The University of Greenwich
Technological Educational Institute
of Kavala

STUDY ON THE
RECOGNITION, MEASUREMENT
AND EVALUATION OF
INTANGIBLE ASSETS

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Abstract

It is widely recognised that in the current corporate environment value creation processes in largely based and cultivated on intangible assets. The appearance of knowledge economy indicates that patents, copyrights, services and knowledge, which are intangible in nature, are the key resources of the modern capitalist system. The economic magnitude of intangible assets has long been acknowledged in the business world. However, it is only recently that measurement and reporting of intangible assets has become a major concern for regulators, governments, enterprises, the accounting profession, investors and other interest groups that are affected. This concern is driven by the significant expansion in private-sector investment in intangible assets and the limitations associated with current information on intangible asset investment. In spite of the fact that the economic magnitude of intangible assets has long been recognised, the major issue of how to account, measure and evaluate intangibles remains unresolved. Current financial reporting in this area, with its disclosure constraints limit innovation and decrease the progress in capital markets in the long run. The absence of a information infrastructure and a conceptual framework surrounding the recognition of the role of intangibles leads to harmful results. Current accounting treatment fails to capture the value of a company that is attributed to its intangible assets.

This study explores the debate over the recognition, evaluation and measurement of intangible assets, collected from the literature and enterprise practise. The methodology drawn is the analysis of secondary data sources. The dissertation highlights the call for the development of an information infrastructure for the financial reporting and measurement of the intangibles. This is achieved by analysing
existing financial accounting reporting frameworks and by pointing the reporting gap concerning the treatment of intangible assets. This study identifies the acknowledgement of the importance of intangible assets by the business world and combines the variety of the approaches adopted towards the enhancement of the current practise. The reasons for conducting this study are primarily driven from the acknowledgement of the urgency of the problem and from the recognition that an appropriate information infrastructure is still absent.
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Chapter 1: Introduction

1.1 Preface

It is know commonly accepted that we are in the heart of the time period in global modern economies, which is characterised by new performance drivers and value adding factors, that are mainly intangible in nature. Therefore, the so-called intangible or knowledge Economy is the new environment that companies have to learn to cope with. This new environment has an intense reflect on financial statements and corporate reporting. In a business world that becomes more immaterial than material, traditional accounting fails to capture the inclusive value of intangible assets. What is currently omitted is a comprehensive information infrastructure that will enable intangibles to be identified, classified and reported effectively.

The increase in the importance of intangibles assets in today’s business environment does not only indicate the need for new accounting rules and assessment tools, but also the need to follow a different and broader view of the dynamics of an entity. The growth of intangibles has exposed the limitations of the existing accounting model, since these assets do not meet the test for balance-sheet recognition. Intangible assets are frequently diffuse in nature and not readily separable from other assets or from the business as a whole.

Firms, which are knowledge intensive, and firms that have investment directions in intangible assets will face increasing levels of information asymmetry in their financial statements. Information asymmetry is harmful to the firm and for society in general, since in the long run reductions in economic growth will occur. Regulations related to the reporting of intangible assets can directly influence the level of information asymmetry. Performance measurement models which have been exercised in practise from companies for internal
purposes, recognise the value of intangible assets and the assessment methods encompass them as valuable drivers.

1.2 Aims and objectives of the dissertation

The aim of this dissertation is to illustrate a critical evaluation of a range of practices and models, in the area of financial reporting, accounting standards and performance measurement models that have come forward, due to the existence of intangible economy. The partial objectives to fulfil this target are:

- To demonstrate an overview of the complex topics concerning the area of intangible assets.
- To provide a clear picture of the explanations for this challenging issue, and evidence for the difficulties in the resolution.
- To investigate from every aspect the new developments and innovative methods in the current corporate practise and identify resolutions from this area.
- To analyse the current proposals imposed by the accounting practise worldwide, and present the harmful effects of the derived information asymmetry.
1.3. Overview

The dissertation includes 6 chapters.

- Chapter 1 defines the concept of the intangible assets issue. It then provides the objectives and aims of the study and the scope for further study.

- Chapter 2 explores current regulatory practices worldwide, and summarises the various accounting treatment of intangibles.

- Chapter 3 illustrates the reasons for the growing importance of intangibles. An empirical report on relationship between Intellectual capital and firm’s corporate performance.

- Chapter 4 presents the extensive academic debate as to the classification and definition of intangible assets.

- Chapter 5 reviews the literature that analyses the economic impact of not accounting for intangibles and includes an illustration of the innovative approaches to the reporting, valuation and measurement of intangibles, gathered from the literature and company practice.

- Chapter 6 documents paradoxes concerning intangibles, some propositions suggested by the academic literature, and the concluding remarks of the whole study.
Chapter 2: Financial reporting on intangibles: Current accounting treatment in the global economy

2.1. Introduction

One of the most crucial issues that governments and accounting regulators face in modern economies is the creation and establishment of new rules and standards, which ensure that intangible assets are identified, measured and reported in traditional financial reporting. The importance of accounting for intangibles is not only limited to the provision of accurate information to the stakeholders, but it is also important or ensuring that investment in intangibles is encouraged and optimised.

Canibano et al. (2000) pointed that academic literature is involved with the topic of accounting and reporting for intangible assets for a long time (Dicksee, 1897). The most common pressure between the relevance principle versus reliability of financial information is quite tense, when the question on how to account for intangibles arises. During the early 1990s, more and more theoretical attention has been given to intangible assets in the field of financial accounting (Eggington, 1990; Hodgson et al., 1993), with particular attention paid to goodwill.

The European Community accepted the fourth and seventh directive on individual company and group accounts, an initial step for creating accounting harmonisation within the member countries. Nevertheless, regarding intangible assets, the EC directives did not set particularly innovative rules, and intangibles should be included in the balance sheet in ad hoc section. There are various approaches between countries worldwide in the reporting of intangibles, and an illustration of these methods will be analysed in this chapter.
2.2 The accounting literature

According to Young (2003), the accounting literature on intangibles has suffered from three limitations to date. First, until recently, most discussions about intangible assets concerned a small subset of what now is considered to be a vast array of resources. Intangibles were defined as those assets that one could not see or touch, such as patents. But even here, the accounting field was limited since a patent only made its way onto an organization’s balance sheet if it had been purchased, but patents arising from internal activities were not included on a company’s balance sheet. The only time GAAP recognised the intangible assets that gave a firm a strong competitive position in its marketplace was when that firm was bought by another at a price exceeding the equity total on the balance sheet; this gave rise to the intangible asset called “goodwill.” Indeed, while much has been written on the proper accounting procedures for goodwill, little discussion took place until recently around the idea that even those firms that had not been purchased also had something akin to goodwill.

The second limitation is that, once the accounting profession recognised the need to address a more broadly defined set of intangible assets, it failed to draw on the work of the strategy theorists as a set of building blocks. Instead, in a movement resonant of the United States’ land rushes of the 19th century, each researcher, along with the Financial Accounting Standards Board itself, staked out his or her territory in this newly emerging field. The result is according to Young (2003), “a bizarre combination of a land rush, the seven blind men and the elephant, and the Tower of Babel”.

The final limitation, and one related to the above land rush, is that little effort has been made to develop a set of principles. Instead, the literature on intangibles to date tends to focus on one of two matters: a description of the problem, frequently illustrated with examples or
anecdotes, but without much in the way of a conceptual framework to structure it, or a handbook for executives who wish to manage their intangible assets more effectively.

According to PRISM study (2003), there are several choices that should be addressed for reporting on intangibles. Even though, these choices are analogous to those required for reporting on tangible assets, they appear of a particular complexity when referred to intangibles. Those choices are:

1. recognition vs. disclosure;
2. recognition and initial measurement of externally acquired intangible assets vs. recognition and initial measurement of internally generated intangible assets;
3. subsequent valuation issues.

In the global level, the most influential accounting bodies are the IASB (International Accounting Standards Board), FASB (Financial Accounting Standards Board) in USA, and ASB (Accounting Standards Board) in UK. The major barriers that lead these bodies to providing insufficient information on intangibles are amortisation and impairment of intangible assets, R&D, initial asset recognition of intangibles and goodwill.

**2.2.1 Amortisation and impairment**

IN the UK, FRS 10 which deals with goodwill requires purchased goodwill to be amortised over the period that the worth of the business is expected to go beyond its net assets and this period should be 20 years or less. For a company to amortise over period of more than 20 years or (in the case of an indefinite useful life) not at all, the assets must be steady for that longer period and also capable of continued measurement so that the annual impairment review will be done.
However, USA and IASB prohibit goodwill amortisation, but instead require annual testing for impairment (SFAS No.142 *Goodwill and Other Intangible Assets* (FASB, 2001) and IFRS 3 *Business Combinations* (IASB, 2004c)). This requirement is based on the assumption that it is not feasible to estimate the depreciation ratio of external acquired goodwill or its useful life.

Concerning the impairment of intangible assets, such an asset should be impaired only if its carrying amount exceeds its recoverable amount and in that case, the asset is written down to its recoverable amount. IAS 36 Impairment of Assets (IASC, 2004a) and FRS11 in UK 11 *Impairment of Fixed Assets and Goodwill* (ASB, 1998) handle this issue and especially IAS36 provides some typical information that might be used for the impairment test, such as changes in market interest rates, changes in the economy and bad economic performance.

### 2.2.2 Research and development

The standards that deal with R&D are SSAP 13 *Accounting for Research and Development* (ASC, 1989) in UK, SFAS No.2 *Accounting for Research and Development Costs* (FASB, 1974) in USA and IAS 38 (revised) *Intangible Assets* (IASB, 2004b). According to SSAP13, R&D cost can be divided in:

- **Pure (or basic) research:** experimental or theoretical work undertaken primarily to acquire new scientific or technical knowledge for its own sake.
- **Applied research:** original or critical investigation undertaken in order to gain new or substantially new scientific or technical knowledge and directed towards a specific practical aim or objective. Capitalisation of pure and applied research is not allowed.
- **Development**: use of scientific or technical knowledge to produce new or substantially improved materials, devices, products or services prior to commercial production or commercial applications, or to improving substantially those already produced or installed.

- **Specific exclusions**: expenditure incurred in locating and exploiting oil, gas and mineral deposits and expenditure reimbursed by a third party.

According to SSAP13, development expenditure can be capitalised only if the following criteria are met:

- for a clearly defined project;
- the related expenditure is separately identified
- the technical feasibility and ultimate commercial viability of the outcome can be assessed with reasonable certainty
- reasonably expected related future revenues will exceed all capitalised and future development, production, selling and administration costs; and
- adequate resources are expected to be available to complete the project and fund the increased working capital.

According to IAS 38 the criteria for capitalising development costs are quite similar with the UK requirements but the US approach is the most strict since it require full expense of all R&D costs, with the exception of software development costs where capitalisation is permitted.
2.2.3 Initial asset recognition

As it will be analysed thoroughly in Chapter 4 the Accounting issue of Intangibles starts from the lack of a coherent definition concerning these assets. The general definition of rights or other access to future economic benefits controlled by an entity as a result of past transactions or events is quite vague to encompass intangible assets. Control for instance can not be applied fully to human Capital or to brand names. The notion future economic benefits also fail to include many intangible assets since these benefits cannot be certain and measured reliable in the present. It is also very difficult to define internally generated intangible assets since in many cases they cannot be allocated to a particular event.

2.2.4 Goodwill and intangible assets

IN the UK, FRS10 Goodwill and Intangible Assets (ASB, 1997) defines purchased goodwill as the difference between the cost of an acquired entity and the aggregate of the fair values of that entity's identifiable assets and liabilities and internally generated goodwill is ignored. FRS 10 states that:

FRS 10 allows capitalization of an intangible only if it was acquired separately and if it was acquired as part of a business acquisition it can then be capitalized as separately from goodwill. The only case that allows capitalization of an internally generated intangible asset is the case that it has an readily market value.

The relevant international standards IAS 38 (revised) Intangible Assets (IASB, 2004b) and IFRS 3 Business Combinations (IASB, 2004c) follow broadly similar lines, with IFRS 3 stating that, under the purchase method of accounting for combinations, an acquired intangible item, including any in-process research and development project (even if these
include components of research), must be recognised as an asset separately from goodwill if it meets the definition of an asset, is either separable or arises from contractual or other legal rights, and its fair value can be measured reliably.

2.3 European Union/ MERITUM Project

The attitude of the world's most influential standard-setting organisations often works as a guiding tool for the direction of accounting development in smaller countries, such as France, Germany and the Scandinavian countries. These countries, as members of the European Union, renewed their accounting legislation with EU fourth and seventh directive fully or partially implemented. Accounting for Intangible assets, with all its different aspects, is still an inhomogeneous area in the international accounting field. Harding (1995) recognises that:

"Many national standard setting bodies have tried to deal with, or are still grappling with, the issues surrounding intangible assets. Few have so far achieved any consensus within their countries."

This review of accounting practice reveals that countries of the European Union have been less reluctant to recognise intangible assets in the balance sheet than standard-setting organisations in the UK, the US, and the FASB, ASB and the IASB are all dominated by the Anglo- American accounting tradition, focusing on the capital market as the primary users of financial statement information. The theoretical basis that the above mentioned standard setting organisation follow is strongly based on the balance sheet oriented approach. This
approach relies on the assumption that a true economic value can be associated with each element in the financial statements and that true income can be estimated as the difference between the net value of the firm's assets at two different points in time.

A relevant question is why Continental European countries, have been less reluctant to recognise intangible assets in the balance sheet than Anglo-American countries. Krohn & Knivsfla (2000) pointed that:

"In credit-oriented economies, such as the Central European ones, it is important to signal the value of the collateral to banks as the main sources of finance. In more equity-oriented economies, such as the Anglo-American ones, it is important to signal value to investors. Could these differences explain the identified difference in attitude toward the capitalisation of intangible resources? Or is the more liberal view on capitalisation a result of these countries lacking a well-developed conceptual framework that both helps them resolve these types of issues and constrain the possible choices available?"

The major early policy initiatives on the reporting of intangibles have been dominated by North American thinking, with a particularly influential start date being the SEC conference in April 1996, followed by the Brookings Institution research initiative, and the body of work led by Baruch Lev from NYU (Lev, 2001). Later that year, an EU initiative took shape, which led onto an important conference at Louvain-La-Neuve (Buigues, Jacquemin and Marchipont, 2000).

Several European initiatives have been developing during this period. The MERITUM project MERITUM (Measuring intangibles to understand and improve innovation management: www.kunne.no/meritum) was an EU research project which began in November 1998, being concerned with the measurement of non-financial value or intellectual capital.
Also in 1998 began a Danish initiative on Knowledge statements, concerned with the practical
external reporting of intellectual capital. In 2001, the MERITUM network was succeeded by
E*KNOWNET, a thematic network on intangibles, financed by the STRATA programme.

During this period, the European Community initiated two major projects concerning
intangibles. The first was a concluded proposal presented by Mantos Consulting in
combination with City University Business School and it was a High Level Experts Group
(HLEG, 2000). The question of intangibles then featured in key speeches by senior European
Commission staff in Lisbon, Nice and Vaxjo. The second project was PRISM
(www.euintangibles.net), funded under the EU Fifth Framework IST programme. It is a
consortium of eight university schools of business or economics in seven EU countries. As its
acronym suggests, it has five main concerns:

P policy-making
R measurement and reporting
I intangibles
S skills development
M management

PRISM is a multi-disciplinary European research initiative aimed at gaining a deeper
understanding of the issues surrounding the management and measurement of intangibles in
the modern economy. The PRISM group believes that intangible investments – in areas such
as R&D, know-how, software, brands, licenses, copyrights, and organizational design - are
the drivers of both competitive advantage and economic value creation. The effort of the
The group is focused on building a community, which is actively engaged in addressing the issues, with the longer-term aspiration of stimulating much-needed change in practices. Such practices pertain to policy-making decisions at a governmental level, data, measurement and reporting systems throughout the economy, and the management challenges posed by operating in a context increasingly dominated by weightless and knowledge-related assets.

2.4 Summary and conclusions

The growth of the international financial markets and the globalisation of modern economies has directed to a new international ground of economic activity. This universal truth implies that accounting and financial reporting has itself extended beyond national frontiers. The most important problem that arised was the diversity of accounting rules between different countries since a variety of accounting rules and principles appeared in practice.

A few studies have been carried out regarding the issues arising from Accounting diversity in the global economy such as Cooke (1993), Hellman (1993) concerning US principles, Simmonds & Azieres (1989) and Joos and Lang (1994) concerning various treatments in Europe. Lainez & Callao (2000) proved that diversity in the recognition of intangible assets has a direct impact in the liquidity and insolvency ratio of companies.

Tangible and intangible investments are made by firms to produce future economic benefits. The main objective of financial statements is to provide internal and external stakeholders with information concerning the financial performance of the firm, and a true and fair view of its assets and liabilities. Accounting standard setters worldwide, usually do not include intangible assets in financial reports on the basis of accounting conservatism.
tradition, which is often associated to tax reasons. Intangible assets will usually only be recognisable as assets if there is a supporting transaction with a cost that can be recorded to represent the asset, and consequently, this cost must be able to be directly linked to a future benefit.

The main disagreement among accounting standard setters, academics and corporate managers, is to whether and how report on intangible assets in the financial statements. Many national standard setting bodies have tried to deal with, or are still grappling with, the issues surrounding intangible assets, but unfortunately, few have so far achieved any consensus within their countries. In the absence of a systematic framework for reporting on intangible assets, financial information revealed, will not be comparable and interpretable, and investor and creditor assurance will be negatively affected.

Concerning diversity, the degree of deviation indicates the complexity accounting rule makers have experienced in establishing accounting requirements in intangibles field. A trend appears to be forming towards less restrictive accounting requirements in this area as indicated by many standard setters that allow the non-amortisation of many recognised intangible assets. Nevertheless, it remains the fact that many internally generated intangible assets are still not recognised.
Chapter 3: Reasons for the escalating importance of intangibles: An empirical examination of the relationship between intellectual capital and firm’s corporate performance.

3.1. Introduction

It is widely recognised that we live in the centre of a new phase of evolution concerning economic activities, which is characterised by new performance and value drivers, which are mainly intangible in nature. In view of that, the so-called knowledge economy, information society or digital economy, is the new environment that firms have to learn to cope with. The economic arena is no longer surrounded by physical flows of material goods, transaction of property rights and products, but is characterised by images, data, symbols and copyrights, something that directly affects all aspects of economic life.

Recognition of the economic magnitude of intangible assets was a slow-moving process in all business sectors. For some firms, intangibles are proved to be the most vital long-term assets, knowledge of their employees, technology under development, manufacturing arrangements, and marketing systems, all of which are absent from financial statements. What is essentially absent is a thorough accounting information infrastructure that would allow intangible assets to be identified, measured, reported and managed effectively. The voluntary disclosure system has not lead to a clear information environment. In the long run, the constraints of financial reporting concerning intangibles, will lead to decrease in progress in capital markets, and will limit innovation.
3.2 Historical review on the growing importance of intangible assets

It is broadly accepted that currently non-physical assets remarkably contribute to enhance the competitiveness and the share value of firms. The enhanced importance of intangibles is generally considered as a result of the increasing competition that has characterised the world economy and that is closely correlated to the globalisation progression and tendencies towards deregulation, the emergence of new competitive productive realities, the discovery of new IT technologies, the growing complexity of the environment in which firms operate and a shift in demand conditions (Maskell and Malmberg, 1999; Asheim, 2001). These aspects obviously relate to the crisis of the Fordist mass-production system, and the shift to a non-price competition based on innovation and quality of products and services (Piore and Sabel, 1984). Furthermore, improvements in capital markets have given an important contribution to the dematerialization of production, with the progressive complexity of financial products, having made it easier to finance expensive intangible assets. All these factors have induced firms to reorganise their production focusing on non-physical activities and resources. In theory, Intangible assets exist from the early years of civilisation and the initial forms of societies. Revolutionary innovations like electricity and pharmaceutical products had created the first intangibles. Intellectual capital or knowledge assets are not just discoveries of the modern world.

The issue on how to account for intangible assets which is a continuing accounting controversial topic, was initially raised by Yang (1927), who noted that:

“Much has been written on goodwill, and by eminent authorities, but so far as the writer has been able to determine, the subject has not been adequately dealt with from the standpoint of accounting. This is noticeably true in the case of accounting textbooks, and even in the
extended special works, such as those of Dicksee and Leake, most of the space is devoted to the legal characteristics of goodwill and the methods of appraisal. In fact, it is fair to say that while the peculiarities of intangible assets have long been recognized by professional accountants and business men, not much advance has yet been made in the direction of a real understanding of the essential nature of intangibles… it has been deemed necessary to discuss the various phases and interpretations of goodwill and related assets.” Later, but with similar overtones, commented in an AICPA session as follows: “I should like to direct your attention to two types of items usually found on balance-sheet, the definition and treatment of which are often vague, confusing, misleading, and wholly lacking in uniformity. I refer to intangible assets and contingent liabilities. I have read much of what has been written by authors of text books and by practising accountants concerning these two groups of accounts, and I am impressed by our more or less vague and incoherent attempts at definitions and by our lack of uniformity in the suggested classification of these items in the accounts and statements … most of this lack of uniformity …can be traced directly to out loose definitions and careless use of terms. Therefore, I suggest that the Institute’s committee on terminology prepare definitions of these terms which may be interpreted and used with more uniformity.”

It could be stated that an important part of the investment in intangible assets is considered to start from the household sector with individuals investing significantly in their own human capital, primarily through education. During the last two decades, private-sector investment in intangible assets has been growing considerably, and the challenge posed by this fact is evidenced in the effort devoted to the area by managers, academics, accounting regulators, analysts, and other interest groups involved.
One of the key explanations for the growing importance of intangibles during the last two decades is the expansion of information technologies and the economic globalisation of business operations. According to the study conducted by the commission of the European Communities Enterprise Directorate General (PRISM, 2003), the problems posed by intangible assets appear at least three dimensional in nature. The first dimension is the lack of a conceptual framework for identifying, collecting and analysing data for internal management (within the enterprise) purposes. The second overlapping dimension deals with external financial reporting on intangible assets. Here the problem is slightly different since accounting regulators have put substantial effort into the development of a conceptual framework. In fact, the existing asset definition, a source of future economic benefits (common to most conceptual frameworks for accounting internationally), is wide enough to catch most intangible assets. Nevertheless, the problem relates to the recognition criteria for assets. The traditional principle is that, to be recognised, assets must be measurable reliably by reference to a ‘past’ cost. The traditional view is that intangible assets cannot be reliably measured. Thus, intangible assets tend not to be systematically reported on the balance sheet. This ‘recognition principle’ leads to a irregular account of the assets employed by enterprises to generate revenues. These two dimensions (internal management and external measurement, and reporting on intangible assets) overlap. The overlap arises through the impact of external reporting rules on internal data collection practices. While these two dimensions would be expected to be related, this relation seems to become tricky to the extent that external conceptual frameworks fail to match with to real world constructs. The third dimension is the relation between microeconomic (enterprise level) and macroeconomic data collection agencies, tools and conceptual frameworks. There are several agencies at micro and macro levels with similar data collection aims but with different terminology and tools at their disposal.
3.3. Reasons for increasing interest in intangibles

The shift from the Mass-production period in the business world to the continuous development of information and communication technology implied that knowledge and intangibles assets possessed would be the most crucial economic forces and firms became learning organizations, in a continuous race in obtaining valuable intangible assets. Knowledge and human capital, patents and technologies under development, information systems that encompass all aspects of the business operations are now the most important goals to be attained. The major explanations for this change are presented in the following sections:
3.3.1 Growth in the knowledge stock

**Figure 3.1: Evolution of knowledge**

<table>
<thead>
<tr>
<th>Early Mechanisation</th>
<th>Steam Power and Railways</th>
<th>Electrical and Heavy Engineering</th>
<th>Fordist Mass Production</th>
<th>Information and Communication Technology</th>
<th>Biotecnology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1770 Cotton Pig Iron</td>
<td>1840 Coal Transport</td>
<td>1890 Steel</td>
<td>1940 Energy (Oil)</td>
<td>1990 Microelectronics</td>
<td>2000-2020 Biotechnology</td>
</tr>
<tr>
<td>Textiles</td>
<td>Steam Engines, Machine Tools, Steam ships, Railways</td>
<td>Electrical and Heavy Engineering</td>
<td>Automobiles, Airlines, Petrochemicals, Highways, Aluminium</td>
<td>Computers Software, Telecoms, ISDN, IT services</td>
<td>Genetics, Space satellites, Environmental Technologies</td>
</tr>
</tbody>
</table>

Source: Adapted from Dogson and Marceau (2000) and shaping Australia’s Future: Innovation-Framework Paper (Department of Industry, Science and resources 2000)
According to the study conducted by The European Communities Enterprise Directorate General (PRISM,2003), the minimum level of knowledge and competencies across operating, investing, and financing functions required for enterprises to even enter a sector and be competitive has increased. Figure 3.1 is a graphical illustration of this point. This graph illustrates a sense of the fundamental role of technology in the dynamics of enterprise entry and exit. Intangible investment in technological innovation builds knowledge stocks over time. Layer upon layer of knowledge increases the initial investment in learning needed. Figure 3.1 summarises the major knowledge areas that have developed since the time of the industrial revolution in the late 1770s to the present time.

“The growth of these major technology areas and the transitions from one major technology paradigm to another, have been accompanied by rapid economic growth and substantial business change. Realisation of the importance of investment in intangible assets to economic growth and productivity has been a slow process” (PRISM,2003).

Previous studies for Macroeconomic models had traditionally excluded intangible investment as a factor of production (Webster, 1999). However, new growth theories moved forward by encompassing labour effects and differentiating skilled from unskilled labour (Romer, 1990). A major theoretical step forward has come with evolutionary theorists who propose that economic growth is determined by endogenous processes of learning and discovery. Evolutionary theorists model enterprise growth and change dynamically as a function of competitive forces in the economy. These more recent analyses emphasise on competitive processes (Metcalfè, 1997) to further our knowledge of the specific patterns of strategic behaviour observed in relation to investment. According to PRISM study,
understanding these competitive processes is central to developing relevant internal and external reporting frameworks.

3.3.2 Reasons for increasing interest in intangibles: Scalability and network effects

Tangible assets are conditional upon the rivalry that if a person uses an asset, he forbids any other interested from using it simultaneously. According to Lev (2001) scalability occurs when one person using an asset does not prevent others from using it on the same time. The most clear example is the use of a software program that allows many users to benefit on the same time. Network effect are described as one’s benefit from being part of a network increases with the number of users connected to it. Networks often result in a snowball effect where success begets success.

The negative aspects of scalability and network effects are management and control issues. Investment in intangible assets gives rise to outputs that are difficult to be defined, so it is difficult to right contracts that guarantee the interests of the members involved, as noted by Hart (1995). Another negative aspect is management compensation contract. For the same reason it is difficult to define motivation standards for managers, if input and output is difficult to observed and allocated.
3.3.3 First- Mover advantage

According to Webster (2000), any benefits generated from tangible capital investment is easy for competing enterprises to imitate. Intangible investment however, is often enterprise specific (for example, skilled work team, the culture of the workplace, patents, negotiated positions within an industry, market networks, etc.) making it very difficult for competitors to copy. Intangible investment therefore can be considered, as a way of achieving a competitive advantage.

In a specific industry firms may have a first-mover advantage, when a company that makes the first move is able to get a larger market share and higher profits than a follower. According to Mueller (1997), the following factors are mentioned that are the benefits of a first mover:

- Switching costs, meaning the costs faced by consumers when the shift from one brand to another.
- Network externalities, meaning that the first mover has the best chance to set up networks.
- Scale economies.
- Learning by doing cost reductions.
3.4 Why do companies want to measure intellectual capital?

The concept of intellectual capital, which will be analysed thoroughly in chapter 4 and chapter 5, encompasses all the knowledge a company possesses, that can be converted into profits. Young, knowledge-intensive organizations face investment shortage by external financiers, and consequently, they have a way to quantify and communicate their intellectual capital to investors and financiers. Besides that, firms want to measure IC strategic and internal management reasons. According to a study conducted by the PRISM project (2003), the main reasons are:

- Association of IC resources with firm’s strategic vision. To support the execution of a specific strategy via a general upgrading of the work with the companies’ human resources.

- To support or maintain various parties awareness of the company.

- To influence stock prices, by making several competencies visible to current and potential customers.

- To make the company appear to the employees as a name providing an identity for the employees and visualising the company in the public. Knowledge of employees and customers will stimulate the development of a set of policies to increase customer satisfaction and customer loyalty.

- Determine the most effective management incentive structures.
The term knowledge companies have been used to describe those companies that focus their strategy on intellectual capital, and consider it as a key input to their production. According to the PRISM study (2003):

“Companies that are creating measurement and reporting requirements are choosing to engage in benchmarking activities because they believe that such activities create value for them. A firm makes an investment in intangibles when it undertakes expenditure, which has a long-term pay-off, but acquires no physical assets. To gauge the relative profitability of such investments, firms need to be able to measure their IC. Firms, which develop a deep understanding of the role of knowledge in their business, treat it as an asset, cultivate and exploit it, are gaining significant business benefits as a result.”

3.5 Consequences of inadequate accounting for intangibles

The major issue of the growing irrelevance of financial statements and the inadequate accounting treatment of intangible assets will be examined thoroughly in chapter 5. However, for a comprehensive illustration and for the purposes of this chapter some points will be mentioned.

The fundamental objective of financial accounting is to provide users of financial statements with useful information for the purpose of efficient and effective decision making. The fact that intangible assets are not fully reflected in the balance sheet, and intangible investments are expensed as they are undertaken, both earnings and the book value of equity
are argued to be understated by the conventional accounting model. Consequently, it is practically unattainable for potential investors and company managers to:

- assess the rate or return (productivity) of investment in intangibles, and changes over time in the efficiency of the firm’s investment activity;
- determine the value of a firm’s intangible capital, and the expected lives (benefit duration) of such assets.

3.6. An empirical investigation of the relationship between intellectual capital and firm’s corporate performance: Evidence from Pharmaceuticals firms

Recently, economists focused their attention on the invisible value omitted from firm’s financial statements. The growing difference between the book value and the market capitalization of the companies highlights the limitations on the financial statements in explaining firm’s potential. Therefore, investigation into how to assess firm’s intellectual capital and whether intellectual capital affects firm’s bottom lines has been of great research interest. There is a consensus among practitioners that the traditional sources of economic value, such as labour and capital have yielded precedence to the intellectual capital (Youndt et al, 2004).

With this motivation we try to extend the understanding of the role of the intellectual capital to generating corporate value and building competitive advantages for companies. In
order to assess the association between the corporate intellectual ability and firm’s performance, this empirical research applies the Value Added Intellectual Coefficient (VAIC), developed by Pulic (1998).

3.6.1. Theoretical background

Nowadays, it is commonly accepted that “hidden” assets, such as knowledge of employees, brand loyalty, market position, play a key role for the survival of more companies. The increased importance of the Intellectual capital as a business and research topic results from the emergence of an economy driven by the knowledge, information, and international competitiveness (Guthrie, 2001). Stemming from the fact that for most companies, the book value correlates insignificantly with the market value and that the know-how increases companies’ efficiency, the correct measurement, and disclosure of intellectual capital is crucial for the evaluation of firm’s future earning potential.

Researchers define intellectual capital as “the sum of all knowledge and knowing capabilities that can be utilized to give a company a competitive advantage” (Youndt et al, 2004, p. 337). It should be noted that intellectual capital is not limited only to knowledge and competence held by individuals but also include knowledge stored within organizational systems, business processes, and customer and supplier relations. A key feature of the intellectual capital is its intangibility. For that reason it cannot be owned and controlled by company and cannot be considered as an asset. Therefore, by omitting the intellectual capital, conventional accounting underestimates the true value of companies (Bornemann and Leitner, 2002).

Except for sophisticated accounting systems, there are few internal and external measures to estimate and visualize the value of intellectual capital (Shiu, 2006). According to the model developed by Skandia, one of the first companies in developing and implementing a
systematic way of measuring the intellectual capital, the intellectual capital consists of the hidden factors of human and structural capital. Roos and Roos (1997) describe the human capital as “what is in the heads of employees” (p.8) and the structural capital as “what is left in the organization when people go home in the evening” (p.8). In other words, the human capital can be defined as skill, combined knowledge, innovativeness of the firm’s individual employee, whether the structural capital is the software, hardware, patents, trade marks, and everything else that supports employee’s productivity (Bontis, 2001). Considering this it is easy to understand why the intellectual capital is expected to play such a significant role in improving both corporate and financial performance.

In recent times, a new measure for corporate intellectual ability, VAIC – the Value Added Intellectual Coefficient, has emerged in the literature (Najibullah, 2005). The VAIC is developed by Pulac (1998) and currently is being used not only for academic, but also for business purposes. Its major components are physical capital, human capital and structural capital.

Firer and Williams (2003) emphasize on several advantages of applying VAIC. First, VAIC presents a uniform and reliable measure that can be used to perform comparative analyses across different sectors locally and globally. Second, VAIC estimation is based on audited information and therefore, calculations can be considered unbiased and confirmable. Finally, the universal acceptance of VAIC has been enhanced by the fact that it is a simple technique that is straightforward of computation by internal and external stakeholders.

The potential of VAIC is stimulated by growing evidence in the literature. Shiu (2006) examines the correlation between the economical potential and intelligent capability of the technological companies in Taiwan. In his research Najibullah (2005) investigates the relationship between the intellectual capital and firm’s market value in the context of commercial banks in Bangladesh. Although, the results from both papers show no strong
correlation between the intellectual capital and companies’ performance, the applied measurement system can be used as a method for the assessment of employees’ achievement by setting the goals in improving the intellectual capital for each department and employee.

3.6.2 Research design

The purpose of this empirical study is to investigate the relationship between the market – to – book value ratio, VAIC and its components, and economical performance in the context of pharmaceutical industry in USA.

The conceptual framework for the research can be illustrated as:

The paper expands the methodology applied by Shiu (2006) by regressing VAIC and its components on additional depending variables – growth revenue, employment productivity.
3.6.2.1. Data and sampling procedure

The sample consists of 10 pharmaceutical companies enlisted in the New York stock exchange. Most of the enlisted companies in the pharmaceutical sector were omitted due to missing data.

Nowadays, the pharmaceutical sector plays a crucial role in world economy. Its innovations for products and drive for competitive advantages mainly account for by intellectual capital. The data employed in this paper were collected from the 2005 fiscal year annual reports of the sampled companies. The observed firms were confined within one sector aiming to obtain a homogeneous sample.

3.6.2.2. Measures of variables

Aiming to test the strength of association between firms’ intellectual ability and corporate performance, the OLS regression analysis has been conducted (Najibullah (2005).

As dependent variables we employ some fundamental ratios for company’s valuation: Market – to - book value (M/B value ratio), profitability ratios (ROA and ROE), and two proxy measures of firm’s growth potential - Growth in revenues (GR) and Employee productivity (EP). The calculation of the selected ratios is straightforward:

M/B value ratio is measured by the total market capitalization divided by the book value of company’s net assets.

Return on assets reflects firm’s efficiency in exploiting total assets. The ROA is measured as the net income is divided by company’s the total assets.

Return on equity represents firm’s profitability, as the net income is divided by the total shareholders’ equity.
Growth in revenues is calculated as the difference between the current year’s revenues and last year’s revenues is divided by the last year’s revenues.

Employee productivity measures the net value generated per employee. It is calculated as the net income is divided by the number of employees.

In order to measure corporate intellectual ability, the VAIC and its components are used as explanatory variables in the model. The key advantage of VAIC is that it is designed to successfully monitor and assess the efficiency in adding value to a firm’s total assets not on cost control (Shiu, 2006). The formulas estimating VAIC are as follows:

Firstly, the ability of a company in creating or value added (VA) is calculated. In other words, finding out how current resources are utilized. The estimation of VA can be expressed as:

\[ VA = \text{Net sales revenues} - \text{Costs of goods sold} - \text{Depreciation} \]

Secondly, we estimate the three major components of firm resources – human capital (HC), capital employed (CE) and structural capital (SC) (Firer and Williams, 2003).

\[ CE = \text{Total assets} - \text{intangible assets} \]

\[ HC = \text{total remuneration on employees} \]

\[ SC = VA - HC \]

Finally, we estimate the components of VAIC. According to (Firer and Williams, 2003) VAIC is a combination of three indicators: Capital employed efficiency, Human capital efficiency and Structural capital efficiency.

\[ VAIC = CEE + HCE + SCE \quad \text{where,} \]

\[ CEE = VA \div CE \]

\[ HCE = VA \div HC \]

\[ SCE = SC \div VA \]
It can be viewed that the CEE and HCE are the value-added by one dollar input of physical assets and human capital, while the SCE is the proportion of the total value–added assigned to structural capital.

Following the methodology applied by Shiu (2006) we use company’s leverage as a control variable.

To perform the regression analysis the E-views software (version 3.0.) has been employed.

3.6.3. Empirical results

By employing the above described research framework, we hypothesize the following: Companies with greater VAIC tend to have better financial performance and higher Market – to – book values, ceteris paribus.

3.6.3.1. Descriptive statistics

Given that the empirical research is based on a sample-dependent phenomenon, it is essential to carefully examine the sample characteristics. Table 1 presents the summary of the descriptive statistics of all the variables employed in the research.

<table>
<thead>
<tr>
<th>Table 1 Descriptive statistics</th>
<th>№ Observations</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/B ratio</td>
<td>10</td>
<td>3.6683</td>
<td>38.1434</td>
<td>10.7676</td>
<td>10.8179</td>
</tr>
<tr>
<td>ROE</td>
<td>10</td>
<td>0.0364</td>
<td>1.9870</td>
<td>0.4434</td>
<td>0.5635</td>
</tr>
<tr>
<td>ROA</td>
<td>10</td>
<td>0.0174</td>
<td>0.2448</td>
<td>0.1376</td>
<td>0.0633</td>
</tr>
<tr>
<td>Leverage</td>
<td>10</td>
<td>0.3414</td>
<td>0.8764</td>
<td>0.5374</td>
<td>0.1734</td>
</tr>
<tr>
<td>Growth in revenue</td>
<td>10</td>
<td>0.0030</td>
<td>0.1635</td>
<td>0.1072</td>
<td>0.0506</td>
</tr>
<tr>
<td>Employee productivity</td>
<td>10</td>
<td>0.0109</td>
<td>73.5200</td>
<td>17.1084</td>
<td>29.0946</td>
</tr>
<tr>
<td>CEE</td>
<td>10</td>
<td>0.1276</td>
<td>0.7803</td>
<td>0.5066</td>
<td>0.2053</td>
</tr>
<tr>
<td>SCE</td>
<td>10</td>
<td>0.1079</td>
<td>0.9746</td>
<td>0.6712</td>
<td>0.2222</td>
</tr>
<tr>
<td>HCE</td>
<td>10</td>
<td>1.1209</td>
<td>39.2910</td>
<td>6.892</td>
<td>11.4425</td>
</tr>
<tr>
<td>VAIC</td>
<td>10</td>
<td>1.1209</td>
<td>39.2910</td>
<td>6.8392</td>
<td>11.4425</td>
</tr>
</tbody>
</table>
The mean of the Market – to – book value ratio is quite high, which suggests that investors overestimate the book value of companies’ net assets as reported in the financial statements. In other words, the true market value of the sample pharmaceutical companies is not revealed in the financial statements. The higher value of the HCE indicates that during the fiscal 2005, the companies were more successful in creating value from its human capital. These findings are consistent with the empirical research of Najibullah (2005), who examines the 2004 annual reports of 22 private commercial banks enlisted in Dhaka stock exchange.

The mean of VAIC is 6.8392 which implies that the pharmaceutical companies create $6.8392 for every $ spent.

The correlation analysis, as initial statistical method, is adopted in order to test the relationship between the studied variables. Table 2 presents the correlation matrix between the dependent and explanatory variables.

### Table 2 Correlation matrix between the studied variables

<table>
<thead>
<tr>
<th></th>
<th>MB</th>
<th>ROE</th>
<th>ROA</th>
<th>GR</th>
<th>EP</th>
<th>CEE</th>
<th>HCE</th>
<th>SCE</th>
<th>VAIC</th>
<th>Leverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB</td>
<td>-</td>
<td>0.4529</td>
<td>0.2985</td>
<td>0.0496</td>
<td>-0.3112</td>
<td>-0.0592</td>
<td>-0.1220</td>
<td>-0.1984</td>
<td>-0.1260</td>
<td>0.6439</td>
</tr>
<tr>
<td>ROE</td>
<td>-</td>
<td>-</td>
<td>0.7297</td>
<td>0.2950</td>
<td>-0.2067</td>
<td>-0.5253</td>
<td>-0.1909</td>
<td>-0.8559</td>
<td>-0.2155</td>
<td>0.7667</td>
</tr>
<tr>
<td>ROA</td>
<td>-</td>
<td>-</td>
<td>0.1057</td>
<td>0.0387</td>
<td>0.1015</td>
<td>-0.2661</td>
<td>-0.6361</td>
<td>-0.2748</td>
<td>-0.3165</td>
<td></td>
</tr>
<tr>
<td>GR</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.6541</td>
<td>-0.1184</td>
<td>-0.7464</td>
<td>-0.6493</td>
<td>-0.7561</td>
<td>-0.0156</td>
<td></td>
</tr>
<tr>
<td>EP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.2957</td>
<td>0.5751</td>
<td>0.4311</td>
<td>0.5743</td>
<td>0.1999</td>
<td></td>
</tr>
<tr>
<td>CEE</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.4995</td>
<td>0.9995</td>
<td>0.0604</td>
<td></td>
</tr>
<tr>
<td>HCE</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.5456</td>
<td>-0.6259</td>
<td></td>
</tr>
<tr>
<td>SCE</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.5691</td>
<td>-0.4391</td>
</tr>
<tr>
<td>VAIC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0404</td>
</tr>
<tr>
<td>Leverage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

In contrast to the expected outcomes, the findings indicate that the CEE, HCE, SCE, and VAIC are negatively related to most of the performance measures and the Market – to – book value. The human capital efficiency, the structural capital efficiency, and the value added intellectual coefficient are found to be positively correlated only with the employee productivity. Although, moderate in nature the positive relation between SCE and EP (r = 0.4311), implies that the appropriate structural capital may improve employees’ productivity and lead to higher revenue.
3.6.3.2. Regression results

Adopting a standard regression analysis, the empirical results from both univariate and multivariate models will be assessed.

Linear regression results for each component of VAIC

The results from the linear regression analysis of the relationship of CEE, HCE, and SCE with M/B value are reported in Table 3 (equation 1).

Table 3 Regressions on the Market-to-book value ratios

<table>
<thead>
<tr>
<th>Equation</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>Probability</th>
<th>R-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equation 1</td>
<td>Intercept 16.8522</td>
<td>14.9591</td>
<td>0.3030</td>
<td>0.0404</td>
</tr>
<tr>
<td></td>
<td>CEE 2.0759</td>
<td>30.6651</td>
<td>0.9482</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HCE 0.0073</td>
<td>0.5897</td>
<td>0.9906</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCE -10.7063</td>
<td>32.7726</td>
<td>0.7550</td>
<td></td>
</tr>
<tr>
<td>Equation 2</td>
<td>Intercept 12.3477</td>
<td>10.0940</td>
<td>0.2560</td>
<td>0.0035</td>
</tr>
<tr>
<td></td>
<td>CEE -3.1188</td>
<td>18.5969</td>
<td>0.8710</td>
<td></td>
</tr>
<tr>
<td>Equation 3</td>
<td>Intercept 11.5561</td>
<td>4.2564</td>
<td>0.0265</td>
<td>0.0148</td>
</tr>
<tr>
<td></td>
<td>HCE -0.1153</td>
<td>0.3317</td>
<td>0.7371</td>
<td></td>
</tr>
<tr>
<td>Equation 4</td>
<td>Intercept 17.2506</td>
<td>11.8664</td>
<td>0.1841</td>
<td>0.0393</td>
</tr>
<tr>
<td></td>
<td>SCE -9.6589</td>
<td>16.8669</td>
<td>0.5826</td>
<td></td>
</tr>
<tr>
<td>Equation 5</td>
<td>Intercept 11.7164</td>
<td>4.4642</td>
<td>0.0304</td>
<td>0.0159</td>
</tr>
<tr>
<td></td>
<td>VAIC -0.1183</td>
<td>0.3293</td>
<td>0.7286</td>
<td></td>
</tr>
<tr>
<td>Equation 6</td>
<td>Intercept -9.8835</td>
<td>10.0914</td>
<td>0.3600</td>
<td>0.4378</td>
</tr>
<tr>
<td></td>
<td>VAIC -0.1430</td>
<td>0.2663</td>
<td>0.6079</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leverage 40.5641</td>
<td>17.6992</td>
<td>0.0557</td>
<td></td>
</tr>
</tbody>
</table>

The regression outcomes confirm the findings from the correlation matrix. None of the three VAIC components is found to be statistically significantly related with M/B value. In
addition, the explanatory power of CEE, SCE, and HCE, regarding the variability in M/B is only 4%.

Furthermore, in order to detect which of the three indicators has a higher effect on investors’ investment decisions, CEE, SCE, and HCE has been regressed on M/B value separately (Table 3, equation 2, equation 3, equation 4). The findings are consistent with the multivariate regression results. Quite surprisingly, the conclusion from the above discussed outcomes is that the investors ignore the contribution of the structural and human capital in achieving better performance.

The results from the multiple regressions, which consider the financial performance, measured by ROE, ROA, GR, and EP, are presented in Appendix 1. It is found that CEE and HCE have a significantly positive effect on profitability, while SCE is found to be significantly negatively related to ROA, at 5% significance level. In addition, according to the outcomes the CEE, HCE, and SCE account for 82% in the variability in ROA. Except for the negative relation between SCE and ROE, the other two components of VAIC (CEE and HCE) are found not to be significantly related with ROE. No other association is detected between the CEE, SCE, and HCE and GR and EP. Although, that the relation between the financial performance and three components of VAIC wasn’t found to be very sound and significant, it has to be noted that the explanatory power of the independent variables is higher (84% for ROE, 66% for GR, and for 48% EP, respectively) than the goodness of fit in regressions on M/B value.

Appendix 2 shows the results from the univariate regression of CEE, SCE, and HCE on the financial performance of the sample pharmaceutical companies. The structural capital efficiency is found to be significantly negatively related with ROA, ROE, and GR. While, HCE is also found to have a negative effect on GR and a positive impact on EP, there is no evidence that human capital efficiency relates to the company’s profitability. The findings for the relation between the capital employed efficiency and the financial performance confirm the conclusions for the correlation between the CEE and market – to – book value, that there is no statistically significant correlation.

Linear regression results for VAIC

The results for VAIC association with M/B value and financial performance correspond to the findings discussed above. It is found that there is no significant relation between the value-added intellectual coefficient and the market valuation of the company (Table 3, equation 6). In addition, the outcomes presented in Appendix 2, show that VAIC does not affect company’s profitability (in a sense of ROA and ROE). It could be suggested that the
traditional accounting measures do not symbolize the intellectual potential of pharmaceutical companies. In contrast, VAIC is found to be significantly positively related with EP and negatively related with GR, at 5% and 8% confidence level. According to the empirical findings, VAIC can account for the variability in revenue growth by 57% and by 33% in employee productivity.

Comparing the regression results conducted from each component of VAIC and for the aggregate measure of VAIC, it can be concluded that CEE, SCE, and HCE are better than explaining the financial performance of the sample firms.

The results from this research correspond to the mixed findings in the existing literature. The overall conclusion is that the conducted empirical research fails to discover any strong correlation between all dependent and explanatory variable. VAIC and its components are found to have no effect on the market valuation of the companies. Despite that, these independent variables are found to account for some of the dependent variables under the financial performance.

### 3.7 Summary and conclusions

The argument on whether there is an essential need at all to account for intangible assets is based on the concepts of free market forces and market efficiency. According to Zambon (2002), there is considerable evidence that this lack of information about asset and true sources of value in corporations is already an urgent problem for corporate investors and managers. If a reporting gap exists, this immediately provides benefits to financial analysts. Barth, Kasznik and McNichols (1999) found that firms with higher intangible assets provide analysts with profitable information acquisition. From investor’s perspective, it is the less informed investor who tends to be disadvantaged when information is not efficient. For instance, Conrad, Johnson and Wahal (2001) report that investors pay notable sums of soft dollar money to acquire research reports, including analysts’ recommendations, in order to become informed investors.

Nevertheless, up to this point it should be mentioned that accounting standard-setters around the world acknowledge the importance of intangibles, but they face complex disclosure issues related to intangibles, and they come across great difficulties in attempting to improve disclosures about intangible assets.
Although the pharmaceutical companies are knowledge-intensive in their nature, we could not find evidence that intellectual capital contributes to its overall corporate performance. However, the huge investments in intangibles prove the significance and the requirement for correct measurement and disclosure of these “hidden asset”.
Chapter 4: An attempt to define intangibles and contemporary resolutions to the definition and classification issues.

4.1 Introduction

In the modern economy, investment expenditures to non-tangible assets gave rise to economically valuable and legally recognised intangible assets such as patents and copyrights. Investment in assets like knowledge capital, research and development (R&D), advertisement, would have been in the past a negligible portion of the total investment of a company, but that is no longer the case. Intangibles resources constitute an increasingly important part of modern economies and on the same time, accounting for intangibles has become an increasingly important problem facing the accounting profession, especially standard setting organisations. An extensive debate has been going as to the definition and classification of intangible assets, disclosure requirements that should be imposed and their accounting treatment in the financial reports.

Obviously, these issues should be the starting point for approaching a compromise within the different views, and more precisely a generally accepted definition of intangibles (assets and liabilities) should exist as a starting basis.
4.2. Recent academic definition opinions

One of the most comprehensive approaches for defining intangibles was introduced by M. Negash (2003), who stated that two definitions can be located for intangibles. The first has a macroeconomic importance while the second has a microeconomic centre of attention. According to his study, between these two extremes one finds several other definitions for intangibles (accounting textbooks like Keiso and Weygandt (1992:589) and Meigs and Meigs (1990:401). Negash stated that:

"In practical-institutional terms, despite the allusion to the market to market accounting and the seemingly thriving empirical research, there is little light that leads towards the “true and fair” representation of assets in periodic financial statements."

Another part of the academic literature by (Rivette and Kline, 2000) and Lanjouw, Pakes and Putnam (1998), relates intangibles with intellectual and knowledge capital and patents. Bianchi and Labory,(2002) indicated that in many cases, intangible assets are created by a combination of physical and non-physical assets and the fact that they are often embedded in physical assets make them even more difficult to identify and define. Hall's (2001:10) definition of intangibles falls to the macroeconomic group and includes trust, reputation, monopoly power, franchise distribution networks, first-to market advantage, intellectual property, stock of know how, organizational principles, electronic business models and ability to put new ideas into action.
In many cases major standard setters around the world usually define intangible assets as non-physical and non-monetary sources of probable but not definite future economic profits accruing to the firm as a result of past events or transactions. Intangibles are characterised as identifiable (separable) non-monetary sources of probable future economic benefits to an entity that lack physical substance, have been acquired or developed internally from identifiable costs, have a finite life, have market value apart from the entity, and are owned or controlled by the firm as a result of past transactions or events.

The dilemma arises at the point where the various definitions elaborated for accounting purposes may appear in many cases to be restrictive. When an enterprise has insufficient control over the expected future economic benefits arising from a team of skilled staff and from training, or when intangibles are not clearly identifiable, there might be serious problems in finding these to meet the definition purposed. However, it seems that the various reasons that lead to this problem do have a logical substance, since as Canibano and Sanchez (2000) pointed, the adjective ‘intangible’ normally goes along with different concepts, including assets, investments, resources or other phenomena. As a result, drawing strictly a circle and encompassing the definitions of intangibles, is neither a coherent solution, and does not provide a consensus among the alternative views.
4.2.1 Definition criteria according to separate identification

The term definition in this context means the way that different countries accounting systems approach and picture the concept of an intangible asset. According to the study of PRISM (2003), intangible assets can be divided into three sub-categories: intellectual property, separately identifiable intangible assets, and non-separately identifiable intangible assets. Intellectual property includes those intangible assets with legal or contractual property rights (Lev, 2001). Assets falling into this category include: patents, trademarks, designs, leases and licenses. Examples of separately identifiable intangible assets are given in figure 3.1. Intangible assets that cannot be separately identified are grouped under the heading of “goodwill”.
Figure 4.1  Definition and Broad Sub-categories of Intangible Assets Adopted In PRISM Study (2003).

<table>
<thead>
<tr>
<th>Intellectual Property</th>
<th>Separately identifiable Intangible assets</th>
<th>Goodwill (Non-separable Intangible assets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>eg: Intangible assets with legal or contractual rights including patents, trademarks, designs, licenses, copyrights, film rights, mastheads</td>
<td>eg: Information systems, networks, administrative structures and process, market and technical knowledge, human capital (if embodied in a codified form), brands, intangibles embodied in capital equipment, trade secrets, internally generated software, drawings</td>
<td>eg: Prior intangible investment embodied in organisations, management expertise, geographic position, monopoly</td>
</tr>
</tbody>
</table>


In spite of the fact that the definition and categorization of Intangible assets in the PRISM study, can capture all the items regarded as intangible assets, according to the financial accounting definition (non-physical source of expected future benefits), intangible assets do not appear on the balance sheet unless the reliable measurement is met. The main cause for this is that future economic benefits aroused by intangible
assets are far more uncertain and difficult to estimate than those coming from tangible assets. PRISM study (2003), suggest the definition ‘non-physical resources of future economic benefits’ can catch most of what is currently understood to be an intangible asset and “recommends this definition as the initial step in identifying intangible assets. Furthermore, PRISM (2003) recommends that:

“Research is needed to understand what recognition criteria would be relevant to ensure reporting on intangible assets meets the objective of financial reporting (which is to provide useful for stakeholders resource allocation decisions.”

4.2.2 Conceptual and List-Based approach

One of the most important and influential approaches to the definition issue was introduced by Stolowy & Cazavan(2001), who centred the difficulty of defining intangible assets, into two broad categories:

1) Actual definitions, named conceptual and

2) Lists of intangible assets, a kind of inventory.
Conceptual approaches can be broken into three classes, a) definitions by opposition (assets other than fixed), b) Tautological definitions (lack of physical substance: an asset must be intangible in order to be included in the balance sheet category ‘intangible fixed assets’.) and c) Real definitions, which make an actual effort to define what an intangible is. Stolowy & Cazavan proved that the first category encompasses the second for the reason that if a firm uses a conceptual approach to intangibles generally also includes a list of intangibles concerned, mainly for reasons of presentation. Figure 4.2 presents these approaches with the additional sub-categories.

Figure 4.2 Conceptual and List-based approach

Source: Stolowy & Cazavan (2001:6)
4.2.3 Definitions provided by the IASB

The definition provided by the IASB globally focus on defining intangible assets as non-physical and non-monetary sources of probable future economic profits accruing to the firm as a result of past events or transactions. The recognition criteria adopted by most standard setting bodies are quite restrictive, leaving most intangible investments out of the concept of intangible assets, as the emphasis is placed on reliability, leaving no space for relevance. In the UK, ASB treats intangible assets as unidentifiable, hence they are all included in goodwill.

IAS 38 (International Accounting Standards) (IASC, 1998) defines intangible assets as non-monetary assets without physical substance held for use in the production or supply of goods or services, for rental to others, or for administrative purposes. Intangible assets must be identifiable, controlled by an enterprise and future economic benefits should be expected to arise from them.

(a) that are identifiable;
(b) that are controlled by an enterprise as a result of past events
(c) From which future economic benefits are expected to flow to the enterprise.
4.2.4 Major academic approaches

The issue of defining intangibles with the subsequent issue of classification has been extensively addressed by academics and professionals. Belkaoui (1992) acknowledged that intangible assets are divided in two major categories, identifiable assets such as patents and unidentifiable assets which are included in Goodwill. White (1970) declared that:

“In most cases, goodwill and other intangible assets arise as residuals in purchase method acquisitions, and represent the portion of the purchase price that cannot be allocated to other, tangible assets. They pointed that goodwill represents the premium paid for the target's reputation, brand names, or other attributes that enable it to earn an excess return on investment, justifying the premium price paid. Hence the name of goodwill.”

As mentioned above, Stolowy & Cazavan(2001) distributed intangible asset definitions into conceptual and list-based approaches and these conclusions were derived by examining the accounting legislation of 23 countries and organisations. A variety of different approaches was revealed since six countries defined intangible assets by opposition, ten had a conceptual approach and only four had real definitions.

Up to this point, the issue that comes up is that this variety of definition approaches can be adapted as starting point for the resolution but unfortunately the problem still exists, since the accounting profession places more emphasis on the reliability of financial statements rather than on their relevance. Intangible assets have been recognised in general as identifiable sources of future economic benefits for firm
that do have a market value, but here is a wide range of elements that currently are regarded as intangible determinants of the value of companies which either do not fit into that definition or do not match the recognition criteria. Intangible assets will not appear on the balance sheet unless the reliability measurement test is performed.

4.3 Intangibles classification: A prologue to the topic

The classification issue of intangible assets is proved to be important indeed, for the treatment of the controversy examined in this paper, but unfortunately, like the definition matter, there is no generally accepted classification. In fact, the classification of intangibles is an issue that has received scarce attention from academic researchers until rather recently. Some attempts by micro and macro level bodies to define the scope of intangible assets have been made. The inherent belief behind this concern could be translated as an effort to derive a unified classification system which will play the role of the major component for measuring and reporting intangibles. Still classification in general as will be presented in the following sections, is based in vague and arbitrary perceptions about the world.
4.4 Classification: The general picture

A common classification system in relation with definition and recognition criteria would help to co-ordinate and integrate the efforts of micro and macro data collection agencies, like accounting regulators and national statistical bodies. As will be evident from the discussion below, the schemas frequently imply collection of both financial and non-financial data. Research evidence suggests this reflects the diversity of value drivers across industries and technologies (e.g., Amir and Lev, 1996). The following section briefly addresses the problem of the classification of intangibles and identifies a number of common factors in order to provide the ground for discussion upon the problem.

According to Rudner (1966):

“The value of classification is associated with its ability to function as a heuristic device, as a help construction for interpretation. We use a language when we describe, a language that is an expression for, and part of, a specific culture. Because it is reasonable to interpret classifications as linguistic artifacts, it follows logically that they are culture bound. The implication is that technically the same intangibles may not necessarily be perceived as similar in different cultures. Alternatively, from a cultural perspective, identical intangibles may not be classified in the same way because they are assigned different properties.”

Grojer (2001), stated that every classification is built upon some ideas and perceptions about the world. The term of knowledge could either mean a) something
that is separated on its own right, b) embedded in human capital and c) a notion included in different types of organisational products and processes. Therefore, every classification is built upon some ideas about the world, how it ought to be ordered. What is obvious from Grojer’s opinion on the accounting debate is that intangibles are difficult to be resolved for the reason that their treatment is based upon perceptions and subjective thoughts. Some Swedish firms tried to classify their intangible investments, mainly for their internal management purposes. These efforts resulted in being important and radical guidelines on the vague issue of classification. A brief presentation of the most widely recognised classification of intangible assets is presented.

4.4.1 Intellectual capital

The model presented is based on one already used in practice by the large Swedish bank-assurance company Skandia. The model was developed in the early 1990s by Leif Edvinsson when he was pointed Chief Knowledge Officer of the company. Edvisson and Malone further developed their model in their paper published in 1997. Their classification proposal is illustrated in figure 4.3. The Human capital is nowadays treated by many organisations as the most important intangible asset. Knowledge, skills and expertise, networks and training will eventually lead to the final goods and services produced that will meet the customer requirements. It could be stated that human capital embraces the creativity and ability to innovate of the firm. Structural capital has been correctly defined as the remains of
the firm when employees go home at night. This notion includes a firm’s infrastructure and all the hard tangible assets that contribute to production.

Figure 4.3: The value distinction tree. Source: Edvinsson et al. (1997)
4.4.2 Eustace’s proposition

Clark Eustace (2000) suggested a particularly compelling categorisation of the different types of intangibles, dividing them into three classes, as presented in figure 4.4:

Figure 4.4: Types of intangibles
4.4.3 Eurostat findings

In their *Second European Report on Science & Technology Indicators (1997)*, EUROSTAT identified ten classes of intangible investment:

- R&D;
- Acquisition of intellectual property rights - patenting and licensing;
- Acquisition of industrial property rights;
- Advertising and other marketing;
- Acquisition and processing of information;
- Acquisition of software;
- Reorganisation of management of an organisation;
- Reorganisation of the accounting system of an enterprise;
- Means devoted to dealing with changes in legal, fiscal, social and economic government policies;
- Other investments in innovation of products or processes of the enterprise.

This listing is fairly general. EUROSTAT further presented a specific classification proposal in association with national statistics institutes. This project was settled due to the certainty created, that statistical measurement instruments and processes face huge challenges due to the lack of relevance of ‘classical methods’ and data, and the unworkable nature of manual data collection methods. EUROSTAT proposed to group these new indicators in four domains, as summarised in Table 4.2.
More work would be then needed to translate this framework into a set of empirical variables that are measurable.

4.4.4 Classification according to ease of measurement of intangible assets

Young (2003), suggested a classification framework that categorized intangible assets, according to easiness of measuring them (figure 4.6). According to the author, as someone moves from the left to the right in the figure, the ability to quantify an organization’s intangible assets diminishes rapidly.
Figure 4.5: Grouping of new indicators on intangible investment proposed by EUROSTAT (2001)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Possible Groups of Indicators</th>
</tr>
</thead>
</table>
| Technology Domain  | • Information Technology and Communications (ICT) Infrastructure  
                      • Internet Infrastructure  
                      • Digitisation  
                      • Virtualisation  
                      • Multimedia  
                      • Internet Users  
                      • Internet Penetration |
| Industry Domain    | • ICT Production and Trade Indicators  
                      • Knowledge Capital Indicators  
                      • Industry Performance Indicators  
                      • Inter-enterprise Alliances Indicators  
                      • New Business Organisational Types Indicators |
| Economy Domain     | • Production Indicators  
                      • Economical Performance Indicators  
                      • Foreign Trade Indicators  
                      • Foreign Investment Indicators  
                      • Internet Economy Indicators  
                      • Business Indicators  
                      • Deregulation Indicators  
                      • Information Production and Diffusion indicators  
                      • Price and Wage Indicators |
| Social Domain      | • Economic and Social Demography Indicators  
                      • Lifelong Learning/Training Indicators  
                      • Living Standards and Lifestyles Indicators  
                      • Cultural Indicators  
                      • Social Inequality Indicators  
                      • Technological Penetration Indicators  
                      • Internet Penetration Indicators  
                      • Time Use |
Figure 4.6: Ease of measurement of intangible assets

Intangible Assets

- Can see or touch
  - Possible to assign a monetary value
    - Contracts with Monetary amounts specified, incentive compensation systems, board Member compensation policies
  - Difficult to assign a monetary value
    - Internally developed patents, contracts without monetary amounts specified, customer histories, secret formulas, trade names, copyrights, delivery routes, software programs, procedure manuals,

- Cannot see or touch
  - Easy to describe
    - Training programs, recruiting programs, shelf-space agreements, established distribution channels, organizational processes, organizational structure,
  - Difficult to describe
    - Talent, creativity, cultural assumptions

Source: Young (2003)
4.5 Summary and conclusions

It is evident that the several accounting classifications and definitions are challenged because ideas, culture and technology change continuously. When the business world experiences a major technology change, the existing classification is challenged. There is a thin line between observing this technology change through IT development, or a change of ideas about organisations and organising. Grojer (2001) stated that:

“The task of constructing a classification of intangibles is not primarily a scientific one. There is no logic of discovery (of the world), just of validation. Discovery and construction is rather a creative process. Although an intangible is a social construct and, by definition, it lacks tangible characteristics, it nevertheless functions as such in the imagination of the observer. The design of a new background can be done either by introducing new accounting concepts, such as intellectual accounting, or by rearranging (classifying) the already recorded transactions under new headings. A change in the names of the accounts, the headlines, or the metaphors is likely to have far reaching implications in the way organisations are perceived.”

Lev & Zarowin, (1999) studied the value relevance of accounting data in explaining stock prices, and their results illustrated that this association decreased between 1980 and 1996. This can be considered as a direct strike to one of the most crucial assumptions of accounting data, its usefulness. The question of Accounting usefulness, indicates the essential necessity for reclassification or a change of the accounting definition boundaries. So, the problem is focused on how to design an appropriate background. It is acknowledged that this is not an easy task, since Grojer
has proved that intangible assets classification is built upon some vague and general ideas about the world, but still, the issue should be resolved and not mistreated by rigid accounting legislations.
Chapter 5: Consequences of accounting information asymmetry. Propositions and measurement approaches to the problem.

5.1. Introduction

All investments are carried out by firms to generate future economic benefits. The purpose of financial reporting is to provide external stakeholders with information concerning the financial performance of the firm, useful for managers, investors, and standard setters. The variation between the accounting treatment of tangible and intangible assets, is proved to be extremely harmful for those that rely on financial information. Firms with considerable investment direction in intangible assets will face increasing levels of information asymmetry in their financial statements, rather than with lower levels of intangible investment.

Information asymmetry is disadvantageous both to the firm, since it results to a higher cost of capital, and for society, in view of the fact that in the long run reductions in economic growth will occur. Regulations related to the reporting of intangible assets can directly influence the level of information asymmetry. Nevertheless, academic researchers and practitioners have tried to provide solutions and proposals to the issue and even though that these models are not mandatory to be applied, these have been implemented by companies for internal purposes.
5.2. The Economics of intangible assets

Intangible assets are repeatedly ignored in the internal economic processes of a firm, since there is a divergence between the accounting treatment and the economic qualities of intangible assets. Especially for the internally developed intangible assets, which come as a result of the development process, these will only arise after a successful achievement of the invention cycle. Such intangible assets are copyrights, brand names and patents. The issue is that many intangible assets do have active markets and only if the outputs of these projects will be generated, then the firm will start investing in tangible assets. Consequently, investment in intangible assets comes before investment in tangible assets in the project life cycle. Successful growth of intangible assets will give the firm the right, but not the obligation, to develop the project.

It is commonly accepted that the most relevant source of information about a firm, are the managers. Nevertheless, managers have their own personal interest and the information provided can be relevant, but not reliable, and this is characterised as one of the main arguments not to recognise internally generated intangible assets.

Lev proved that the central point of the accounting dilemma with intangible assets is the vagueness of the future of intangible investment: In order to have a reliable appraisal of the intangible asset now, practitioners must be able to know the future outcomes of these investments (for example the commercial success of a drug or a software program which has been under the development process). But the future of intangibles is generally dark. The uncertainty associated with most intangible assets is essentially higher than that of material and financial assets.

Zambon pointed that:
“Interest in accounting for intangibles is based on the assumption that the present non-accounting of intangibles is causing harmful effects. Supporters for the inclusion of human capital and structural capital into the balance sheet argue that such capitals may largely explain the gap between book value and market value, namely intellectual capital. Opponents argue that balance sheet are not designed to be speculative and that determining precise figures/numbers are highly subjective and difficult to measure. The main argument for accountability and accounting regulation is (capital) market failures, eg. appropriate accounting regulation would reduce the amount of market failures” (S. Zambon, 2002).

It has been comprehensively acknowledged in this paper that the current accounting rules concerning accounting worldwide, do not communicate relevant and appropriate information about the modern business world. It could be stated that the weakness of accounting-based information is derived from the fact that at a hundred years ago, the value creation process in the business community involved many transactions, mainly in the form of transfer of property rights. That was the reason the core basis of accounting involves legal mandatory transactions with third parties, such as borrowing, sales and purchases. However, in the modern knowledge-based international economy the main part of value creation comes before the time of transactions. Lev and Zarowin (1999) pointed that the successful development of a drug, for example, creates considerable future value, but the actual transaction which is the sales in this example may take years to occur. The proved that the value-relevance of accounting information was mainly attributed to this derived deviation between market values and financial information.
Tangible and intangible assets receive differing accounting treatments primarily due to the high uncertainty regarding future outcomes of intangible investments. The accounting thesis is based on the argument that if an asset is not controlled by the enterprise (inability to exclude non-owners from enjoying some benefits), it cannot be regarded as an asset, and since there is non-existence of intangible markets, its estimation will be biased and unreliable. Any potential propositions for the accounting solution of the problem should now focus on how to narrow down the high uncertainty of future outcomes, partial excludability, and the non-trade ability characteristics of intangibles.

Lev and Zarowin had examined the decrease in the value relevance of accounting (1997) and the illustrated that it had been decreasing over the past 20 years, while the intangible strength in the form of expensed cost related to intangibles as a percentage of sales for instance, had been increasing in the same period. Lev and Zarowin divided their sample firms into two groups, for firms with an increasing intangible intensity and firms with a decreasing intangible strength. For the firms with a decreasing intangible intensity, they found the greatest increase in value-relevance. Consequently, the results of Lev and Zarowin sustain the assumption that chronological changes in intangibles (especially R&D) are a part of the explanation for the unreliable information content of reported earnings. Similar conclusions were derived by Lev and Sougiannis,( Lev and Sougiannis, 2000).

Following this research area, many academic researchers have recognised that the value-relevance of accounting has been decreasing over the past decades as accounting numbers and especially reported earnings, are less able to make clear the deviations in stock prices than before ( Rayburn, 1986; Beaver et al, 1987; Board and Walker, 1990; Easton and Harris, 1991; Ramesh, 1991; Ramesh and Thiagarajan,
1995; Hayn, 1995; Lev and Zarowin, 1997; Aboody and Lev, 1999; Lev and Zarowin, 1999). Lev and Zarowin (1999) argument was based in the increased intangible investment during the last decades, so the current accounting practice for intangibles created an discrepancy between the valuation implied in firms' earnings and their stock prices.

Collins et al. (1997) proved that the value-relevance of earnings has been declining over the past 40 years, whereas the value-relevance of book value has increased and related findings were suggested by (Dichev, 1997; Ely and Waymire, 1998; Francis and Schipper, 1999). The direction that these researchers suggest, demonstrated that the value-relevance of earnings and book value has not declined but instead, it appears to have increased slightly. These conclusions challenge the results of Lev and Zarowin (1999) and others that the value-relevance of financial statements has been declining.

Beyond these efforts of proving that the current accounting treatment of intangibles leads to a broad weakening of financial information, the opponents of immediate expensing of intangible resources provide the plain and logical argument that such investments should be capitalised and their costs amortised to confront with the matching of costs with future benefits. This would have a direct positive impact on the usefulness and relevance of accounting information:

"Information is relevant if it has the capacity to confirm or change a decision-maker's expectations. Thus, the value-relevance of a financial statement is its ability to confirm or change investors' expectations of value" (Hoegh Krohn & Henry Knivsfla, 2000:255).
5.3 Negative effects of accounting irrelevance

Current accounting practise initiates a harmful level of risk associated to the underassessment of intangibles in the analysis of the financial position of a firm. On the basis of publicly available financial information potential investors might choose to construct their portfolio, including firms investing little or nothing in intangibles and therefore, publish higher levels of earnings and book values in the short-term, instead of buying stock of firms that undertake large investments in intangibles which may make them appear as less attractive in the short run, but guarantee higher future earnings. Lev and Zarowin (1998) and Francis and Schipper (1999), stated the decreasing usefulness of earnings for stock returns due to the choice that investors make. Obviously, this fact diminishes the efficiency of the financial markets in general, since investors are provided with non-relevant and non-comparable financial statements and will most likely not be able to assess the value of companies to make efficient resource allocation decisions.

The urgency for establishing a path towards a better accounting treatment of intangibles is proved to be of crucial importance, not only for investors, but for managers also. Managers do need a general definition framework and a comprehensive classification, since they are challenged to identify value relevant intangible investments that are most appropriate for the purposes of the organisation. These investments must be easily communicated to analysts and shareholders, since failure to proceed with the correct investment will lead in the reduction of competitive power and a deterioration of the firm's financial position in the long run. According to PRISM study (2003), information asymmetry caused by intangibles will have the following effects:
5.3.1 Share repurchases

A share repurchase is the method that the company buys back its own shares, either on or off the stock market. There are various incentives for a company to follow this process, and one of the most common is when the company estimates that its shares are undervalued in the market. After the repurchase, the market usually reacts by increasing the share price. Barth and Kasznik (1999) provide evidence that companies with higher levels of spending on intangible assets (as indicated by high R&D), are more to be expected to follow a share repurchase. Such companies are not able to communicate the true value of their companies through financial statements disclosure, and they have to take into account the additional costs involved in initiating a repurchase, which could have been avoided.

5.3.2 Analyst following

Another option for companies with higher levels of spending in intangible assets and face information asymmetry, is to encourage analyst following. Tasker (1998) proved that R&D-intensive companies conduct more conference calls with analysts relative to other companies. Analysts will be attracted to firms with high levels of intangible assets, for the reason that in these firms it is more likely that that the shares will be undervalued, and obviously this provides an opportunity for higher returns.
5.3.3 Share price volatility and the impact of R&D fully expensed

Campbell, Lettau, Malkiel and Xu (2001) find evidence of a substantial increase in both firm and industry price volatility between 1963 and 1997. This period also matches with a general increase in business level intangible assets. Further to this evidence, Campbell et al. find that the areas in which the increase in the volatility is high, is for companies involved in the telecommunication industry, IT, and retail sectors, which are obviously industries with higher levels of intangible assets.

Lev, Sarath and Sougiannis(2000), after the examination of more than 1500 R&D-intensive companies, revealed that companies with a high growth rate of R&D expenditures are steadily undervalued by investors. Darrough & Rangan (2001), stated that in the year of initial public offering, firms tend to have decreased R&D levels and, consequently, higher reported earnings so as to improve investor's perceptions about the company's prospects. Full expensed R&D affects negatively earnings. Managers are tempted to change the level of investment in intangibles in order to present a better financial picture of the firm. Some managers may sacrifice the long-term prospects of their companies to meet short-term earnings targets by cutting or postponing intangible investments. Aboody and Lev (2000) proved that companies, which are technology and science-intensive and provide compensation packages for managers including stock and stock options, the potential for gains to insiders in companies with R&D activities are, on average, three to four times, larger than insider gains in companies without R&D.
5.3.4 Information irrelevance

As suggested by Economic theory, information asymmetry is the differences in the information offered to interest groups, might give birth to adverse private and social consequences. Such an adverse cost, is the insider information that managers and well connected financial analysts possess, concerning a firm’s operations and potentials, and this knowledge might not be available to the market. Insider trading is the where an individual with private knowledge about a company trades with the intention of earning abnormal positive returns. Albert Kyle (2000) stated that informed persons (such as managers having information about the success of a drug under development in human clinical tests) would advantageously trade to exploit their private information. Given human nature, it sound quite logical, and Kyle also proved that no matter how intense and active research is performed by interest groups, insider gains will never be reduced. Insider information will only be reduced if companies will be imposed to publish mandatory non-financial information.

Kyle's model concluded that the gains of better-informed investors would be a function of the variability of the value of the firm. As it was mentioned previously in this paper, firms that are more intangible-intensive, their value is volatile, and it should be expected that the size of information asymmetry and insider gains to be analogous. Negative social consequences of significant gains to informed investors are the analogous losses to other investors and the deterioration in investor's confidence in the reliability of financial markets.
5.4 New resolutions to the measurement and reporting of intangibles

The PRISM project (2003) pointed that during the 1990s, many academics and a growing number of companies, especially in northern Europe, have begun to review the issue of measuring, evaluating and reporting on intangible assets, in response to the problem raised by non-accounting for intangibles. Since the importance of intangibles is continuously increasing in the global economic system and in determining a company’s value, new proposals mainly from the academic environment have been originated to fill in the gap from the failure of traditional economic and managerial concepts. Those existing traditional solutions are no longer adequate enough to provide satisfying answers, and the problem still exists.

The centre of attention in many recent economic and accounting studies has been in detailed classifications and analytical tools, with a major target in better understanding and reporting intangibles. As it has been pointed out previously in this study, intangible assets are generally shown on the balance sheet in view of the fact that they fulfil four specific criteria:

1. Must be identifiable
2. Must have future utility
3. Can be transferred separately
4. Can be controlled by the enterprise
If an intangible asset fails to meet the criteria above, it cannot be recognised in the company’s accounts.

One of the most successful efforts to re-conceptualise the issue of better understanding and representing intangibles has been the concept of intellectual capital (Edvinsson and Malone, 1997). Intellectual capital can be described simply as knowledge that can be converted into profits. There are, however, a variety of other IC definitions and experts have yet to reach a consensus on a commonly accepted definition. Researchers and other large accounting/consulting firms have played an important role in the search for suitable classification of intangibles. Intellectual capital includes/encompasses inventions, ideas, general know-how, design approaches, computer programs and publications. Distinguishing between the different areas of IC will help to improve the understanding of what IC is. Some parts of intellectual capital are complex to evaluate, and the costs and benefits are difficult to quantify. Other definitions of intellectual capital/assets include:

‘Intellectual capital is intellectual material – knowledge, information, intellectual property, experience that can be put to use to create wealth.’ (Stewart 1998)

‘Knowledge that can be converted into value.’


“Intangible assets as non-monetary assets without physical substance that are held for use in the production or supply of goods or services, for rentals to others, or for administrative purposes: (a) that are identifiable; (b) that are controlled by an
enterprise as a result of past events; and (c) from which future economic benefits are expected to flow to the enterprise (IAS 38).

(PRISM 2003) listed 7 intangibles measurement methods which have been widely disclosed and discussed in publicly available sources. These models will be presented synoptically in this section, for the reason that a more thorough analysis would go beyond the scope of this study.

The seven methods which will be analysed are the following:

1. Market-to-book value and Tobin’s Q
2. Economic Value Added (EVA)
3. Lev’s knowledge capital calculation formula
4. Edvinsson and Malone’s Skandia Navigator
5. Sveiby’s intangible assets monitor
6. Kaplan and Norton’s Balanced Scorecard
7. Lev’s Value Chain Scoreboard
5.4.1 Market-to-book Value and Tobin’s Q

The Market-to-Book value method is one of the most widely used methods for measuring and evaluating intellectual capital mainly due to its straightforwardness and mathematical simplicity. The ratio is market value (stock market capitalization) over company’s net accounting value (presented in the company’s financial statements). According to the PRISM (2003) study, in spite of the fact that this method is quite simple and provides the value of intangibles by the difference of the company’s market value and its accounting value, it gives rise to many problems.

An essential criticism on the Market-to-Book Value ratio is that it does not take numerous exogenous factors into account, which may influence investor’s perceptions of the company’s potential to generate profit, factors that influence company’s value. Such factors could be industrial policies, macroeconomic conditions, etc. Another problem with the ratio in question is the numerator and denominator are derived from different calculation procedures. Book value is determined by accounting practices and policies already adopted by the company, while market value reflects both the company’s current policies and its strategic objectives which means that it reflects investor’s expectation to generate profits in the future.

Another method that is observed to be applied mostly in firms with a high degree of knowledge and technology, is “Q” developed by James Tobin, Nobel Prize winner for economics in 1981. The Q ratio has the market value as a numerator, but it also considers the replacement cost of the company’s assets, with a view in predicting investor behaviour. If Q is positive, meaning that the intangible assets replacement cost is less than the market value, it indicates a high return on investment. The higher
the Q figure, denotes a higher value of intellectual capital. PRISM study (2003), points that both Market-to-Book value and Q ratio, are affected by the same exogenous factors and are useful in the following cases:

- In making comparisons between very similar companies, like those operating in the same industry;
- When monitoring trends in the value of the company’s intellectual capital.

When both the Market-to-Book value and Q ratio decrease, it is plain to presume that a firm’s intangible assets value is also decreasing.

5.4.2 Economic Value Added (EVA)

The EVA (Economic Value Added) method was initially conceived as an internal performance indicator adopted by companies to evaluate their effectiveness in employing invested capital. This method was initially introduced by Stern Stewart & Co. 1991 (Stewart, 1991), and it was analysed further in the coming years (Al Ehrbar and Stern Stewart & Co., 1998; Young and O’Burne, 2000; Stern et al., 2001).

EVA compares two ratios that reflect the value creation of a company: ROI (return on investment), and the cost of factors generating ROI (the cost of debt and the cost of capital).

EVA can be calculated either by one of the following formulas:
- \( EVA = (ROIC - WACC) \times \text{invested capital} \), or
- \( EVA = NOPAT - (WACC \times \text{invested capital}) \).

Where

\( WACC \) = Weighted Average Cost of Capital after taxes
\( NOPAT \) = Net operating profit after operating taxes = Earnings before interest and tax (EBIT) - cash operating taxes = (Net sales - Operating expenses) - Cash operating taxes.
\( ROIC \) = ratio between NOPAT and invested capital

Undoubtedly, shareholder value creation implies the maximum difference between the company’s market value and its book equity capital (shareholder’s original investment). This difference is the present value of EVA, and it represents the shareholder’s value which is added up to the original investment. If a company has a positive and high EVA, investors should pay a premium over net equity, thus creating value. If a company produces a negative EVA, this would imply a value destruction for the shareholders, since the return on invested capital (ROIC) would be less than the weighted average cost of capital (WACC).
5.4.3 Lev’s knowledge capital formula (1999)

Lev developed the knowledge capital calculation formula in order to measure the financial statement impact of knowledge related investments.

The formula is:

Knowledge Capital = Normalised earnings - earnings from tangible and financial assets - knowledge-capital discount rate.

The numerator in the formula represents earnings attributable to knowledge capital and the denominator refers to the interest rate used for present value discounting. Lev assumed that annual earnings can be divided into two resource categories, tangible fixed assets and long-term financial assets, and intangible assets, by using a 7% yield rate for tangible assets and a 4.5% yield rate for long-term financial assets. These rates were applied to companies in the pharmaceutical and chemical industries, and the earnings component derived from the intangible assets, was calculated as a residual. This was actually the knowledge capital formula. According to this method, firms are able to estimate the contribution of knowledge capital to to their performance, and if calculations are repeated with a view to future performance, it could be feasible to obtain future earnings flow attributable to intangible assets.

The knowledge capital measurement formula is to large extent based on the traditional goodwill calculation. PRISM (2003) study, has identified two specific weaknesses associated to Lev’s formula. The first is that Lev’s basic assumption is
that earnings can be broken down into two specific components, one portion attributable to tangible and long-term financial assets, and another portion to intangible assets, something that is quite arbitrary, and not stable with the accounting tradition of some countries like Italy. In Italy earnings are treated as something aggregate, and they express the interaction of all the company's resources as unit. A second criticism is that this method is directed for the portion of earnings attributable to tangible and long-term financial assets and for the portion attributable to intangible assets. Actually, there is no common agreement on this method since determining average earnings from tangible and long-term financial assets is subjective and difficult to define technically.

5.4.4 Skandia Navigator by Edvinsson and Malone (1997)

The Skandia Navigator, as already mentioned in this paper, was initially used in practice by a large Swedish bank assurance company named Skandia. The method was developed by Lief Edinson who was the company’s Chief Knowledge Officer in the early 1990’s and further examined by Edvinson and Malone in 1997. The purpose of Skandia Navigator is not only to measure intellectual capital, but to allow analysts to navigate among its components, consisting of five areas of interest affected by intellectual capital and their interaction over time. The five focuses or areas of interest are:
Financial Focus

This area refers to the totality of the company’s efforts to create value in monetary form. Some of the indicators proposed by Edvinson and Malone in order to measure the financial focus are:

- Total assets
- Total assets\employees
- Revenues generated new business operations
- Hours spent on customers\total employee work hours
- Revenues from new customers\total revenues

Customer focus

According to Edvinson, the relationship between customers and the company define a company’s customer value. In order to maintain long term and stable customer relationships and to measure this value, a company should pay attention to the following indicators:

- Market share %
- Number of customers
- Annual sales\customers
- Customers lost
- Average length of customer relationship
• Customer visit to the company
• Days spent on customer visits
• Customer\employees
• Average contact time with customer at the time of sale

Processes Focus

This field focuses on managing technological factors such as IT technology, network, archives and work procedures. The indicators suggested by the authors are:

• Administrative expenses\operating assets
• Personal computers\employees
• Administrative expenses\employees
• IT staff\total staff
• Technical and information capacity\employees

These indicators according to Edvinson and Malone will allow managers of a company to allocate and measure value to processes only when they contribute to value creation for the company, and the indicators will allow them to relate performance with the originally stated objectives.
Focus on innovation and development

The indicators that are suggested by Edvinson and Malone to measure this focus are:

- Skills development cost/employees
- Innovation costs/customers
- R&D costs/administrative costs
- Training expenses/employees
- Human resources allocated to R&D/Total human resources.

Human resources focus

This is the most important focus for intellectual capital and consequently for Skandia Navigator. This area is placed in the center of the model for the reason that it interacts closely with the other areas. Some of the most crucial indicators for this area are:

- Leadership index (%)  
- Motivation index (%)  
- Employee turnover (%)  
- Average seniority (%)  
- Number of female managers (%)
Skandia Navigator is considered by many academics and researchers, the most well-known and thorough Intellectual capital measurement method. As part of their effort, Skandia developed over 100 metrics to be included in their intellectual capital navigational report. The metrics, however, create a two-fold problem. First, they are an amalgam of both quantitative and descriptive measures without a common basis of measurement. Because several of the metrics are descriptive, they are infused with a subjectivity that is difficult to generalize across organizations. The second, and more important issue is, when are these measures to be recognized. The current practice is kin to the original balance sheet approach; the value of the various categories are derived and presented as a snapshot” in time, without further information as to he projected timing of the cash flows. The issue remains on when to capitalise those intangibles and more significantly, how to expense them.

5.4.5 Intangible assets monitor by Sveiby (1997)

The intangible assets monitor is a diagram model that divides Intellectual Capital into three categories:

1. External structure
2. Internal structure
3. Staff skills

As reflected in figure 5.1, three general areas of interest concerning intangibles are analysed according to the categories mentioned above. Sveiby translates this method as a strategic guideline for a company, something that allows users to insert different indicators according to the special characteristics of the company studied.
### Intangible Assets

<table>
<thead>
<tr>
<th>External Structure</th>
<th>Internal Structure</th>
<th>Personnel Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Growth\Renewal</strong></td>
<td><strong>Growth\Renewal</strong></td>
<td><strong>Growth\Renewal</strong></td>
</tr>
<tr>
<td>• Growth of personell</td>
<td>• Investment in IT</td>
<td>• Competence enhancing customers</td>
</tr>
<tr>
<td>• Growth of market share</td>
<td>• Time for R&amp;D</td>
<td>• Growth of average professional competence</td>
</tr>
<tr>
<td>• Customer satisfaction</td>
<td>• Personell behaviour towards managers, culture, customers</td>
<td>• Turnover competence</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td><strong>Efficiency</strong></td>
<td><strong>Efficiency</strong></td>
</tr>
<tr>
<td>• Revenues per customer</td>
<td>• Percentage of administrative staff</td>
<td>• Value added per employee</td>
</tr>
<tr>
<td>• Sales per agent</td>
<td>• Sales per staff</td>
<td>• Changes in the proportion of highest competence employees</td>
</tr>
<tr>
<td><strong>Stability</strong></td>
<td><strong>Stability</strong></td>
<td><strong>Stability</strong></td>
</tr>
<tr>
<td>• Repeat orders</td>
<td>• Age of organisation</td>
<td>• Employees turnover</td>
</tr>
<tr>
<td>• Age of structure</td>
<td>• Rookie ratio</td>
<td></td>
</tr>
</tbody>
</table>

Source: Sveiby, 1997:200
5.4.6 The Balanced Scorecard By Kaplan and Norton


Undoubtedly, one of the most famous and widely applied measurement systems created by Kaplan and Norton, is the Balanced Scorecard. The essential theory behind the Balanced Scorecard model, lies in the following statement:

“The traditional financial accounting measures like return-on-investment and earnings-per-share can give misleading signals for continuous improvement and innovation activities in today’s competitive environment demands. The traditional financial performance measures worked well for the industrial era, but they are out of step with the skills and competencies companies are trying to measure today”.

(Kaplan and Norton, 1992:71)

The Balanced Scorecard combines traditional financial measures with several non-financial operating measures, which are proved to be drivers of future performance. This grouping of financial and non-financial measures provides managers the opportunity to get a balanced view of the company’s performance. Figure 5.2 illustrates the four perspectives of the model, where measures are allocated:
For each of these perspectives, a given company will define predetermined objectives and measures, both financial (financial perspective) and non-financial (for the customer perspective, the internal business process perspective and the innovation and learning perspective).
In 2001, Kaplan and Norton published an advanced version of the model, which characterized it as an essential strategic instrument, which could become an essential part of a company’s strategic management process. Figure 5.2 illustrates the importance of the model as a strategic tool. In the new version, each of the models measures comprised a chain of cause-and-effect relationships communicating to the entire organization the significance of the strategy applied in each business unit. The interest in the Balanced Scorecard as a model for measuring intangible assets began as the model became an critical part of a company’s strategy, combined with the reality that intangible assets became important to a company’s strategic development.

5.4.7 Lev’s value chain Scoreboard (2001)

The value chain Scoreboard proposed by Lev is an analytical intangible assets measurement method, and it could be described as the advanced method of knowledge capital formula already discussed above. The basic idea behind the value chain Scoreboard is the intention to recognize the individual components in the company’s operations and to isolate the impact that they have on the value creation process. The value chain is considered to be the basic innovation process, important for the company’s survival and success. It starts with the finding of products and services, then it moves to the development and technology feasibility stage, and finally to the product\service marketing stage, as illustrated in figure 5.3.

Those intangibles measurement and valuation models do have important differences between them. Some of them focus on measuring intangibles, while the other are directed to evaluate company’s performance, by emphasizing invisible
factors linked to non-financial areas. According to PRISM study (2003), these models could be classified in two frameworks: the atomistic orientation versus the holistic orientation, meaning the attitude of a model to address, respectively, the measurement and/or representation of an individual intangible resource, or alternatively, the measurement and/or representation of the whole intangibles capital available to an organization. PRISM study distinguishes also two more subdivisions, monetary and non-monetary methods.

Figure 5.3 The value chain Scoreboard (Source: Lev, 2001:111)
5.5. Summary and conclusions

The difference between the accounting treatment of tangible and intangible assets, has been demonstrated to influence negatively the economic cycle, since it creates a major information leakage. Planned remedies range from encouraging firms to voluntarily disclose information about intangibles possessed, to suggesting fundamental modifications in the regulated accounting and reporting system. Firms with significant investment in intangible assets will face higher levels of information asymmetry with external stakeholders than firms with lower levels of intangible investment. Information asymmetry is harmful both to the firm (through a higher cost of capital) and society (through reductions in economic growth).

One of the main problems associated to the intangible assets is linked to the significant constraints in measuring them. This has negative consequences in terms of information asymmetry and management costs. The research into measuring the intangible assets or the intellectual capital of companies has produced a plethora of proposed methods and theories over the last few years, which have been adopted in practice. Regulations related to the reporting of intangible assets can directly influence the level of information asymmetry. Researchers have moved forward into providing guidelines and suggestions on how to treat intangible assets within the accounting framework. The purposed models by academics and practitioners suggest a framework for reporting, evaluation, and measure of intangible assets and intellectual capital. In spite of the fact that these frameworks derive important questions concerning their reliability, consistency, and thoroughness, since the indicators implied are still vague and quite general, it is certainly a step forward to the solution of the problem.
Chapter 6: Emerging considerations and concluding remarks

6.1 Introduction

Traditional accounting with its ‘logical’ division between ‘tangible’ and ‘intangible’ assets has been academically sensitive and incomplete. As long as assets are described as legal rights that produce future benefits controlled by an enterprise, then ‘tangibility’ is nothing more than a redundant accounting concept. Nevertheless, standard setters, based solely on the notions of verification and auditability, follow the paradigm of tangibility. It sounds quite out-of-date methodology, to search for proofs of existence of an asset in seeing and touching it. For auditors and standard setters, the ‘old economy’ of buildings, plant, equipment and stocks somehow defined the solidity of their role as verifiers. Yet the concept of ‘tangibility’ also obscured the fact that even the old economy had always been more ‘new’ than they could admit.

Intangible assets are one of the most critical moments in the history of accounting. Since developed economies have become more knowledge-based and technology-intensive, the view of the firm has significantly changed and intangible resources have become fundamental determinants of value. Until recently, accounting has failed to provide an accurate view of intangible value drivers and therefore traditional (historic cost) financial statements have experienced a momentous loss of relevance. Hence, there is currently a significant gap between the accounting estimate of the firm’s value and its market value. Under these conditions, standard setting bodies and academics are in front of the call to put forward new guidelines for the recognition, measurement and reporting of intangibles.
6.2 Paradoxes concerning the study of intangible assets

According to the PRISM project (2003), there is a fundamental paradox concerning intangible assets. The term “intangible” defines something by an exclusion, by the fact to be “not-tangible”. This leads to the fact that intangibles in economics are treated as residuals. Nevertheless, nowadays, intangible assets have received great value so as to be treated as the new profit drivers for firms. In the knowledge-based economy, or intangible economy (Foray and Lundvall, 1996; Eustace, 2000) - the sources of value and competitiveness for firms, as for regions and nations, are drastically shifted from physical to intangible assets. At the firm’s level assets such as information systems, customer loyalty, reputation, brands, competencies and knowledge, represent an increasing share of the company value and have become the most critical factor for its competitiveness. According to PRISM (2003)

“Recent estimates suggest that nowadays 50-90% of the value created by a firm come not from management of traditional physical assets, but from management of intangible assets (Hope and Hope, 1998). In 1982 the value of tangible assets, reported on the balance sheet of Standard & Poor 500 companies in the U.S. on average made up still 62% of the market value of these companies, while in 1998 this ratio has been totally turned around: only 15% of the market value of S&P 500 companies was represented through the value of their tangible assets (Daum, 2001). Therefore, what it is needed is a shift in perspective. Rather to consider intangibles as “exceptions” that have to be integrated into traditional theoretical frameworks it is necessary to rewrite traditional concepts in order to see them at the light of the new
“rule”. This new scenario presents numerous challenges that involve corporate managers, investors, accounting standard setters and policymakers.”

The research of the PRISM project (2000) led to the identification of three major paradoxes. First, the more the system is based on intangible assets, the stronger it becomes, since these assets create more value compared with the tangible ones. On the same time, measurement problems involve risk and vulnerability since the more the system is based on intangible assets, the more exposed it is, because its value is uncertain. Inability to measure intangibles leads to downside effects in all economical fields. At the firm level, wrong strategies might be decided if assets are not well assessed. At industry level, the lack of proper data on intangibles and their contribution to productivity and performance may lead to a misallocation of resources, both within and between firms. Concerning capital markets, if the financial information which entities are imposed to disclose becomes less informative about the real assets and sources of value within the firm, capital markets do not function well, by overvaluing or undervaluing firms.

The second paradox relates to the collective intangible assets. The economy is stronger, if intangible assets are not concentrated, or made available to all economic agents. However, the more they are diffused, the less each firm can appropriate the returns from investments in intangible assets.

The third paradox is derived from the second one. The interference of Governments and standard setters is essential to guarantee the encouragement of investing in intangible assets, especially through the provision of the collective intangible assets. However, this reduces appropriation and decreases the incentive to invest in intangible assets. The problem is therefore to guarantee property rights through legislation and accounting practices so as to provide incentives for investing
in intangible assets. Nevertheless, this favours the creation of monopolies, hence negative effects to public welfare.

6.3 Proposition by Young (2003) concerning a starting basis for the resolution of the issue.

Given the above discussion, Young (2003) suggests a set of principles that could constitute a starting basis around which regulators and other stakeholders could discuss in order to define universally accepted GAIP (General Accepted Intangibles Principles).

**Principle 1. Position**

This principle is similar to GAAP’s “entity” principle. It requires a firm to both define the strategic position it occupies, or aims to occupy, in its chosen industry. If a firm is operating in multiple industries, it would need to identify its strategic position in each. It also would need to compare its return on assets with the industry average, which will serve to link intangible reporting with financial reporting. This principle will allow readers of intangible statements to have a basis on which to assess how the firm’s intangible assets can assist it in its efforts to maintain or improve upon its strategy. The relevance of the strategic position’s evaluation in order to provide a fulfilling picture of the “intangible” capability of the firm emerges also from the analysis of the credit rating assignment process.
Principle 2. Evolution

This principle requires that a firm report on the status and flows of its intangible assets over a period of several years. It will allow readers to see both the current status of an intangible asset and how it has evolved over time. This principle recognizes that some intangibles require several years to reach maturity.

Principle 3. Cost

This principle recognizes that some intangibles can be assigned with a monetary value, but diminishes the potential problem of different members of the financial community ascribing varying values to an intangible asset, or the entity overestimating the value of its intangible assets. Thus, a patent, for example, would be reported at the full cost of developing it, but no attempt would be made to estimate the value of that patent to the entity.

Principle 4. Tactility

This principle recognizes that some so-called intangible assets nevertheless can be seen or touched, and therefore listed, even if it is not possible for the entity to ascribe a cost to them. Non-complete contracts, information systems, procedural manuals, the organizational structure, and customer histories are examples of “tactile” intangibles.
**Principle 5. Results**

This principle requires the entity to report on results, rather than processes, for those intangibles that cannot be ascribed a cost. Under this principle, for example, the entity would report the number of employees trained rather than number of training programs it ran.

**Principle 6. Category**

This principle stipulates that there is a number of categories of intangible assets, and requires the entity to describe its intangibles in each.

**Principle 7. Sustainability**

This principle requires the entity to assess the sustainability of its profitability in terms of six threats: loss of customers, supplier hold-up, substitutes, new entrants, the actions of rivals, and slack. For each area the entity would need to describe how its intangible assets help to raise buyer switching costs, avoid supplier hold-up, mitigate the effect of substitutes, prevent the entry of new competitors, deter the
actions of rivals, and eliminate slack. It is important to note that this principle does not require the entity to describe new activities it is taking in an attempt to raise its buyers’ switching costs, deter supplier hold-up, create substitutes for its rivals products or services, enter new industries, or develop new competitive approaches to its rivals. Such a requirement would likely compromise the entity’s strategy.

**Principle 8. Conservatism**

This principle is identical to that in GAAP. The entity should anticipate the worst, but it should also explain what it is doing to avoid it.

**Principle 9. Materiality**

This, too, is identical to the GAAP principle. It allows entities to avoid reporting on items that are immaterial.

Young (2003) suggests that, based on these 9 principles (or postulates), and according to the stock and flow theory of wealth measurement, there would appear to be a need for a status and flow intangibles report. It would cover a three-year period and would be organized by category. For each category, the report would show the entity’s assets classified into three areas: tactile-monetary, tactile-non-monetary, and non tactile. The report would show the changes that occurred to the intangible assets during each year.
6.4 Concluding remarks

Operations that involve intangible assets are from their nature risky and uncertain. Not only the generation of intangible assets through investments in education, R&D and innovation is an uncertain process because of its dynamic nature, but also the transmission of intangibles that are protected by property rights is characterized by a high degree of risk. This is due to the information asymmetry associated to intangibles. Problems in recognizing and quantifying intangibles give rise to principle-agents tensions among actors involved in the exchange of these assets. Moreover, intangible assets management represent an extremely uncertain process because of the necessity of ‘operating in the dark’ (Lev, 2001), without an effective possibility to measure and quantify assets and performances. The "knowledge-intensive" nature of most intangibles is one of the main determinant of risk: it is more difficult predict output given non-physical inputs and it is more difficult for firms to appropriate returns from their products while these products are essentially ‘intangibles’.

Indeed, an interesting conclusion for future research that seems to emerge from the PRISM (2003) work is that not enough attention has been paid so far to the internal side of the intangibles reporting, i.e. the production by organisations of structured information on intangibles, and its connection to the external release and diffusion of this information. In other words, measuring and reporting on intangibles is an important theoretical and practical issue not only per se, but also for its stress on the internal/external interface of an organisation. The issues linked to the intangibles and their role vis-à-vis accounting, audit and financial analysis are complex and very broad. On the other hand, much of the extant literature have focused on these issues,
so that one could say that this is at the same time one of the largest but also one of the most investigated fields in the new intangibles literature.

What is currently missing however is an appropriate information infrastructure to enable intangible assets to be identified, measured, reported and managed effectively. The information infrastructure must be based on solid economic principles, should be standardised and become mandatory. To meet the information needs of all levels of the economy, the infrastructure needs to be co-operatively supported by interest groups micro and macroeconomic arenas. Investment in intangible assets will only be optimised when this occurs. The information infrastructure must be based on a conceptual framework that provides a comprehensive definition of intangible assets, combined with coherent rules for measurement, and enforcement mechanisms to encourage reliable reporting practices.
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