGTN	0.43	7.52	0.43	0.37	0.00
COASTAL	2.06	1.69	1.67	4.53	0.00
FRAME	0.29	0.52	0.33	0.34	0.41
GLODINA	0.18	0.15	0.34	0.39	0.49
GUBINGS	0.17	0.30	0.38	0.36	0.60
NINIAN	0.28	0.17	0.37	0.44	0.74
PALS	0.27	0.41	0.50	0.57	0.96
SEARDEL	0.25	0.36	0.43	0.40	0.82
TOLARAM		0.96	0.57	0.58	1.02
<hr/>					
CLOTHING AND TEXTIL					
<hr/>					
A-V-I	0.55	0.59	1.27	2.07	2.83
AFBRAND	0.67	4.20			
CADSWEP	1.78	4.11	4.93	5.17	5.66
CGSMITH	1.81	1.19	2.57	2.80	2.97
CONAFEX	6.05	7.66	2.66	2.31	1.45
CROOKES	0.40	0.59	1.03	1.03	0.97
DELCORP					
DELFOOD	3.92	1.82	5.12	4.61	4.74
DELHOLD					
HLH	0.68	1.56	1.04	1.96	1.76

I-&-J	0.53	0.56	1.29	1.58	2.22
ILLOVO	1.40	1.59	3.32	1.70	1.48
INTRADING	5.00				
KOLOSUS	0.65	1.43	0.86	1.09	1.35
LIFESTYLE	2.39	5.62	4.62		
NAMFISH	1.71	0.68	1.81	0.92	1.83
NAMSEA	0.39	0.72	0.81	1.03	2.08
NATCHIX	0.58	0.62	1.09	1.60	
OCEANA	1.19	1.80	2.57	2.55	2.53
OTK	0.85	1.62	2.51		
RAINBOW	0.63	0.36	1.17	1.28	1.48
SEAHARV	1.13	1.22	1.30	2.27	2.20
SOVFOOD	0.55	1.07	2.05	4.02	
TIGBRANDS	2.57	1.80	3.02	3.02	3.15
TONGAAT	1.07	0.92	2.15	1.92	1.54
WBHOLD	0.38	0.44	0.68	0.79	0.65
<hr/>					
FOOD					
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AMAPS		4.42	3.55		
ANBEECO	0.27	0.82	0.67	1.21	0.66
CEDARGRO	0.93	1.79			
DAEWOO				3.56	2.77
FRIDGEM	0.58	1.02	5.32	2.64	
NUWORLD	1.28	3.39	6.18	4.07	4.02
OMEGA	0.14	2.08	2.19	4.23	
STEINHOFF	1.77				
<hr/>					
FURNITURE & APPLIAN					
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AF-&-OVER	0.76	0.77	0.48	1.13	0.66
AFGLASS	0.00				
AMLAC		1.39	1.67	3.70	
AUTOQIP	1.16	2.23	1.21	1.17	0.79
BEARMAN	0.67	0.90	2.58	3.18	4.01
IMPERILOG	0.62	0.52	0.84	2.22	1.98
BRANDCO	0.50	2.94	1.38	437.75	278.10
BUSBY	1.19	6.44			
CASHBIL	1.06	1.28	1.16	1.76	5.51
CHET	0.98	1.52			
CMH	1.12	1.01	1.41	3.39	1.78
DAWN	2.02		2.77	3.41	2.90
DYNAMO	0.17			4.28	3.62
EDCON	0.86	2.27	3.44	5.54	5.57
ELLERINE	1.41	1.22	3.11	1.79	1.88
FASHAF	2.12	3.48	1.79	2.08	1.13
FOSCHINI	1.84	3.18	3.04	6.01	5.90
GLOHOLD	0.35	0.88	1.25	5.35	2.90

HEAVEN	8.19	5.40	10.24		
HOMECHOIC	2.89	2.10	3.85	2.74	
HUDACO	0.93	0.73	2.31	3.24	3.84
ILIAD	1.47	1.19			
INMINS	0.48	0.40	1.50		
INVICTA	0.62	2.12	6.40	5.52	11.57
ITLTILE	2.88	3.28	2.70	1.85	1.24
JDGROUP	2.41	3.35	2.42	2.14	1.33
LA-STORE	3.19	9.17	10.49		1.01
MATHOMO	0.17	1.36	4.83	3.44	
MCRTAIL	0.73	8.47	2.75	3.88	5.74
METCASH		6.17	5.05	5.50	6.39
MIDAS	1.51	1.44	1.46	1.23	2.66
NICTUS	0.83	0.93	0.64	0.94	1.00
NUCLICKS	3.46	2.89	4.02	2.58	3.44
PEPGRO	2.98	4.15	4.96	4.34	12.35
PEPKOR	2.33	2.67	2.92	2.85	3.28
PICKNPAY	5.05	6.33	4.66	4.76	3.49
PIKWIK	15.60	25.66	27.40	39.77	26.95
PRIMATOY		2.13			
PROFURN	3.77	1.62	2.81	1.95	2.34
RAG	0.63	2.63	0.00		
RELYANT	0.58	1.07	0.67	0.66	0.66
RENAISAN		1.22			
RETCORP	1.52	12.09	5.28	4.37	1.11
REX-TRUE	0.73	0.84	0.58	1.13	0.66
SHOPRIT	4.01	5.45	5.62	4.52	3.57
SPECLTY	2.73	3.61	2.41	5.37	3.68
SPORT	1.84				
STORECO	8.76	10.78	6.23	15.38	12.46
TILEAFRIK	3.36				
TRUWTHS	3.57	3.98			
UNIGRO	5.45		2.10	1.08	1.71
VALAUTO	0.51	0.61	0.76	0.69	0.55
VALCAR	0.73	1.21	0.98	0.86	0.83
WETHLYS	2.55	3.18			
WINBEL	0.24	0.38	1.67	1.57	1.85
WINHOLD	0.24	0.40	1.78	1.65	1.31
WOOLIES	2.18	3.04	0.00		
WOOLTRU	2.23	1.87	4.10	3.53	5.90
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RETAIL					
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ALEXNDR	0.40	1.08	1.02	1.28	1.40
ARGENT	0.34	0.61		1.79	3.73
BASREAD	2.07	2.08	4.84	4.77	6.13
BATEPRO	1.08	1.29	1.98	3.26	1.32
BUILDMAX	0.44	1.07	1.52		

CEMENCO	0.57	0.21	0.56	0.54	0.43
CERAMIC	2.22	2.96	1.88	1.19	0.93
CLYDE	0.30	0.38	0.43	0.46	0.76
CONCOR	0.85	1.34	1.89	1.79	2.40
ED-LBATE	0.42	0.45	0.78	1.48	2.13
G5HOLD	0.25	0.38	1.08	1.62	1.13
GOLDSTEIN	0.24	0.43	1.10	2.07	1.48
GROUP-5	0.28	0.45	1.24	1.94	1.52
HOWDEN		0.40	2.29	0.00	
L-T-A	3.89	1.60	2.60	2.27	2.62
M&R-HLD	0.39	0.73	1.39	1.96	2.56
MASONITE	0.29	0.25	0.49	0.81	1.33
MINGRAN	0.34	0.32	0.65	1.13	0.51
OZZ	0.56	1.10	2.35	2.70	2.11
PORTHLD	0.09	0.22	0.84	0.38	0.34
PPC	1.35	0.96	2.73	2.62	3.64
S&SHOLD		0.31	0.54	1.39	1.18
STOCKS		0.43	0.65	1.58	1.27
TOCO	3.23	11.13		3.27	1.36
WBHO	0.70	1.46	1.53	1.29	0.77
YORKCOR	0.56	0.40	0.72	0.84	1.26

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#### BLD, CONSTR & ENGIN

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BARLOWS	0.95	0.82	2.26	1.81	1.87
CORPGRO	1.98	3.85	6.22	2.28	
FASIC	0.98	1.00	0.96	1.16	1.00
KAIROS	2.70		0.58	2.69	0.61
LENCO	1.09	0.94	1.43	2.67	2.69
LONAFRIC	5.91	5.43			
METJE-&-Z	0.76	0.69	0.61	0.96	0.56
MT-EAGLE	1.63	3.90	2.25	2.49	1.36
REMBR-BEH	1.20	1.22	2.02	1.96	1.74
REMGRO	1.57	1.45	2.21	2.11	1.97
RICHEMONT	1,453.12		33.03	71.02	11.95
SABVEST	0.58	0.65	0.52	0.58	0.92
TEGKOR	1.09	0.99	1.87	1.89	1.61
TIB	1.08	1.05	1.91	1.75	1.60

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#### DIVERSIFIED INDUSTR

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ALTECH	1.61	1.86	0.91	2.06	1.36
ALTRON	0.35	0.88	0.66	1.59	1.08
BICAF	0.11	0.10	0.12	0.23	0.58
CONLOG		17.99	3.79	2.97	3.26
CONTROL	0.94	0.69	1.75	4.91	3.52
DELTA	2.77	2.64	3.53	3.31	3.63
DIGICOR	3.05				

ELSEC	3.01				
PASDEC		15.55	0.78	0.77	0.51
GRINTEK	2.35	2.28	1.79	1.88	2.24
IST	4.26				
MACADAM	0.50	0.63	4.36	3.66	1.54
NEI-AFR	0.54	0.33	0.81	1.82	1.95
NEIHOLD	0.57	0.26	1.52	2.07	1.98
POWTECH	0.87	2.01	1.73	3.15	2.52
REUNERT	2.43	0.96	3.43	3.61	5.57
SEARTEC	0.43	1.67	0.96	1.28	1.36
SETHOLD	19.82				
STANTRN	2.93	4.91	5.04	2.83	2.13
UNIHOLD	2.21	3.10		1.17	1.33
VENTRON	0.67	1.27	0.85	2.35	1.67
VOLTEX	0.68	1.03	1.86	2.87	2.35

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#### ELECTRONICS & ELECT

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CITYLDG	0.99	1.56	2.55	6.07	6.88
CULLINAN	0.92	2.22	4.28	0.89	0.90
DON	0.48	0.96	0.53	2.16	2.14
GOLDREEF	0.40	1.08	1.13	1.08	1.00
KERSAF	0.88	0.81	1.61	2.36	1.73
KING	1.53	2.74	4.09		
LESRNET	0.86	1.26	2.23	3.51	1.80
MONEX	0.77	2.09	1.62	3.52	2.25
MORIBO	0.65	6.89	27.39	13.11	38.96
NANDOS	3.60	7.48	0.00		
OAKFLDS	1.29	1.94	5.40	3.01	5.68
SAIL					
SEKUNJALO	1.27				
SISA	0.70	0.80	1.02	2.03	1.68
STEERS	3.54	14.02	8.91	13.88	10.80
STOCHOT	0.25	0.64	1.47		
TEREXKO	0.53	1.35	0.64		
TOURVST	9.76	9.26	15.41		

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#### HOTELS & LEISURE

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ASTA	0.00				
BRNWARE	19.45	42.13			
C-TECH					
CCH	10.42	19.74			
COMPAREX	4.80	6.32	7.94	6.65	8.50
CONNECT		17.26			
CRUX	7.82				
CSHOLDING	8.76				



DATATEC	11.67	29.47	33.17	74.65	7.77
DCENTRIX	7.01				
DIDATA	16.56	17.42	23.10	13.80	6.36
ELEXIR		7.40			
EOH	19.01				
FARITEC	20.22				
FINTECH	2.07	3.06	2.84	4.81	4.50
GLOTEC	6.43				
HICORL	1.37	0.79	1.30		1.63
IFUSION	5.78	14.34		4.78	7.77
IDION	12.35				
ITECH		4.79	0.00		
ITITECH	5.44	7.36			
XCHANGE	373.73				
KTL	1.73	1.60	1.53	1.69	1.84
MAXTEC	8.41				
MBTECH	5.24	0.00			
MGX	5.67	12.20	10.48	7.62	
MMWTECH	0.80	6.60			
MUSTEK	3.04	4.71	11.75		
OSI	3.90				
PARACON	5.44				
PINNACLE	0.00				
PTH					
RECTORN	3.10				
SILTEK	1.58	1.28	2.07	2.52	3.53
SOFTLINE	13.83	11.40	1.63		
SPESCOM	2.34	3.05	3.03	1.86	1.54
SPICER	51.63		70.62	5.41	4.28
TOP-TECH					
UCS	6.73	4.41			
USKO			4.79	2.89	4.62
VESTA	7.96				
YTHRK	1.58	4.88			
INFORMATION TECHNOL					
ABACUS			5.17		
AME	3.76	8.55			
BILBOARD	3.53				
CAXTON	1.90	3.87	36.10	3.06	1.28
CORPCOM	7.98	18.99			
CTP	1.50	3.43	3.83	3.89	2.15
KGMEDIA	1.31	2.95	1.87	2.76	1.45
MIHH		6.67	3.68		0.00
M-NETSS			149.19	10.20	
NASPERS	4.76	3.95	4.53	5.97	3.52
JOHNCOM	3.09	3.58	4.11	6.44	3.30

PRIME	21.50	128.42			
SASANI	2.23	8.53	24.97	23.39	1.04
<hr/> MEDIA <hr/>					
ALEXWYT	0.95	0.33	0.64	0.62	0.83
ARIES		1.06	1.67	1.28	2.46
ASTRAPAK	3.01	6.95			
BOWCALF	1.31	1.66	2.58	2.97	3.47
COATES	0.81	0.71	1.02	1.16	1.34
COPI	2.42	2.66	3.29	3.03	2.52
GUNDLE	0.22	0.60	2.06	1.27	0.84
HARWILL	5.31	6.73	3.87	3.31	2.11
MALBAK	1.11	1.57	1.75	1.76	2.18
NAMPAK	2.14	1.29	3.34	4.14	3.99
PARAGON	1.16	3.04			
PLASGRP	1.39				
PROSPUR	1.81	2.41			
TRNPACO	1.66	2.94	0.90	1.21	0.22
<hr/> PACKAGING & PRINTIN <hr/>					
BIDVEST	5.12	4.66	4.09	4.66	4.67
DNASUP		1.38	2.12	3.39	4.09
ENSERVE	0.64	1.00		6.73	
FEDICS	4.50	5.12			
GLOVIL				0.00	
GRAY	14.51				
MOLOPE	6.42	10.24			
REBHOLD	8.29	56.55	281.64		
SENTRY					
SERVEST	7.24	3.70	3.58	4.13	2.58
TERFIN	21.02				
WACO	0.55	0.71	0.55	0.83	0.06
<hr/> SERVICE <hr/>					
ACCORD	5.61				
AUTOPGE	2.50	3.45	2.11	3.65	1.57
JASCO	6.57	2.74	2.29	4.57	5.15
PARADIGM	2.65	15.69			
RADIOSPR	6.41	12.35			
SHAWCELL	8.04				
TELJOY	2.89	4.90	2.73	4.30	9.04
<hr/> TELECOMMUNICATIONS <hr/>					
AVIS	3.64	4.37	0.00	0.00	

BELL	0.83	0.76	0.93	1.72	0.00
BOLTONS	0.13	0.21	0.24	0.38	0.37
CARGO	0.25	0.30	0.39	0.77	0.54
COMAIR	3.35	0.00			
DORBYL	0.66	0.88	1.52	2.01	
DUNLOP	0.78	0.48	0.41	1.24	2.13
GRINCOR	0.37	0.26	0.46	1.07	1.30
IMPERIAL	2.48	2.96	3.08	2.73	6.12
IVS	2.27				
LASER	1.57	1.27	0.94	0.81	0.63
MAXTYRES	1.61	1.94			
METAIR	0.37	0.29	0.51	0.61	1.31
METKOR	0.54	0.65	1.29	1.68	
MICOR	0.82	3.12	3.21	2.15	1.97
MOBILE	0.70	2.21	2.72	3.70	3.80
PUTCO	0.51	0.41	0.23	0.47	0.52
ROADCOR	1.61	3.43	1.87	14.53	
SAFREN	1.02	0.83	1.66	2.07	2.16
SUPRGRP	2.93	3.98	4.59	3.14	0.95
TIWHEEL	4.72	6.16	5.06	4.37	4.25
TOYOTA	0.30	0.24	0.44	0.51	0.74
TRENCOR	0.71	1.76	2.34	3.23	3.19
UNISERV	3.13	3.86	3.29	2.37	3.89
UNITRAN	1.21	1.67	2.27	3.24	2.62
VALUE	1.10				
VENTEL	0.79	0.35	0.40	0.66	0.60
WESCO	0.25	0.13	0.35	0.48	0.67
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TRANSPORT					
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AECI	0.68	0.39	0.76	1.17	1.18
AFROX	2.58	1.64	3.79	3.76	3.83
CHEMSERVE	2.52	2.19	3.65	2.93	0.30
ENERGY	7.18	1.41	2.54	1.42	
FRANSAF		3.40	2.45	3.91	3.05
OMNIA	1.02	0.91	1.55	2.70	2.46
SASOL	1.57	1.50	2.55	2.51	2.25
SONDOR	0.44	1.63	2.55	3.40	4.43
SPANJAARD	3.66	4.94	3.75	1.47	0.82
STRAND	0.77	1.21	0.66	1.71	2.94
<hr/>					
CHEMICALS, OILS & P					
<hr/>					
ABIL	5.58	16.81	8.09	2.60	0.00
ABSA	1.45	2.19	1.65	1.52	0.97
BOE	0.92	0.88	2.71	4.11	3.70
BOECORP	0.62	0.62	2.76	3.65	3.06
FIRSTRAND	2.63	4.97	9.45	4.37	3.25

INHOLD	3.57	4.19	3.24	2.45	3.33
INVSTEC	4.38	3.08	2.99	2.37	2.29
MRCANTIL	0.95	0.00			
NEDCOR	2.58	2.26	2.78	2.06	1.82
REGAL	1.96				
RMBH	1.73	3.15	4.86	4.60	3.52
SAAMBOU	1.91	3.53	2.48	2.10	1.29
SIB	1.74	1.20	1.50	5.08	2.58
SBIC	1.75	1.20	1.97	1.97	2.51
<hr/>					
BANKS					
<hr/>					
ALEXFBS	74.59		6.67	0.00	
AMB	1.65	4.79			
ARCAY	1.18	0.96	3.92	6.27	
BJM	3.82	4.01			
BRAIT	3.32	5.59	3.32	4.29	4.89
CADIZ	4.25				
COROHL	2.72	1.58	2.66	3.39	3.31
CREDCOR	3.02				
DECILLION	3.03				
EQUINOX	3.17				
FURNCAP	0.23	0.41	0.35	0.37	0.46
GENSEC	2.12	2.00	2.79	3.85	
GLENMIB	29.12				
GLOBAL	0.65				
GREENWICH	6.37				
HEDGE	0.85				
IOTA	4.94	3.91	1.97	0.55	1.33
NAIL	4.53	7.68	1.33	1.28	1.07
NIBH	2.04				
OUTSORS	9.09		48.93		
PERGRIN	54.49				
PSG	1.49	2.12	3.33	12.77	17.47
QUYN	13.34				
RA-HOLD	1.98	3.77	2.06	1.22	1.72
RAD	3.99	7.02			
RAI	1.70	2.88	1.89	1.19	1.75
SASFIN	1.65	4.22	3.18	2.42	2.13
TBBH	0.12				
TIGON	12.25	17.91	15.36	2.07	
TISEC					
UNIFER	6.35				
<hr/>					
FINANCIAL SERVICES					
<hr/>					
AMAPROP	0.59	0.13	0.28	0.42	0.49
BONATLA	0.87	1.02			

COMPASS		0.68		0.17	0.19
CONFED	2.09	2.14	2.35	2.32	2.94
FORIM	1.00	2.08	3.24	3.08	1.45
GOODCAP	0.42				
IPROP	0.31	0.30	0.64	1.13	1.53
LIBINT	0.00				
MARCONS	0.33	0.46	0.56	3.16	2.80
MAWENZI	0.30	0.98	1.58	1.05	1.04
OVBEL	0.72	0.85	0.51	0.52	0.34
PROPFIN	5.01	0.00	4.04	0.00	3.18
PUTPROP	0.53	0.55	0.51	0.72	0.53
SABLE	0.19	0.52	0.58	1.22	1.13
SAMRAND	0.58		0.67	0.94	0.83
WESCAP	1.11	0.83	4.82	0.00	0.00

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PROPERTY

## **APPENDIX 5**

### **TOBIN'S "q" RATIO**

	1999	1998	1997	1996	1995
ABI	5.75	5.66	3.18	2.81	3.53
AWETHU	0.94	3.55			
DISTIL	1.03	1.26	2.28	2.12	1.73
FORTUNE	1.63	1.59	1.85	2.25	3.04
KWV-BEL	0.76	0.95	1.67	1.56	1.10
SABPLC	3.26	4.61	3.75	4.93	3.68
SFW	0.46	1.13	1.68	1.31	0.78
<hr/>					
BEVERAGES					
<hr/>					
ADONIS	0.25	0.63	0.50	0.52	0.35
AMMGROUP	0.22	0.68			
BOLWEAR	0.15	0.27	0.26	0.51	0.43
BURLINGTN	0.29	4.69	0.28	0.26	0.00
COASTAL	1.47	1.25	1.52	4.53	0.00
FRAME	0.25	0.44	0.24	0.28	0.34
GLODINA	0.15	0.13	0.28	0.31	0.31
GUBINGS	0.13	0.25	0.30	0.27	0.44
NINIAN	0.25	0.14	0.32	0.35	0.57
PALS	0.24	0.37	0.46	0.53	0.91
SEARDEL	0.23	0.35	0.29	0.29	0.74
TOLARAM	0.78	0.21	0.24	0.37	0.69
<hr/>					
CLOTHING AND TEXTIL					
<hr/>					
A-V-I	0.51	0.55	1.14	1.75	2.35
AFBRAND	0.64	4.11			
CADSWEP	1.74	3.67	4.34	4.51	4.91
CGSMITH	1.36	0.88	1.87	2.04	2.06
CONAFEX	6.00	7.62	2.57	2.27	1.36
CROOKES	0.38	0.56	0.96	0.96	0.90
DELCORP					
DELFOOD	2.83	0.58	2.10	1.62	2.91
DELHOLD					
HLH	0.56	1.42	0.80	1.67	1.46
I-&-J	0.45	0.48	1.09	1.34	1.87
ILLOVO	0.89	1.09	1.99	1.26	0.99

INTRADING	5.00				
KOLOSUS	0.61	1.31	0.71	0.98	1.11
LIFESTYLE	2.06	5.41	4.31		
NAMFISH	1.55	0.63	1.10	0.77	1.53
NAMSEA	0.33	0.63	0.71	0.94	1.91
NATCHIX	0.54	0.58	1.02	1.46	
OCEANA	1.09	1.67	2.30	2.27	2.27
OTK	0.80	1.56	2.35		
RAINBOW	0.56	0.32	0.90	1.12	1.29
SEAHARV	1.05	1.13	1.19	1.97	1.94
SOVFOOD	0.52	1.02	1.96	3.88	
TIGBRANDS	2.36	1.59	2.74	2.71	2.75
TONGAAT	0.87	0.75	1.84	1.48	1.18
WBHOLD	0.37	0.42	0.68	0.77	0.64
<hr/>					
FOOD					
<hr/>					
AMAPS		4.24	3.48		
ANBEECO	0.27	0.82	0.66	1.19	0.66
CEDARGRO	0.93	1.78			
DAEWOO				3.49	2.70
FRIDGEM	0.54	0.96	5.14	2.56	
NUWORLD	1.25	3.32	5.85	3.84	3.67
OMEGA	0.14	2.07	2.16	4.23	
STEINHOFF	1.59				
<hr/>					
FURNITURE & APPLIAN					
<hr/>					
AF-&-OVER	0.72	0.70	0.43	0.95	0.51
AFGLASS	0.00				
AMLAC		1.23	1.62	3.61	
AUTOQIP	1.14	2.20	1.19	1.15	0.75
BEARMAN	0.65	0.88	2.50	3.09	3.89
IMPERILOG	0.62	0.51	0.80	2.09	1.86
BRANDCO	0.50	2.94	1.38	437.75	278.10
BUSBY	1.19	6.42			
CASHBIL	0.99	1.21	1.08	1.67	5.16
CHET	0.96	1.50			
CMH	1.11	0.99	1.38	3.33	1.75
DAWN	1.91		1.97	2.10	2.44
DYNAMO	0.16			4.20	3.52
EDCON	0.81	2.14	3.21	5.19	5.12
ELLERINE	1.39	1.21	3.07	1.77	1.85
FASHAF	1.97	3.34	1.70	1.99	1.04
FOSCHINI	1.77	3.07	2.92	5.75	5.62
GLOHOLD	0.35	0.88	1.25	5.32	2.85
HEAVEN	7.49	5.28	10.11		
HOMECHOIC	2.88	2.08	3.82	2.72	

HUDACO	0.90	0.71	2.20	3.06	3.53
ILIAD	1.43	1.18			
INMINS	0.46	0.38	1.45		
INVICTA	0.62	2.12	6.18	5.43	10.94
ITLTILE	2.85	3.26	2.67	1.82	1.21
JDGROUP	2.39	3.32	2.40	2.12	1.31
LA-STORE	3.17	9.15	10.40		1.01
MATHOMO	0.16	1.34	4.77	3.39	
MCRTAIL	0.72	7.38	2.66	3.76	5.40
METCASH		5.62	4.58	4.90	4.98
MIDAS	1.46	1.42	1.43	1.19	2.57
NICTUS	0.80	0.90	0.61	0.93	0.96
NUCLICKS	3.36	2.78	3.90	2.54	3.12
PEPGRO	2.98	4.15	4.96	4.34	12.35
PEPKOR	2.14	2.49	2.66	2.54	2.89
PICKNPAY	4.40	5.85	4.25	4.15	2.45
PIKWIK	15.60	25.66	27.40	39.77	26.95
PRIMATOY		2.11			
PROFURN	3.73	1.60	2.79	1.92	2.30
RAG	0.62	2.62	0.00		
RELYANT	0.57	1.05	0.65	0.65	0.62
RENAISAN		1.20			
RETCORP	1.49	11.45	5.08	4.21	1.05
REX-TRUE	0.71	0.80	0.54	1.02	0.56
SHOPRIT	3.36	4.48	4.99	3.77	2.94
SPECLTY	2.60	3.47	2.27	5.09	3.44
SPORT	1.80				
STORECO	8.76	10.78	6.23	15.38	12.46
TILEAFRIK	3.33				
TRUWTHS	3.29	3.59			
UNIGRO	4.60		1.90	1.02	1.63
VALAUTO	0.50	0.60	0.73	0.66	0.51
VALCAR	0.71	1.18	0.94	0.81	0.76
WETHLYS	2.53	3.15			
WINBEL	0.19	0.26	1.27	0.93	0.89
WINHOLD	0.21	0.32	1.50	1.16	0.79
WOOLIES	2.08	2.90	0.00		
WOOLTRU	2.12	1.84	3.78	3.28	5.29
<hr/>					
RETAIL					
<hr/>					
ALEXNDR	0.36	1.00	0.98	0.98	1.04
ARGENT	0.32	0.59		1.72	3.68
BASREAD	2.07	1.77	3.93	3.15	3.15
BATEPRO	1.02	1.21	1.77	2.86	1.13
BUILDMAX	0.42	1.04	1.49		
CEMENCO	0.33	0.14	0.38	0.37	0.31
CERAMIC	2.07	2.72	1.62	1.07	0.88



CLYDE	0.29	0.37	0.38	0.44	0.70
CONCOR	0.79	1.27	1.75	1.66	1.90
ED-LBATE	0.40	0.44	0.75	1.40	2.01
G5HOLD	0.18	0.29	0.75	1.00	0.68
GOLDSTEIN	0.24	0.43	1.10	2.07	1.48
GROUP-5	0.25	0.40	1.08	1.38	1.05
HOWDEN		0.38	2.23	0.00	
L-T-A	2.63	1.14	1.90	1.59	1.94
M&R-HLD	0.36	0.69	1.18	1.59	2.03
MASONITE	0.24	0.21	0.39	0.62	0.94
MINGRAN	0.31	0.30	0.64	0.98	0.44
OZZ	0.53	1.04	2.21	2.52	1.94
PORTHLD	0.09	0.18	0.65	0.32	0.28
PPC	1.12	0.72	1.79	1.56	2.31
S&SHOLD		0.28	0.50	1.29	1.07
STOCKS		0.40	0.62	1.50	1.18
TOCO	3.02	11.07		2.70	1.16
WBHO	0.65	1.36	1.37	1.11	0.67
YORKCOR	0.48	0.36	0.64	0.67	1.06
<hr/> BLD, CONSTR & ENGIN					
BARLOWS	0.87	0.70	1.95	1.54	1.58
CORPGRO	1.94	3.81	6.01	2.28	
FASIC	0.95	0.97	0.92	1.11	0.94
KAIROS	2.49		0.56	2.12	0.51
LENCO	1.07	0.85	1.26	2.50	2.48
LONAFRIC	5.73	5.27			
METJE-&-Z	0.74	0.67	0.58	0.92	0.53
MT-EAGLE	1.62	3.83	2.21	2.47	1.32
REMBR-BEH	1.13	1.17	1.85	1.85	1.62
REMGRO	1.52	1.42	2.12	2.05	1.90
RICHEMONT	249.78		27.67	42.53	10.27
SABVEST	0.58	0.65	0.52	0.57	0.92
TEGKOR	0.95	0.89	1.54	1.65	1.37
TIB	0.92	0.92	1.51	1.49	1.32
<hr/> DIVERSIFIED INDUSTR					
ALTECH	1.57	1.79	0.86	1.93	1.27
ALTRON	0.31	0.80	0.59	1.42	0.89
BICAF	0.10	0.10	0.12	0.22	0.58
CONLOG		16.42	3.62	2.61	2.81
CONTROL	0.90	0.68	1.69	4.67	3.27
DELTA	2.58	2.40	3.17	2.66	3.10
DIGICOR	3.00				
ELSEC	2.99				
PASDEC		6.21	0.67	0.70	0.46

GRINTEK	2.21	2.21	1.74	1.82	2.03
IST	4.21				
MACADAM	0.49	0.62	4.32	3.61	1.51
NEI-AFR	0.51	0.30	0.73	1.49	1.65
NEIHOLD	0.51	0.22	1.26	1.47	1.48
POWTECH	0.75	1.77	1.51	2.67	2.04
REUNERT	2.30	0.89	3.10	3.15	4.40
SEARTEC	0.43	1.66	0.96	1.28	1.36
SETHOLD	16.05				
STANTRN	2.83	4.80	5.04	2.59	2.00
UNIHOLD	1.95	2.84		0.96	1.07
VENTRON	0.52	1.09	0.70	1.85	1.23
VOLTEX	0.67	1.02	1.63	2.46	1.91

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#### ELECTRONICS & ELECT

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CITYLDG	0.96	1.53	2.49	5.86	6.41
CULLINAN	0.86	2.03	3.22	0.63	0.65
DON	0.47	0.94	0.51	2.11	2.06
GOLDREEF	0.40	1.08	1.12	1.08	0.98
KERSAF	0.82	0.75	1.42	2.08	1.50
KING	1.48	2.74	4.07		
LESRNET	0.84	1.21	2.17	3.30	1.68
MONEX	0.76	2.08	1.62	3.43	2.15
MORIBO	0.64	6.53	26.35	12.64	36.55
NANDOS	2.74	6.10	0.00		
OAKFLDS	1.29	1.94	5.35	2.98	5.65
SAIL					
SEKUNJALO	1.01				
SISA	0.64	0.75	0.92	1.85	1.58
STEERS	3.14	11.74	8.34	12.68	10.17
STOCHOT	0.25	0.64	1.46		
TEREXKO	0.53	1.35	0.64		
TOURVST	9.53	9.17	15.11		

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#### HOTELS & LEISURE

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ASTA	0.00				
BRNWARE	18.25	40.21			
C-TECH					
CCH	10.29	19.68			
COMPAREX	4.74	6.30	7.87	6.61	8.33
CONNECT		16.75			
CRUX	7.76				
CSHOLDING	8.50				
DATATEC	11.49	29.24	31.12	63.39	7.46
DCENTRIX	7.00				

DIDATA	16.10	16.73	22.15	13.37	5.99
ELEXIR		7.38			
EOH	18.96				
FARITEC	20.05				
FINTECH	2.02	3.00	2.78	4.67	4.32
GLOTEC	6.15				
HICORL	1.37	0.75	1.22		1.55
IFUSION	5.73	13.97		4.78	7.77
IDION	12.27				
ITECH	ERR	4.72	0.00		
ITITECH	5.35	7.20			
XCHANGE	305.44				
KTL	1.73	1.60	1.43	1.51	1.52
MAXTEC	8.29				
MBTECH	5.22	0.00			
MGX	5.59	11.97	10.17	7.17	
MMWTECH	0.79	6.59			
MUSTEK	3.03	4.71	11.67		
OSI	3.87				
PARACON	5.43				
PINNACLE	0.00				
PTH					
RECTRON	3.09				
SILTEK	1.56	1.26	2.06	2.50	3.36
SOFTLINE	13.74	11.37	1.61		
SPESCOM	2.30	2.98	2.99	1.80	1.52
SPICER	50.35		4.41	2.22	2.45
TOP-TECH					
UCS	6.69	4.37			
USKO			4.32	1.98	3.14
VESTA	7.88				
YTHRK	1.58	4.84			
INFORMATION TECHNOLOGICAL					
ABACUS			4.85		
AME	3.68	8.19			
BILBOARD	3.34				
CAXTON	1.80	3.54	31.10	2.65	1.08
CORPCOM	7.87	18.85			
CTP	1.43	3.11	3.32	3.18	1.78
KGMEDIA	1.30	2.94	1.76	2.56	1.17
MIHH	56.30	6.51	3.64	918.26	0.00
M-NETSS			63.23	9.48	1,128.79
NASPERS	3.92	3.69	4.09	5.56	3.19
JOHNCOM	2.70	3.55	3.83	6.01	3.06
PRIME	14.15	79.71			
SASANI	1.91	8.19	22.47	23.39	1.04

<hr/> MEDIA <hr/>					
ALEXWYT	0.76	0.27	0.53	0.49	0.69
ARIES		1.01	1.54	1.14	2.28
ASTRAPAK	2.25	5.61			
BOWCALF	1.14	1.42	2.20	2.49	2.75
COATES	0.74	0.66	0.94	1.07	1.23
COPI	2.34	2.56	3.13	2.88	2.35
GUNDLE	0.20	0.49	1.79	1.00	0.66
HARWILL	4.52	6.02	3.42	2.82	1.91
MALBAK	1.00	1.30	1.48	1.59	1.97
NAMPAK	1.78	1.06	2.72	3.52	3.16
PARAGON	1.09	2.92			
PLASGRP	1.36				
PROSPUR	1.66	2.37			
TRNPACO	1.41	2.37	0.65	0.86	0.15
<hr/> PACKAGING & PRINTIN <hr/>					
BIDVEST	4.69	4.56	3.84	4.41	4.41
DNASUP		1.38	2.12	3.39	4.09
ENSERVE	0.58	0.89		5.49	
FEDICS	4.17	4.86			
GLOVIL				0.00	
GRAY	13.68				
MOLOPE	6.07	9.98			
REBHOLD	8.19	54.01	184.05		
SENTRY					
SERVEST	7.02	3.70	3.12	3.48	1.85
TERFIN	20.91				
WACO	0.46	0.51	0.33	0.55	0.03
<hr/> SERVICE <hr/>					
ACCORD	5.58				
AUTOPGE	2.46	3.37	1.94	3.31	1.36
JASCO	6.34	2.68	2.19	4.33	4.93
PARADIGM	2.64	15.65			
RADIOSPR	6.18	12.28			
SHAWCELL	8.02				
TELJOY	2.57	4.54	2.33	3.19	4.20
<hr/> TELECOMMUNICATIONS <hr/>					
AVIS	3.22	4.00	0.00	0.00	
BELL	0.81	0.71	0.87	1.60	0.00
BOLTONS	0.09	0.14	0.13	0.20	0.17

CARGO	0.17	0.20	0.20	0.39	0.25
COMAIR	2.99	0.00			
DORBYL	0.59	0.79	1.33	1.71	
DUNLOP	0.66	0.40	0.34	0.81	1.52
GRINCOR	0.27	0.20	0.31	0.71	0.81
IMPERIAL	2.26	2.81	2.91	2.58	4.91
IVS	1.67				
LASER	1.51	1.09	0.76	0.68	0.48
MAXTYRES	1.53	1.86			
METAIR	0.35	0.27	0.49	0.57	1.22
METKOR	0.42	0.53	0.95	1.22	
MICOR	0.81	2.91	2.92	2.02	1.81
MOBILE	0.70	2.21	2.72	3.70	3.80
PUTCO	0.36	0.27	0.23	0.46	0.51
ROADCOR	1.41	2.67	1.80	10.79	
SAFREN	1.02	0.53	1.13	1.36	1.50
SUPRGRP	2.82	3.80	4.08	3.11	0.95
TIWHEEL	4.39	5.87	4.84	4.21	3.84
TOYOTA	0.30	0.24	0.44	0.51	0.72
TRENCOR	0.65	1.59	2.26	3.13	3.08
UNISERV	3.13	3.86	3.29	2.37	3.65
UNITRAN	1.09	1.52	2.00	2.73	2.13
VALUE	0.98				
VENTEL	0.65	0.31	0.36	0.62	0.56
WESCO	0.25	0.13	0.35	0.48	0.64
<hr/> TRANSPORT <hr/>					
AECI	0.62	0.31	0.60	0.88	0.85
AFROX	2.05	1.64	3.79	3.76	3.83
CHEMSERVE	2.33	1.93	3.42	2.61	0.27
ENERGY	7.16	1.12	2.35	1.29	
FRANSAF		2.99	2.20	2.39	2.44
OMNIA	0.77	0.66	1.17	1.91	1.56
SASOL	1.13	1.05	1.58	1.51	1.22
SONDOR	0.41	1.44	2.13	2.87	3.36
SPANJAARD	2.89	4.24	2.81	1.19	0.74
STRAND	0.70	1.02	0.63	1.61	2.68
<hr/> CHEMICALS, OILS & P <hr/>					
ABIL	5.57	16.72	8.09	2.60	0.00
ABSA	1.40	2.12	1.60	1.43	0.92
BOE	0.91	0.88	2.71	4.07	3.64
BOECORP	0.62	0.62	2.76	3.65	3.06
FIRSTRAND	2.56	4.33	9.31	4.29	3.20
INHOLD	3.57	4.19	3.14	2.40	3.19
INVSTEC	4.33	3.06	2.95	2.35	2.26

MRCANTIL	0.94	0.00			
NEDCOR	2.56	2.22	2.71	2.01	1.76
REGAL	1.96				
RMBH	1.73	3.15	4.82	4.51	3.45
SAAMBOU	1.88	3.51	2.34	1.94	1.19
SIB	1.73	1.20	1.50	4.98	2.57
SBIC	1.73	1.18	1.95	1.93	2.46
<hr/>					
BANKS					
<hr/>					
ALEXFBS	50.31		6.35	0.00	
AMB	1.65	4.78			
ARCAV	1.18	0.96	3.92	6.27	
BJM	3.81	4.00			
BRAIT	3.32	5.58	3.32	4.29	4.89
CADIZ	4.25				
COROHL	2.72	1.58	2.66	3.39	3.31
CREDCOR	2.99				
DECILLION	3.02				
EQUINOX	3.17				
FURNCAP	0.18	0.33	0.23	0.27	0.35
GENSEC	2.12	2.00	2.79	3.85	
GLENMIB	25.12				
GLOBAL	0.65				
GREENWICH	6.36				
HEDGE	0.85				
IOTA	4.91	3.91	1.81	0.51	1.15
NAIL	4.45	7.42	1.33	1.28	1.07
NIBH	2.04				
OUTSORS	9.07		48.73		
PERGRIN	54.33				
PSG	1.49	2.12	3.25	12.02	13.17
QUYN	13.16				
RA-HOLD	1.98	3.77	2.06	1.22	1.72
RAD	3.99	7.02			
RAI	1.70	2.88	1.89	1.19	1.73
SASFIN	1.64	4.19	3.17	2.40	2.10
TBBH	0.12				
TIGON	12.21	17.86	15.21	2.07	
TISEC					
UNIFER	6.24				
<hr/>					
FINANCIAL SERVICES					
<hr/>					
AMAPROP	0.59	0.13	0.28	0.42	0.49
BONATLA	0.87	1.02			
COMPASS		0.68		0.17	0.19
CONFED	2.08	2.14	2.35	2.31	2.91

FORIM	0.95	1.99	3.14	2.97	1.34
GOODCAP	0.42				
IPROP	0.31	0.30	0.64	0.98	1.21
LIBINT	0.00				
MARCONS	0.33	0.46	0.55	3.16	2.80
MAWENZI	0.29	0.98	1.57	1.05	1.03
OVBEL	0.72	0.85	0.50	0.52	0.34
PROPFIN	5.01	0.00	4.00	0.00	3.18
PUTPROP	0.53	0.55	0.51	0.72	0.53
SABLE	0.19	0.51	0.58	1.21	1.13
SAMRAND	0.58		0.67	0.94	0.83
WESCAP	1.11	0.83	4.81	0.00	0.00

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PROPERTY

## **APPENDIX 6**

### PEARSON CORRELATION COEFFICIENTS

MB = Market-to-Book

Q = Tobin's Q

CIV = Calculated Intangible Value

#### **BEVERAGES**                      MB to Q                      MB to CIV                      Q to CIV

1999

correlation	1	-0.73	-0.73
population size (N)	7	7	7
significance (p)	0	0.065	0.066

1998

correlation	1	-0.83	-0.829
population size (N)	7	7	7
significance (p)	0	0.021	0.021

1997

correlation	1	-0.633	-0.632
population size (N)	6	6	6
significance (p)	0	0.177	0.178

1996

correlation	1	-0.504	-0.503
population size (N)	6	6	6
significance (p)	0	0.308	0.309



1995

correlation	1	-0.54	-0.538
population size (N)	6	6	6
significance (p)	0	0.268	0.271

## CLOTHING AND

## TEXTILES

1999

correlation	0.989	-0.8223	-0.8118
population size (N)	12	12	12
significance (p)	0.00	0.001	0.001

1998

correlation	0.981	-0.5885	-0.5607
population size (N)	12	12	12
significance (p)	0	0.044	0.058

1997

correlation	0.9916	-0.2022	-0.1949
population size (N)	11	11	11
significance (p)	0	0.551	0.566

1996

correlation	0.9954	-0.2074	-0.2323
population size (N)	11	11	11
significance (p)	0	0.541	0.492

1995

correlation	0.998	0.7226	0.7275
population size (N)	11	11	11
significance (p)	0	0.012	0.011

## FOOD

1999

correlation	0.9657	0.7588	0.7185
population size (N)	26	26	26
significance (p)	0	0	0

1998

correlation	0.9098	0.4024	0.1483
population size (N)	25	25	25
significance (p)	0	0.046	0.479

1997

correlation	0.9914	0.7778	0.7539
population size (N)	24	24	24
significance (p)	0	0	0

1996

correlation	0.9908	0.6848	0.6903
population size (N)	22	22	22
significance (p)	0	0	0

1995

correlation	0.9921	0.6791	0.6771
population size (N)	20	20	20
significance (p)	0	0.001	0.001

## FURNITURE AND

### APPLIANCES

1999

correlation	0.9998	0.8231	0.8222
population size (N)	7	7	7
significance (p)	0	0.023	0.023

1998

correlation	0.9999	0.4266	0.4225
population size (N)	7	7	7
significance (p)	0	0.34	0.345

1997

correlation	1	0.569	0.569
population size (N)	6	6	6
significance (p)	0	0.239	0.239

1996

correlation	0.9999	0.1049	0.0948
population size (N)	5	5	5
significance (p)	0	0.867	0.88

1995

correlation	0.9999	0.1563	0.153
population size (N)	4	4	4
significance (p)	0	0.844	0.847

## RETAIL

1999

correlation	0.9996	0.0637	0.0766
population size (N)	55	55	55
significance (p)	0	0.644	0.578

1998

correlation	0.9998	-0.0017	0.0047
population size (N)	54	54	54
significance (p)	0	0.99	0.973

1997

correlation	0.9998	0.2292	0.2329
population size (N)	47	47	47
significance (p)	0	0.121	0.115

1996

correlation	0.9998	0.4919	0.5023
population size (N)	45	45	45
significance (p)	0	0.001	0

1995

correlation	0.9997	0.6351	0.6452
population size (N)	42	42	42
significance (p)	0	0	0

**BUILDING,  
CONSTRUCTION  
AND ENGINEERING**

1999

correlation	0.9836	0.1857	0.1264
population size (N)	25	25	25
significance (p)	0	0.374	0.547

1998

correlation	0.9342	-0.0814	-0.2982
population size (N)	26	26	26
significance (p)	0	0.693	0.139

1997

correlation	0.9842	0.4496	0.4317
population size (N)	25	25	25
significance (p)	0	0.024	0.031

1996

correlation	0.9889	0.488	0.3981
population size (N)	25	25	25
significance (p)	0	0.013	0.049

1995

correlation	0.9989	0.5936	0.579
population size (N)	24	24	24
significance (p)	0	0.002	0.003

## **ELECTRONICS**

### **AND ELECTRICAL**

1999

correlation	0.9907	-0.1071	-0.1022
population size (N)	21	21	22
significance (p)	0	0.644	0.651

1998

correlation	0.9937	0.0941	0.1247
population size (N)	19	19	19
significance (p)	0	0.702	0.611

1997

correlation	0.9972	-0.2562	-0.2648
population size (N)	17	17	17
significance (p)	0	0.321	0.304

1996

correlation	0.9991	0.1573	0.1707
population size (N)	18	18	18
significance (p)	0	0.533	0.498

1995

correlation	0.9981	0.1725	0.1564
population size (N)	18	18	18
significance (p)	0	0.494	0.535

## **HOTELS AND**

### **LEISURE**

1999

correlation	0.9905	-0.0839	-0.205
population size (N)	18	18	18
significance (p)	0	0.741	0.414

1998

correlation	0.9924	-0.3879	-0.4447
population size (N)	17	17	17
significance (p)	0	0.124	0.074

1997

correlation	0.9684	0.3217	0.1638
population size (N)	16	16	16
significance (p)	0	0.224	0.544

1996

correlation	0.9995	0.8062	0.8123
population size (N)	11	11	11
significance (p)	0	0.003	0.002

1995

correlation	0.9947	0.6816	0.6524
population size (N)	11	11	11
significance (p)	0	0.021	0.03

## **INFORMATION**

### **TECHNOLOGY**

1999

correlation	1	0.1701	0.1711
population size (N)	40	41	40
significance (p)	0	0.288	0.291

1998

correlation	1	0.7516	0.7521
population size (N)	24	24	24
significance (p)	0	0	0

1997

correlation	1	0.2347	0.2344
population size (N)	15	15	15
significance (p)	0	0.4	0.4

1996

correlation	0.9999	0.2458	0.2465
population size (N)	12	12	12
significance (p)	0	0.441	0.44

1995

correlation	0.9983	0.6246	0.6437
population size (N)	12	12	12
significance (p)	0	0.03	0.024

## MEDIA

1999

correlation	0.9997	0.0956	0.1132
population size (N)	13	13	13
significance (p)	0	0.756	0.713

1998

correlation	0.9999	0.0959	0.1
population size (N)	12	12	12
significance (p)	0	0.767	0.757

1997

correlation	1	-0.1177	-0.1147
population size (N)	11	11	11
significance (p)	0	0.73	0.737

1996

correlation	0.9999	-0.0124	-0.015
population size (N)	10	10	10
significance (p)	0	0.973	0.967

1995

correlation	0.9995	-0.1607	-0.166
population size (N)	10	10	10
significance (p)	0	0.657	0.647

## PACKAGING AND

## PRINTING

1999

correlation	0.9981	0.8181	0.8381
population size (N)	13	14	13
significance (p)	0	0	0

1998

correlation	0.7891	0.267	-0.196
population size (N)	13	13	13
significance (p)	0.001	0.378	0.521

1997

correlation	0.9996	0.6905	0.7069
population size (N)	10	10	10
significance (p)	0	0.027	0.022

1996

correlation	0.9995	0.506	0.5324
population size (N)	10	10	10
significance (p)	0	0.136	0.113



1995

correlation	1	0.2399	0.2409
population size (N)	10	10	10
significance (p)	0	0.504	0.503

## SERVICE

1999

correlation	0.9999	-0.2949	-0.2842
population size (N)	10	10	10
significance (p)	0	0.408	0.426

1998

correlation	0.9997	0.6825	0.7008
population size (N)	9	9	9
significance (p)	0	0.043	0.035

1997

correlation	0.9986	0.8608	0.885
population size (N)	5	5	5
significance (p)	0	0.061	0.046

1996

correlation	0.999	0.8082	0.8338
population size (N)	6	6	6
significance (p)	0	0.052	0.039

1995

correlation	0.9983	0.8581	0.8858
population size (N)	4	4	4
significance (p)	0.002	0.142	0.114

## TELECOMMUNICA

### TIONS

1999

correlation	0.9993	0.4195	0.4385
population size (N)	7	7	7
significance (p)	0	0.349	0.325

1998

correlation	0.9999	0.137	0.1476
population size (N)	5	5	5
significance (p)	0	0.826	0.813

1997

correlation	0.9999	-0.9662	-0.9634
population size (N)	3	3	3
significance (p)	0.007	0.166	0.173

1996

correlation	0.9998	-0.991	-0.9883
population size (N)	3	3	3
significance (p)	0.012	0.086	0.097

1995

correlation	0.998	-0.992	-0.982
population size (N)	3	3	3
significance (p)	0.04	0.081	0.121

## TRANSPORT

1999

correlation	0.999	0.4915	0.504
population size (N)	28	28	28
significance (p)	0	0.008	0.006

1998

correlation	0.9769	0.3345	0.3108
population size (N)	26	26	26
significance (p)	0	0.095	0.122

1997

correlation	0.976	0.1897	0.0862
population size (N)	24	24	24
significance (p)	0	0.375	0.689

1996

correlation	0.9628	0.4265	0.2484
population size (N)	24	24	24
significance (p)	0	0.038	0.242

1995

correlation	0.9726	0.7403	0.622
population size (N)	21	21	21
significance (p)	0	0	0.003

## CHEMICALS, OILS

### AND PLASTICS

1999

correlation	0.8971	0.8859	0.7819
population size (N)	9	9	9
significance (p)	0.001	0.001	0.013

1998

correlation	0.6262	0.922	0.8164
population size (N)	10	10	10
significance (p)	0.053	0	0.004

1997

correlation	0.9875	0.796	0.8313
population size (N)	10	10	10
significance (p)	0	0.006	0.003

1996

correlation	0.9844	0.7008	0.72
population size (N)	10	10	10
significance (p)	0	0.024	0.019

1995

correlation	0.8896	0.7582	0.7205
population size (N)	9	9	9
significance (p)	0.001	0.018	0.029

## **BANKS**

1999

correlation	0.9999	0.5164	0.5086
population size (N)	14	14	14
significance (p)	0	0.059	0.063

1998

correlation	0.9999	0.0318	0.0274
population size (N)	13	13	13
significance (p)	0	0.918	0.929

1997

correlation	0.9998	0.5351	0.5277
population size (N)	12	12	12
significance (p)	0	0.073	0.078

1996

correlation	0.9993	0.7941	0.7847
population size (N)	12	12	12
significance (p)	0	0.002	0.003

1995

correlation	0.9993	0.9284	0.9291
population size (N)	12	12	12
significance (p)	0	0	0

## FINANCIAL

## SERVICES

1999

correlation	0.9998	-0.1349	-0.1341
population size (N)	31	31	31
significance (p)	0	0.469	0.472

1998

correlation	0.9997	-0.4333	-0.429
population size (N)	18	18	18
significance (p)	0	0.072	0.076

1997

correlation	0.999	-0.2607	-0.2583
population size (N)	14	14	14
significance (p)	0	0.368	0.373

1996

correlation	0.9982	0.0133	0.0091
population size (N)	13	13	13
significance (p)	0	0.966	0.977

1995

correlation	0.9863	0.7963	0.7548
population size (N)	9	9	9
significance (p)	0	0.01	0.019

## PROPERTY

1999

correlation	1	0.2042	0.2039
population size (N)	16	16	16
significance (p)	0	0.448	0.449

1998

correlation	1	0.3866	0.3859
population size (N)	13	13	13
significance (p)	0	0.192	0.193

1997

correlation	1	0.1655	0.1667
population size (N)	13	13	13
significance (p)	0	0.589	0.586

1996

correlation	0.9948	0.7373	0.6739
population size (N)	13	13	13
significance (p)	0	0.004	0.012

1995

correlation	0.9871	0.8015	0.724
population size (N)	13	13	13
significance (p)	0	0.001	0.005