

**Intellectual Capital: Current Issues
and Policy Implications**

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ABSTRACT

Substantial differences between company book values and market values indicate the presence of assets not recognised and measured in company balance sheets. Intellectual capital assets account for a substantial proportion of this discrepancy. At present, companies are not required to report on intellectual capital assets which leaves the traditional accounting system ineffective for measuring the true impact of such intangibles.

Regulations currently in place are analysed in this paper. Prior research concerning intellectual capital is next presented. Frameworks for intellectual capital are compared. Indicators used for the measurement of intellectual capital are examined. The research methodologies employed for collecting information about the use of intellectual capital accounts in companies are reviewed.

Guidelines available to companies for reporting on intellectual capital are considered and also the efforts made towards developing an accounting standard for intellectual capital. Finally, current issues and policy implications of accounting for intellectual capital in the future are examined.

Keywords: Intangible assets, intellectual capital

1. INTRODUCTION

Substantial differences often exist between the market and book values of companies. Much of these differences can be explained by intellectual capital assets not recognised in company balance sheets. Intellectual capital can be thought of as the knowledge-based equity of a company (International Federation of Accountants, 1998). It includes assets relating to employee knowledge and expertise, customer confidence in the company and its products, brands, franchises, information systems, administrative procedures, patents, trademarks and the efficiency of company business processes (Danish Trade and Industry Development Council, 1997). This has presented companies with a new challenge - how to account for intellectual capital.

1.1 Objectives of this paper

This paper reviews the literature to date on accounting for intellectual capital focussing on five main areas:

- Current regulations for intangible assets.
- Prior research on intellectual capital.
- Frameworks for classifying and managing intellectual capital.
- Intellectual capital indicators and measurement techniques.
- Methodology used in prior empirical research.

The paper also focuses on issues currently facing policy makers, such as future guidelines for companies and the setting of accounting standards.

1.2 Definition and classification of intangible assets

Table 1 compares UK/Irish, US and international accounting standards on intangible assets. It highlights the definitions, classification, recognition and amortisation of intangible assets as referred to in the standards.

IAS 38 and APB 17 deal only with identifiable intangible assets, while FRS 10 encompasses both goodwill and intangible assets. Unlike FRS 10 and IAS 38, APB 17 *Intangible Assets*, issued in 1970, offers no definition. The definitions of intangible assets in FRS 10 and IAS 38 have many similarities. They specify that intangible assets should be identifiable, non-mandatory/non-financial assets and without physical

substance. FRS 10 emphasises control of the intangible asset, which must be under that of the entity through custody or legal rights. Control is mentioned elsewhere in IAS 38, separate to the definition. Unlike FRS 10, legal enforceability of a right is not a necessary condition for control under IAS 38. The US standard emphasises the purpose for which the intangible asset is held, i.e. future economic benefits are expected to flow to the enterprise through the use of the intangible asset.

The accounting standards all provide methods for classifying intangible assets and examples of classification categories. FRS 10 provides that intangibles should be classified in a category if they have a similar nature, function or use in the business of the entity. Examples of classification categories are licences, quotas, patents, copyrights, franchises and trademarks. IAS 38 provides that intangible assets should be classified in terms of expending resources or incurring liabilities or the acquisition, development or enhancement of intangible assets such as: scientific or technical knowledge, design and implementation of new processes or systems, licences, intellectual property, market knowledge and trademarks. IAS 38 has a broader list than FRS 10, including elements of intangible assets such as design and implementation of new processes. Common examples of items to be listed under these classification headings are computer software, patents, copyrights, customer lists, market share and marketing rights. APB 17 proposes several different bases to classify the types of intangible assets. APB 17 has several bases of classification (which reduces comparability across companies): identifiability, manner of acquisition, expected period of benefit and separability from the entire enterprise.

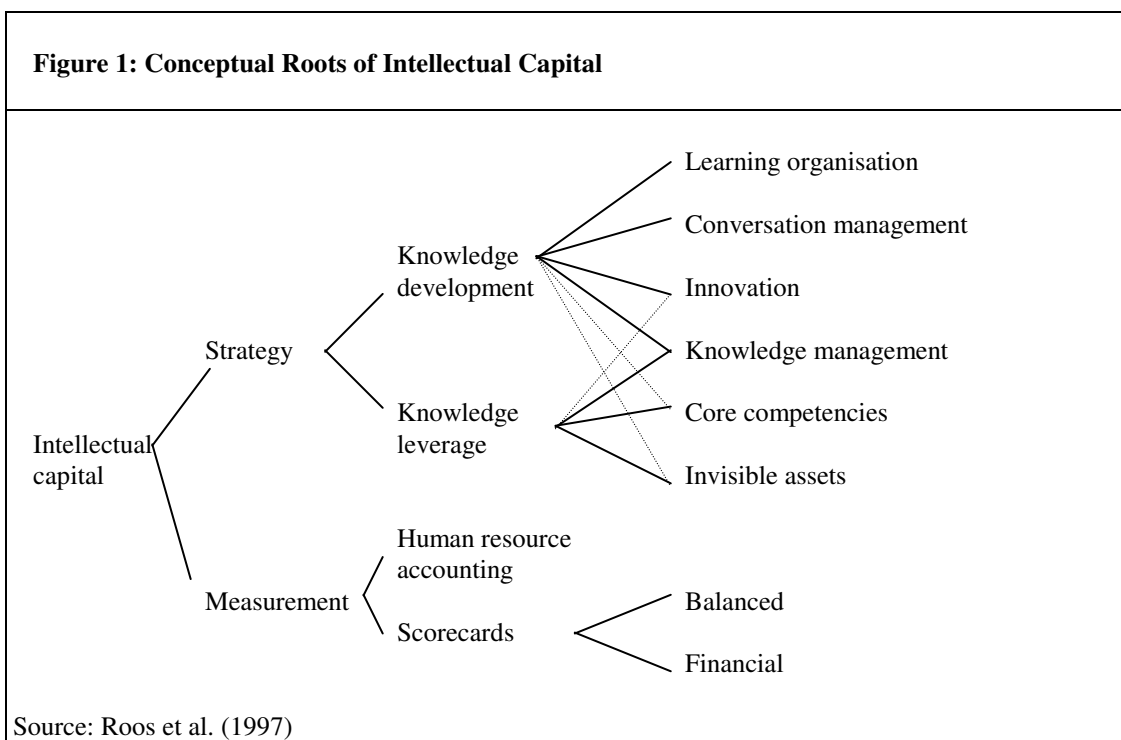
Intangible assets are defined very narrowly, not including assets such as human resources, customer loyalty, company reputation. These elements of intellectual capital, if managed properly, have huge potential for creating value which many companies feel can no longer be ignored.

Table 1: Comparison of Accounting Standards for Intangible Assets

	FRS 10 Goodwill and Intangible Assets	IAS 38 Intangible Assets	APB 17 Intangible Assets
Definition of Intangible Assets	Non-financial fixed assets that do not have physical substance but are identifiable and controlled by the entity through custody or legal rights.	An identifiable, non-monetary asset without physical substance held for use in the production or supply of goods or services, for rental to others or for administrative purposes.	No definition
Classification of Intangibles	A category intangible assets having a similar nature, function or use in the business of the entity e.g. licences, quotas, patents, copyrights, franchises and trademarks.	Expending resources or incurring liabilities or the acquisition, development or enhancement of intangible resources such as scientific or technical knowledge, design and implementation new processes or systems, licences, intellectual property, market knowledge and trademarks.	Classified on several different bases: identifiability, manner of acquisition, expected period of benefit, separability from the entire enterprise.
Recognition	An internally developed intangible asset may be capitalised only if it has a readily ascertainable market value.	An intangible asset should be recognised if: it is probable that the future economic benefits that are attributable to the asset will flow to the enterprise. The cost of the asset can be measured reliably.	An internally developed intangible asset should be recognised if it: (a) is specifically identifiable. (b) has a determinate life. (c) can be separated from the entity.
Amortisation	Where intangible assets have a limited useful economic lives they should be amortised on a systematic basis over those lives. Where intangible assets have indefinite useful economic lives, they should not be amortised.	The depreciable amount of intangible assets should be allocated on a systematic basis over the best estimate of their useful lives.	Intangible assets should be amortised by systematic charges to income periods over the estimated time to be benefited.

Elements of intellectual capital such as human resources, company reputation, customer loyalty, are not included in the narrow definition of intangible assets as set out in UK/Irish and international accounting standards. However, in the knowledge management field, the term intangible asset is understood in a broader context. Most approaches follow the IAS 38 notion of intangibles but include some additional factors such as value-generating databases and employer-employee relations.

Roos et al. (1997) traced the theoretical roots of intellectual capital to two different streams of thought - the strategic stream and the measurement stream (Figure 1). The strategic stream focuses on the creation, use of knowledge and the relationship between knowledge and value creation. The measurement stream relates to the need to develop a new information system, measuring non-financial data with the traditional financial ones.



Stewart (1997) defines intellectual capital as *intellectual material - knowledge, information, intellectual property and experience - that can be put to use to create wealth.*

Roos et al. (1997) classify intellectual capital into structural and human capital, “thinking” and “non-thinking” assets. This distinction is arrived at since people (human capital) require different management methods from structural capital. Another distinction has been suggested by Brooking (1996) which identifies four components of intellectual capital: market assets, human-centred assets, intellectual property assets and infrastructure assets. The difference between these two classification systems is that they assume different levels of aggregation of the elements of intellectual capital. Most other classification schemes for intellectual capital distinguish between external (customer related), internal structures and human capital (e.g. Sveiby, 1997; Petrash, 1996; Skandia, 1995).

- External structure concerns customer and supplier relations.
- Internal structure consists of patents, concepts, computer and administrative systems. The corporate culture of the company also belong to the internal structure.
- Human capital relates to people’s capacity to act in situations. It includes skills, education, experience, values and motivation.

Different terms, but with only slightly different meanings, are used to identify the categories. These classification categories are examined in more detail in section 3.

1.3 Organisation of the paper

Section 1 has compared and contrasted the UK/Irish, US and international accounting standards for intangible assets. The purpose of this is to show the widening gap between accounting for intangibles and the need for companies to account for intellectual capital, for which there is no accounting standard currently in place. In the second section, prior research on intellectual capital is reviewed. Section 3 compares different intellectual capital frameworks for classifying and managing intellectual capital. Section 4 identifies intellectual capital indicators and also examines how intellectual capital is measured, using both financial and non-financial measures. The different research methodologies used in undertaking empirical research on intellectual capital are discussed in Section 5. Finally, Section 6 looks at the guidelines needed by companies and how they should be made operational. It also considers the policy implications for the future, for example, whether accounting

standards, mandatory or voluntary, should be put in place and how they should be implemented.

2. PRIOR RESEARCH

Much research, both theoretical and empirical, has been undertaken on intellectual capital in recent years, which is summarised in Table 2. Early research focused on defining intellectual capital and on methods of classification (e.g. Brooking, 1996; Edvinsson and Malone, 1997; Sveiby, 1997; Roos et al., 1997). Kaplan and Norton (1992), Sveiby (1997) and Edvinsson and Malone (1997) proposed different frameworks for classifying intellectual capital. These frameworks are broadly similar, but show different inter-relationships among the elements of intellectual capital.

In 1993 Leif Edvinsson, in a supplement to Skandia's Annual Report, used for the first time the word Intellectual Capital instead of the accounting term Intangible Assets (Edvinsson and Malone, 1997). Skandia AFS, a Swedish financial services company, was one of the first companies to report the "hidden" intellectual capital assets of the business. Skandia went on to develop one of the most important models, the Skandia Navigator, for managing intellectual capital. Another important researcher in intellectual capital is Karl-Erik Sveiby who has carried out a considerable amount of the pioneering research on intellectual capital management. He points out that the increasing importance of intellectual capital may require a fundamental shift in the way we think about organisations. The ideas put forward at Skandia, by Sveiby and others will be discussed in later sections of this paper. Two companies, Skandia AFS (Edvinsson, 1997) and Dow Chemical (Petrash, 1996) were involved in much of the pioneering efforts of intellectual capital management. Each company also developed its own framework for managing intellectual capital. A comparison of the frameworks are given in section 3.

Table 2: Analysis of Prior Research

Study	Definition & classification	Developed IC framework	Literature review	Empirical research	Identified IC indicators	Measurement of IC	Examined IC statements	Focus on human capital	Guidelines for firms
Kaplan & Norton (1992)		X							
Petrash (1996)	X	X							
Brooking (1996)	X								
Edvinsson (1997)		X							
Edvinsson & Malone (1997)	X	X							
Roos et al. (1997)	X					X			
Sveiby (1997)		X							
Danish Trade & Industry Development Council (1997)				X	X		X		
IFAC (1998)			X						
Sveiby (1998a)		X							
Sveiby (1998b)		X							X
Canibano et al. (1999a)			X						
Danish Agency for Trade & Industry (1999)				X			X		
Bornemann et al. (1999)				X	X				
Blackjuijs et al. (1999)		X		X					
Ferrier (1999)									X
Westphalen (1999)				X		X			
Johanson et al. (1999a)			X					X	
Johanson et al. (1999b)				X		X			
Johanson (1999)				X					
Achten (1999)				X	X				
Andriessen et al. (1999)				X		X			
Miller et al. (1999)				X	X				
Bukh et al. (1999)				X			X		
Hoogendoorn et al. (1999)				X	X		X		
Canibano et al. (1999b)				X	X	X			
Bassi (1999)			X		X				
Leadbetter (1999)			X			X			
Okana et al. (1999)			X		X				
Guthrie et al. (1999)				X	X				
Brennan (1999)				X	X				
Grojer & Johanson (1999)			X						X

Against this background, empirical research was carried out in many countries to examine how companies account for intellectual capital assets. Indicators of intellectual capital, intellectual capital statements and measurement of intangibles were analysed, for the purpose of identifying best practices in firms. Numerous intellectual capital indicators were found to be used in companies and are discussed in section 4. Different measurement approaches, incorporating financial and non-financial indicators, are also emerging in the literature (e.g. Roos et al., 1997; Canibano, Garcia-Ayuso, Sanchez, Chaminade, and Escobar, 1999b).

2.1 MERITUM Project

Many of the research studies mentioned in this paper form part of an ongoing project investigating intellectual capital called MERITUM - Measuring Intangibles to Understand and Improve Innovation Management. Six European countries (Finland, France, Denmark, Norway, Spain and Sweden) are participating in this research. The project started in November 1998 and will continue for 30 months. The principle aim is to produce guidelines to measure and disclose intangibles for the purpose of improving decision-making for managers and stakeholders. Four main activities will be addressed as part of the project:

- Establish a classification scheme for intangibles.
- Document company management and control systems for identifying European best practices in measuring intangibles.
- Assess the relevance of intangibles in the functioning of capital markets by means of market data analysis.
- Produce guidelines for the measurement and reporting of intangibles.

2.2 Empirical Research

Table 3 summarises fourteen empirical research studies on different aspects of intellectual capital. The research was conducted in the Netherlands, Scandinavia, Austria, Canada, Australia and Ireland. Research objectives have focused on intellectual capital statements, intellectual capital frameworks and measuring and reporting on intellectual capital. A variety of research methodologies were used (interview, case study, questionnaire, survey of annual reports, focus groups), the most popular being case study, involving a small number of companies. Interviews and

questionnaires were often used to supplement each other and usually involved larger sample sizes. The methodologies employed will be analysed in greater detail in section 5. A brief summary of the finding of each project is also given in Table 3.

Intellectual capital management was found to be important for a company's long term success. Companies managing their own intellectual capital outperformed other companies (Danish Trade and Industry Development Council, 1997; Bournemann et al., 1999; Johanson, 1999). Human capital is regarded as the most valuable asset (Bachhuijs et al., 1999; Johanson et al., 1999b; Miller et al., 1999). Numerous intellectual capital indicators were also identified (Danish Trade and Industry Development Council, 1997; Miller et al., 1999).

3. FRAMEWORKS FOR INTELLECTUAL CAPITAL

Intellectual capital frameworks have been developed for the purpose of understanding intellectual capital. Common characteristics or features evident in these frameworks are identified and discussed in this section.

Intellectual capital frameworks are broadly divided into two types. Firstly, frameworks for classifying intellectual capital assets are discussed. In order for intellectual capital to be managed and measured, the elements must first be categorised and understood. Secondly, frameworks for managing intellectual capital are discussed. These models have been developed and tested in companies and provide a practical method of managing intellectual capital.

Table 3: Empirical Research on Intellectual Capital

Study	Country	Research Objective	Sample Size	Industry	Size of firm	Methodology	Variables of Interest	Summary of study results
Danish Trade & Industry Development Council (1997)	Denmark & Sweden	Nature of IC statements	10	Various	Large	Interview	Objective, content, impacts, organisation & definitions included in IC accounts	Great creativity shown by the 10 companies. Different measures used but linked to four main categories - human resources, customers, technology & processes. IC accounts were used to keep organisational development on track, not for procuring capital.
Bornemann, Knapp, Schneider, Sixl (1999)	Austria	Value of IC from stakeholders' perspective	40	Various	All sizes	Interview Questionnaire Annual reports	Non-financial measures, KSFs for company development, comparison of Austrian SMEs with international companies.	Companies supporting the development of their IC are outperforming those who do not manage their IC. Measures of strategy implementation, market share, human resources & innovativeness are crucial. Awareness of the topic of IC is growing.
Backhuijs, Holterman, Oudman, suffice Overgoor, Zijlstra (1999)	Netherlands	Framework for indicators of IC	3	Industrial manufacturing	Large	Case study	Significance of intangible assets, interwovenness, identification & definition of indicators	It is impossible to see intangible assets as separate elements. Human capital is central to intangibles. Relatively few indicators in measuring intangibles. Increased transparency provides information about cash flow potential and risk profile.
Johanson, Martensson, Skoog (1999)	Sweden	Measurement & management of intangibles	11	Various	Large & Medium	Case study	Development, purpose, content & outcome of the measurement system	Market considerations were the most significant driving force in the development of the measurement system. Market & human capital measures are of central interest.

Table 3: Empirical Research on Intellectual Capital

Study	Country	Research Objective	Sample Size	Industry	Size of firm	Methodology	Variables of Interest	Summary of study results
Johanson (1999)	Sweden	Characteristics of intangibles	11	Various	Large & Medium	Case study	Classification of intangibles, relationship between intangibles	Fundamental purpose of a measurement system is to improve critical success factors & to enhance the long-term competitiveness of the firm.
Achten (1999)	Netherlands	Transparency of intangible production assets	3	Developers and producers of: flower bulbs, branded software and seeds.	Medium	Case study	Identification of intangible production assets & measurement of inputs	IC variables are important for the company as a whole & for individual investment. Indicators are relevant for external use. However, management judgement is subjective & as yet there are no tools for quantified evaluation.
Andriessen, Frijlink, van Gisbergen, Blom (1999)	Netherlands	Valuation of intangible assets	3	Electrical engineering, transport and financial services	Medium	Case study	Measuring intangibles in terms of future earnings capacity	Measurement of intangibles provides vital management information about the company's strategic assets. The value of intangibles is subjective since it is a direct result of a firm's ability to find value-adding application.
Miller, DuPont, Fera, Jeffrey, Mahon, Payer, Starr (1999)	Canada	Measuring & reporting of IC	4	Capital-intensive, high technology, institute of higher education	Large	Questionnaire Focus groups	IC indicators	Human capital emerged as the most valuable asset. The findings point towards a need to adopt a more comprehensive approach to dynamically managing human, structural & customer capital.

Table 3: Empirical Research on Intellectual Capital

Study	Country	Research Objective	Sample Size	Industry	Size of firms	Methodology	Variables of Interest	Summary of study results
Canibano, Garcia- Ayuso, Sanchez, Olea, Escobar (1999b)	Spain	Measuring IC	1	Electronics	Medium	Case study	IC indicators	Firms need a framework for classifying IC. Differences across firms make it necessary to develop firm and industry specific models for measuring IC.
Bukh, Larsen, Mouritsen (1999)	Denmark	Development of IC statements	23	Various	All sizes	Interview Questionnaire	IC indicators	Firms are changing & adapting the contents & form of their initial IC statement model. NFIs are being more widely introduced.
Hoogendoorn, de Bos, Krens, Veerman, ter Beek (1999)	Netherlands	Development of IC statements	3	Insurance, international consultants, publishing & information	> 50 staff	Questionnaire Interview	Identification of IC, valuation of intangible assets, IC indicators	The general conclusion of the study is that providing greater transparency on IC with the aid of an IC statement as an appendix to the financial statements is a practical possibility.
Danish Agency for Trade and Industry (1999)	Denmark	Development of IC statements	19	Various	All	Case study	IC measurements, guidelines for companies	The first set of IC accounts focus on individual companies IC assets. The project is now focusing on general guidelines for all companies.
Guthrie, Petty, Ferrier, Wells (1999)	Australia	Reporting of IC	20 7	Various	Large	Annual reports Case study	Contents of IC reports, role of industry as a driving force for IC.	Few companies have taken a proactive approach to measuring & reporting of IC. No industry is significantly ahead of the others in terms of IC reporting. A lack of a general framework was evident.
Brennan (1999)	Ireland	Reporting of IC	11 21	Various knowledge-intensive	Large & medium	Annual reports	Content of IC reports, comparison of market and book values.	Irish companies were found to have substantial intangible IC assets. IC is rarely referred to in annual reports.

3.1 Classifying Intellectual Capital

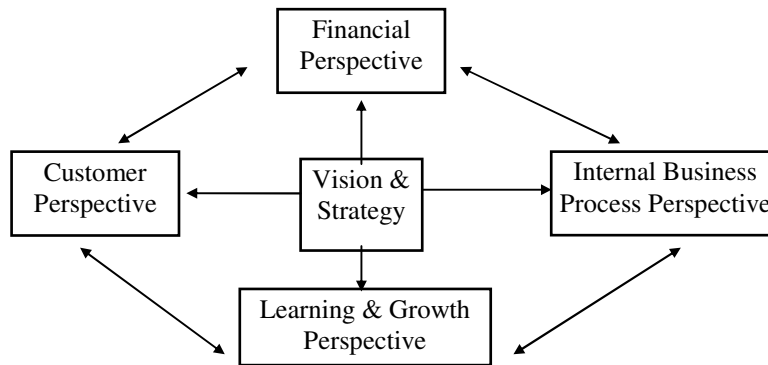
Traditionally, intangible assets have been classified in terms of research and development (R&D), marketing and training. More contemporary classification schemes divide intangibles into categories of external (customer-related) capital, internal (structural) capital and human capital. Frameworks are summarised in Table 4. The principle models are the Balanced Scorecard (Kaplan and Norton, 1992), the Value Platform (Petrash, 1996) and the Intangible Asset Monitor (Sveiby, 1997). Many of the frameworks classify intellectual capital into the same three broad classification categories - human, customer and structural capital. However, these classification schemes are presented differently in each of the models.

Table 4: Frameworks for Classifying Intellectual Capital		
Developed by	Framework	Classification
Kaplan & Norton (1992)	The Balanced Scorecard	Internal processes perspective Customer perspective Learning & growth perspective Financial perspective
Haanes and Lowendahl (1997)	Classification of Resources	Competence Relational
Lowendahl (1997)	Classification of Resources	Competence Relational
Sveiby (1997)	The Intangible Asset Monitor	Internal structure External structure Competence of personnel
Edvinsson & Malone (1997)	Skandia Value Scheme	Human capital Structural capital
Petrash (1996)	Value Platform	Human capital Customer capital Organisational capital
Danish Confederation of Trade Unions (1999)	3 Categories of "Knowledge"	People Systems Market

Kaplan and Norton (1992) developed the Balanced Scorecard (Figure 2) which measures organisational performance across four linked perspectives: financial, customer, internal business processes and learning and growth. The Balanced Scorecard represents a set of cause-and-effect relationships among output measures

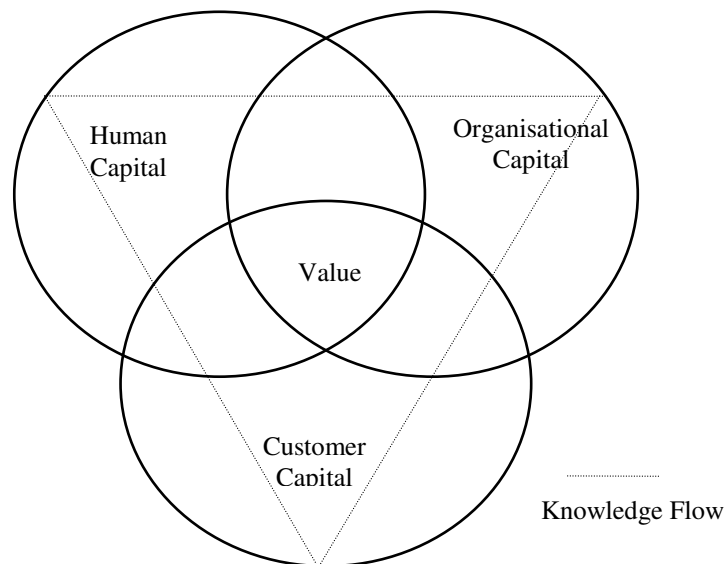
and performance drivers. It provides for the control of intangibles while simultaneously monitoring financial results.

Figure 2: The Balanced Scorecard



Source: Kaplan and Norton (1992)

Figure 3: Value Platform



Source: Petrash (1996)

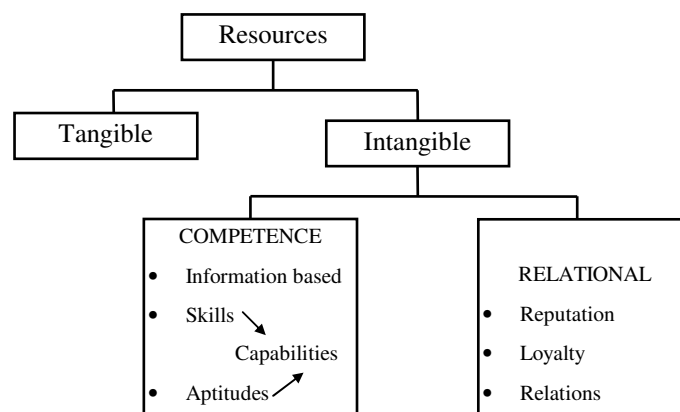
The Value Platform or the Intellectual Capital Model (Figure 3), as it is known was developed in a collaborative effort which includes Edvinsson (Skandia), Onge (The Mutual Group) and Petrash (Dow Chemical). Their definition states that:

$$\text{Intellectual Capital} = \text{Human Capital} + \text{Organisational Capital} + \text{Customer Capital}$$

The model depicts the interrelationships among the three major types of intellectual capital. The dotted lines represent the management of the intellectual assets. The objective is to increase the number of inter-relationships so as to maximise the value space.

Haanes and Lowendahl (1997) (Figure 4) and Lowendahl (1997) (Figure 5) both classify intangible resources into competence and relational resources. Competence is the ability to perform a given task. It exists at two levels - individual (knowledge, skills, aptitude) and organisational (databases, technology, procedures). Relational resources refer to the reputation of the company and client loyalty.

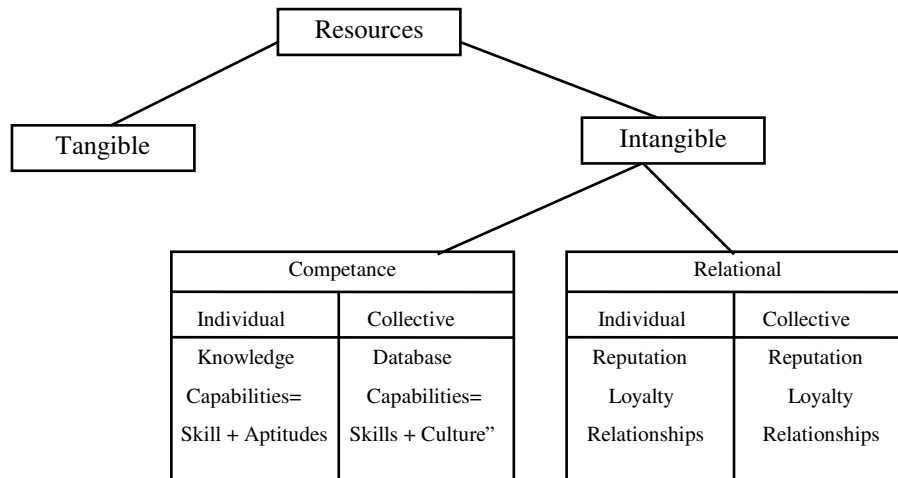
Figure 4: Classification of Resources according to Haanes and Lowendahl (1997)



Source: Haanes and Lowendahl (1997)

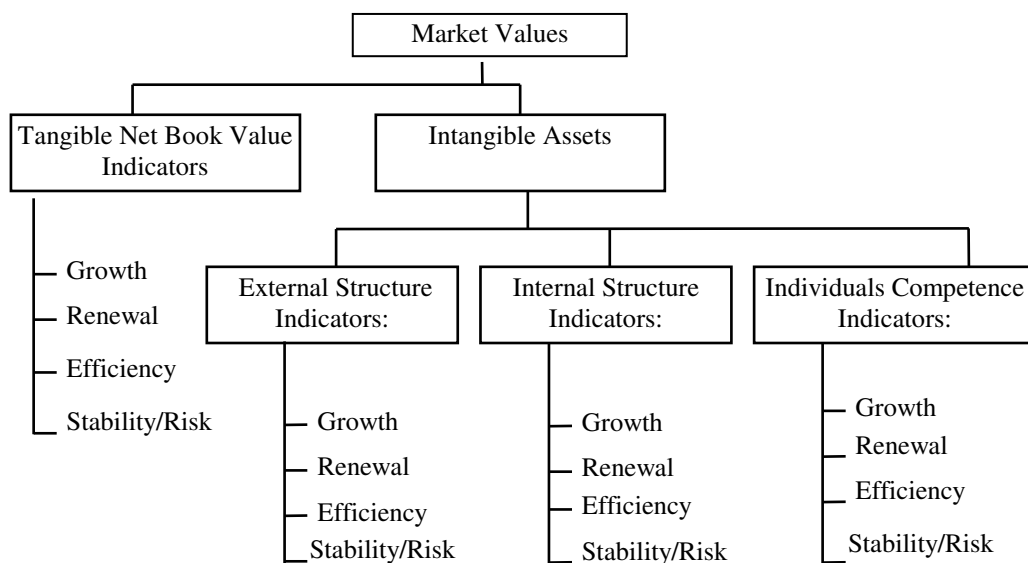
In Figure 5, Lowendahl (1997) takes a step further by dividing the competence and relational categories into two subgroups, individual and collective, depending on whether the resource is employee or organisation focused.

Figure 5: Classification of Resources according to Lowendahl (1997)



Source: Lowendahl (1997)

Figure 6: Intangible Asset Monitor Framework

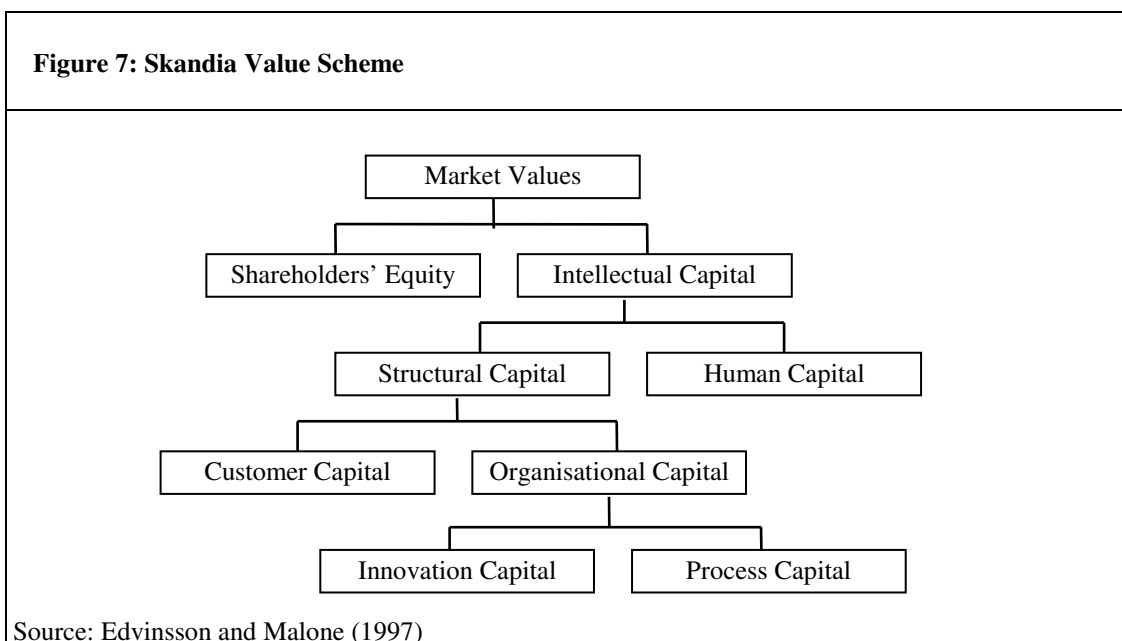


Source: Sveiby (1997)

In the Intangible Asset Monitor (Figure 6), Sveiby (1997) proposes a framework developed from the Invisible Balance Sheet. Invisible assets are matched on the financing side of the balance sheet by equally invisible finance, most of which is in the form of invisible equity. The Intangible Asset Monitor model classifies intellectual capital into the same three categories: internal structure, external structure and individual competence. Individual competence refers to people's capacity to act in

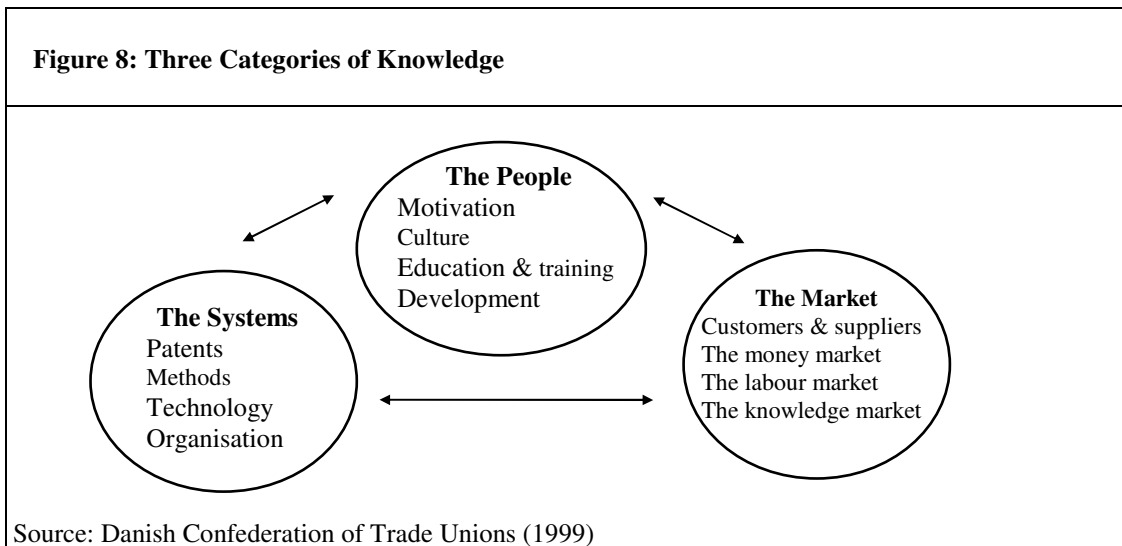
various situations. Internal structure consists of both the formal and informal culture within the organisation. It includes patents, concepts, models, databases and internal systems. External structure comprises of the relationships between the organisation and others - e.g. customers, suppliers, brand names, trademarks and reputation. Human capital is vital to organisations because without people an organisation cannot function. Employee competence, skills, training and experiences are all elements of individual competence.

The Skandia Value Scheme (Figure 7) was developed by Edvinsson in 1993. Intellectual capital is divided into structural capital and human capital. Structural capital includes customer and organisational capital, representing the external and internal focus of structural capital. Organisational capital consists of innovation and process capital. Process capital represents the know-how (e.g. manuals, best practices) in the company. Innovation is that which creates success in the future and includes intellectual assets and intellectual property.



A further model to help understand intellectual capital is the framework developed by the Danish Confederation of Trade Unions (Figure 8). The *People* represent employees and managers in the organisation. Human capital refers to what people can do, individually and collectively. The *System* is the knowledge in the company which

is independent of people. It includes patents, contracts, databases, information and production technology. The *Market* consists of the relationships between the organisation and outsiders, e.g. suppliers, distributors and customers. These three categories of knowledge are closely intertwined. For example, the success of new technology is dependent on staff competence and training.



It is likely that new models will evolve in the future with the growing interest and importance of intellectual capital management.

3.2 Comparison of Classifying Frameworks

These frameworks developed independently of each other. Although many of them are very similar, they have developed from different perspectives. Considerable differences are apparent when the frameworks are depicted diagrammatically. For example, the Skandia Value Scheme (1997) is a simple tree diagram classifying intellectual capital into structural and human capital. Haanes and Lowendahl (1997) also use a tree diagram with two different classification headings, competence and relational resources. The Intangible Asset Monitor, the Value Platform and the Three Categories of Knowledge have classification categories with different names but essentially the same meaning. The Danish Confederation of Trade Unions (1999) assumes that the people, systems and market must interact with each other. The Value Platform is a more advanced model showing that the value-creating space is largest

when the inter-relationships of human, organisational and customer capital are maximised.

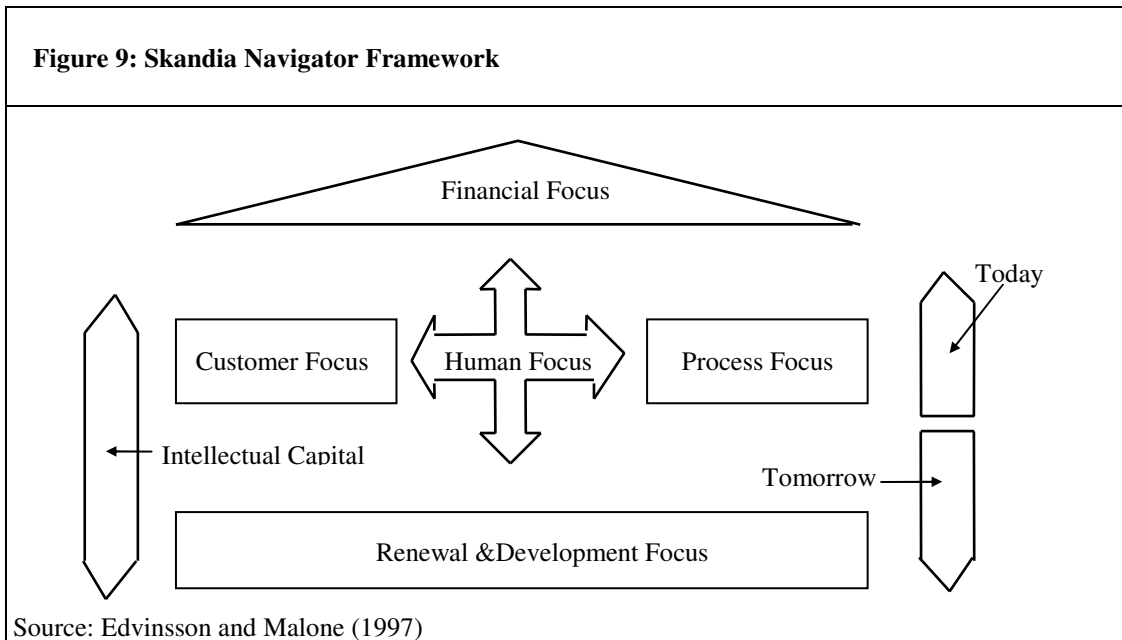
There are some similarities between the Intangible Asset Monitor (1997) and the Balanced Scorecard (1992). The two frameworks both classify intangibles into three categories. Both theories suggest that non-financial measures provide a means of complementing financial measures and should also be present at the strategic level of the firm. However, the frameworks make different basic assumptions. Firstly, Sveiby (1997) regards people as the only profit generators in an enterprise. Kaplan and Norton (1992) do not make this assumption. In addition, the Intangible Asset Monitor puts forward the idea that indicators should be found for the growth, renewal, stability and efficiency of intangible assets to assess how the intangible asset is developing. The Balanced Scorecard, on the other hand, aims to balance the traditional perspective by adding the customer, process and learning and growth perspectives. Finally, the Balanced Scorecard does not question “what constitutes a firm”, while Sveiby looks at the firm from a “knowledge perspective.”

3.3 Managing Intellectual Capital

Two of the most cited frameworks for managing intellectual capital are those of Skandia (Skandia, 1994) and Dow Chemical (Petrash, 1996). These organisations have followed two different strategic routes to arrive at essentially the same destination - the successful management of intellectual assets to maximise their value adding potential for the organisation. Both models have been very successful at creating an awareness of the need to deploy, protect and renew intellectual assets.

Skandia, a large Swedish financial services company, developed a framework referred to as the Skandia Navigator (Figure 9), first appearing as a supplement to the company's 1994 annual report. It is based on the structure of concepts presented by Sveiby (1997) in the Invisible Balance Sheet. Skandia has taken it several steps further by incorporating a form of presentation introduced by Kaplan and Norton (the Balanced Scorecard) and applied it to several areas. Skandia's Navigator Framework is a major communications tool for strategic intent. The Skandia Navigator provides a means to better predict future performance, which in turn leads to improved

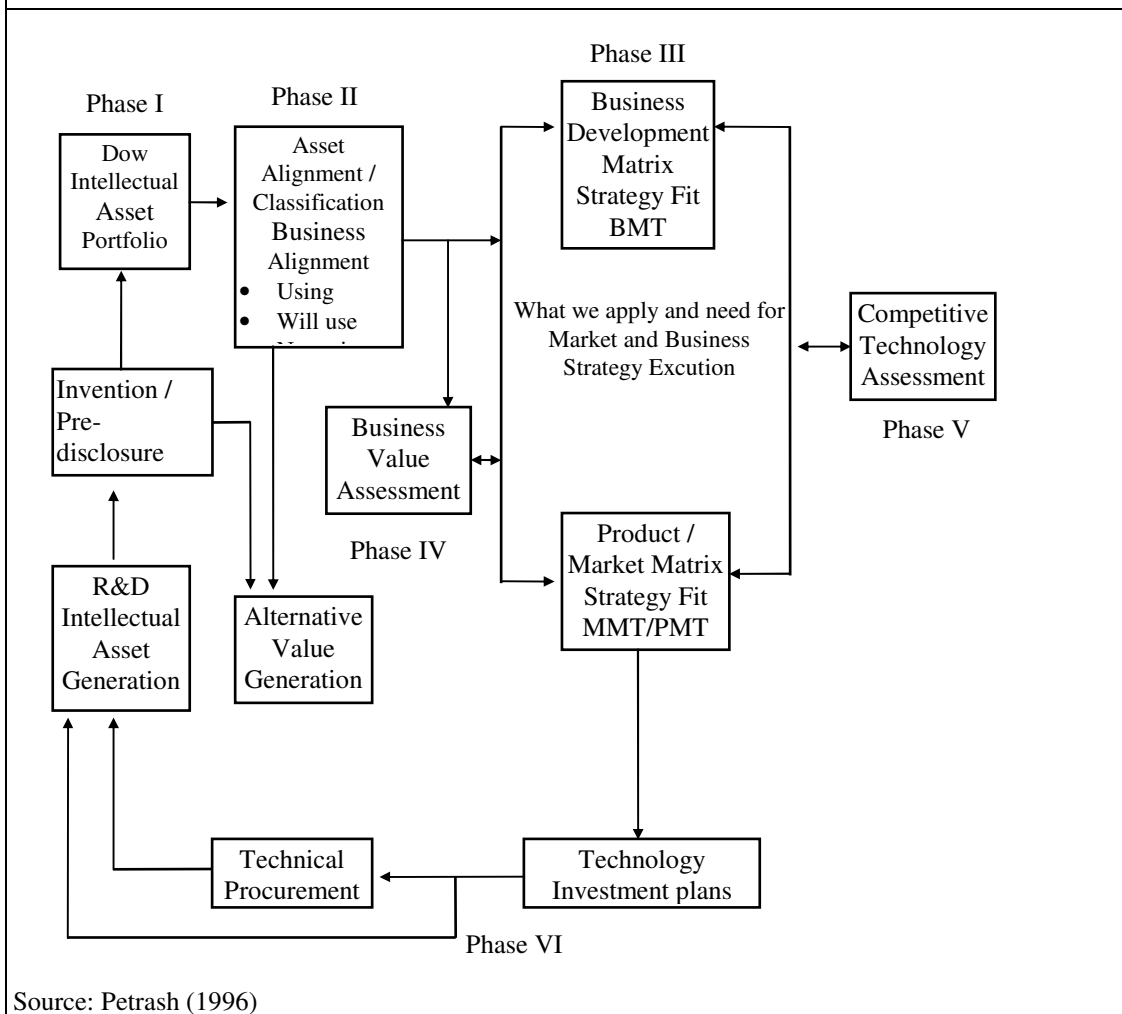
management decision-making. The five building blocks of Skandia's Navigator are customer, process, human, financial and renewal / development. The central focus is on people. Critical success factors are identified and then quantified in order for changes over time to be measured.



The Dow Chemical Company developed a vision, functional systems and tools for managing its intellectual assets which has been in use since 1993. Dow's Intellectual Asset Management Model focuses on the tactical management of intellectual assets to achieve strategic goals. It was first implemented in the area of patents. The Intellectual Asset Management framework (Figure 10) is a continuous and iterative process comprising of six phases

- Portfolio phase: Defines existing intellectual assets.
- Classification phase: Determines “use” of the intellectual assets in terms of what the business is (1) using (2) will use (3) will not use.
- Strategy phase: Integrating intellectual assets to maximise value and also to identify intellectual assets needed to fill any strategic gaps.
- Valuation phase: Developing Intellectual Asset Management alignment and strategy.
- Competitive assessment phase: Understanding intellectual assets' competitive environment.
- Investment phase: Procurement of technology necessary to achieve strategic business objectives.

Figure 10: Dow Intellectual Asset Management Model.



If the technology is obtained successfully the intellectual asset is then incorporated into the portfolio and the process is repeated.

Theoretical research has attempted to define and classify intellectual capital, but with limited success (Brooking, 1996; Roos et al., 1997; Sveiby, 1997; Edvinsson and Malone, 1997). A universal definition and classification model has yet to be agreed upon.

4. INDICATORS OF INTELLECTUAL CAPITAL

Intellectual capital indicators are identified and analysed in this section. Different measurement approaches / models are also identified.

An indicator is an object of measurement which such as employee satisfaction, customer loyalty, IT literacy and quality processes. Measurement difficulties arise because many intellectual capital indicators cannot be quantified in a monetary form. More innovative steps are required in some cases.

4.1 Categories of Indicators

Bournemann et al. (1999) identified three categories to classify indicators of intellectual capital - human capital (knowledge, skills, motivation, team relations), stakeholder relationships /customer capital (supplier and customer relations) and structural capital (databases, organisational structure, superior procedures). A fourth category, image or reputation capital, has also been suggested which influences the other types of indicators.

The Danish Trade and Industry Development Council (1997) examined the intellectual capital accounts of ten Scandinavian companies. Measurement of intellectual capital can be categorised into four types of indicators: human resources, customers, technology and processes. However, they are not strictly defined and may overlap in some cases. For example, processes are involved in the other three categories of indicators. Canibano et al. (1999b) also used these indicators as a basis for developing a measurement model. A sample list of the indicators, classified under these four headings are presented in the next four subsections.

4.1.1 Human Resources

Measurements with a human focus reflect human capital in firms and the renewal and development of those resources. They include a number of indexes to calculate employee competency, creativity and turnover. Table 5 provides a sample of these measures.

Table 5: Human Resource Indicators

Indicator	Method of Measurement
Seniority	Average number of years of employment in the company and /or position.
Education	Number of employees with education from school or university qualification.
Education costs	Annual cost of internal and external courses (including on-the-job training).
Employee satisfaction	Measured based on a questionnaire designed to collect information about job satisfaction, the work environment and company policy.
Value-added per employee	Profit plus pay / Number of employees

Source: Danish Trade and Industry Development Council (1997)

Table 6: Customer Indicators

Indicator	Method of Measurement
Distribution of turnover by markets, customer and products	The percentage distribution by products, customer and markets.
Marketing	Total expenses for marketing of the company's products. Total expenses for marketing / Total turnover
Customers per employee	Number of customers / Number of employees
Customer satisfaction	Measured based on a questionnaire investigating the motivation, helpfulness and reliability of staff.
Repeat business	Share of turnover related to existing customers. Share of customers with X years business with the company.

Source: Danish Trade and Industry Development Council (1997)

4.1.2 Customer

The customer focus assesses the value of customers to companies. Measures reflect market share, customer service and support costs. Examples of customer indicators are shown in Table 6.

4.1.3 Technology

Effective use of technology - IT use and spending per employee - within the firm is also measured. Technology indicators are shown in Table 7:

Table 7: Technology Indicators	
Indicator	Method of Measurement
Total IT investment	Cost of purchasing and servicing of hardware and software.
IT literacy	Number of employees with IT-related education and literacy.
Number of IT work stations	Number of supported work stations. Number of PC work stations / Number of employees
Source: Danish Trade and Industry Development Council (1997)	

4.1.4 Processes

The process focus is on efficiency measures such as time, workload, error ratios and quality. Table 8 shows a sample of indicators capturing these elements.

Table 8: Process Indicators

Indicator	Method of Measurement
Cost per process	Distribution of total cost per process.
Staff distribution by processes	Distribution of employees by processes.
Investment in offices and workshops	Total expenses for upgrading of equipment.
Lead time	Number of working days from commencing production to completion.
Product development time	Length of time from the product idea phase to the completion of its development.
Quality	Measured by means of a questionnaire inquiring whether the product fulfilled a reasonable expectation of quality.
Error rate	Number of production errors / Total production.
Customer response time	Length of time between receiving an order to its delivery.
Reputation of the company	Various parties' assessment of the company's production methods, employee relations, contribution to society etc. measured using a questionnaire.

Source: Danish Trade and Industry Development Council (1997)

4.2 Types of Indicators

The Danish Trade and Industry Development Council (1997) identified three types of intellectual capital indicators: *what is there*, *what is done* and *what happens*:

- *What is there* - company's resources - e.g. human resources, customers, processes and technology, usually measured in a descriptive, non-financial statement.
- *What is done* – how the intellectual capital management system works – e.g. human resource development, customer care, access to technology.
- *What happens* – whether the use of intellectual capital is leading to efficient products and services requested by customers e.g. customer satisfaction, IT literacy in the company, business process efficiency.

Examples of the types of indicators are shown in Table 9.

Table 9: Types of Intellectual Capital Indicators			
Category	What there is Statistical information	What is done Internal key figures	What happens Effect goals
Human Resources	*Seniority *Education *Education costs	*Share of employees with development plan *No. of development days per employee *Education costs per employee	*Employee satisfaction *Human resource turnover *Increase in value per employee
Customers	*Distribution of turnover on markets and products *Marketing expenses	*Customers per employee *Marketing expenses per cost DKK *Administration costs per marketing DKK	*Customer satisfaction *Repeat purchase *Customer with long- term relations
Technology	*Total IT investments *No. internal/external IT customers	*Pcs per employee *IT expenses per employee	*IT literacy
Processes	*Costs per process *HR distribution by processes *Investments in R&D infrastructure	*Lead time *Product development time *Running-in expenses for new organisational units	*Error rate *Waiting time *Quality *Reputation of the company
Source: Danish Trade and Industry Development Council (1997)			

4.3 External Reporting of Intellectual Capital

Guthrie et al. (1999) carried out a content analysis of the annual reports to assess the extent of intellectual reporting of large Australian companies. Sveiby's (1997) Intangible Asset Monitor was used to classify results into 24 selected intellectual capital indicators. Brennan (1999) replicated the study in Ireland. Table 10 compares the finding of the two studies. Both projects found that intellectual capital is rarely reported in annual reports and, when reported, a consistent framework was found to be lacking. The frequency of reporting the different intellectual capital indicators compared poorly between the two studies. The Australian study found entrepreneurial spirit to be the most frequently reported, followed by customers and management processes. In contrast, Brennan (1999) found very few references to employees and entrepreneurial spirit. The Irish study also found customers to rank highly along with

business collaborations. The differences in the size of the enterprises may, in part, account for the variances in the results. The top 19 Australian listed companies would be considerably larger than the Irish companies selected for this study. Cultural differences between the two countries may also be a factor.

Table 10: Frequency of Reporting IC Indicators		
Indicators	Frequency %	
	Guthrie et al. (1999)	Brennan (1999)
Internal (Structural) Capital		
Intellectual Property		
Patents	15	27
Copyrights	5	9
Trademarks	10	9
Infrastructure Assets		
Management philosophy	60	9
Corporate culture	30	0
Management processes	75	27
Information systems	50	27
Networking systems	15	0
Financial relations	5	0
External (Customer/Relational) Capital		
Brands	45	0
Customers	80	45
Customer loyalty	35	9
Company names	25	0
Distribution channels	50	36
Business Collaborations	65	45
Licensing Agreements	40	27
Favourable contracts	5	18
Employee Competence (Human Capital)		
Know-how	30	36
Education	30	9
Vocational qualification	5	0
Work-related knowledge	60	18
Work-related competencies	45	0
Entrepreneurial spirit	95	18
Source: Brennan (1999)		

4.4 Usefulness of Indicators

Mavrinac and Siesfield (1997), Miller et al. (1999) and Bournemann et al. (1999) examined the usefulness / importance of intellectual capital indicators. A comparison of the three studies is shown in Table 11. The findings showed that managers perceived human capital indicators as being the most useful. Miller et al. (1999) found the top four indicators to be leadership skills, employee satisfaction, employee

motivation and years of experience. The results of Bournemann et al.'s study support the findings of Mavrinac and Siesfield (1997) that indicators for strategy implementation, market share, innovativeness and the company's ability to attract and retain high calibre employees are crucial. Managers of all the companies felt that structural indicators were least useful.

Results for customer capital indicators suggest that certain classifications of intellectual capital indicators depend upon the nature of the business. For example, customer satisfaction was only ranked tenth in Mavrinac and Siesfield (1997). The findings point towards a need for companies to adopt a more comprehensive approach to managing intellectual capital. Successful companies were also found to manage intellectual capital better than less successful firms.

Table 11: Comparison of the Usefulness of IC Indicators			
Indicator	Mavrinac and Siesfield (1997)	Ranking Miller et al. (1999)	Bournemann et al. (1999)
Human			
Leadership skills		1	
Execution of corporate strategy	1		3
Management credibility	2		
Employee motivation		3	
Employee satisfaction		4	
Years of experience in profession		6	
Ability to attract employees	5		6
Management experience	7		
Quality of compensation policies	8		5
IT literacy of staff		8	
Customer/Relational			
Quality perceived by the customer			2
Customer satisfaction		2	1
Growth in business/service volume		5	
Market share	6		8
Number of customer complaints		7	
Structural			
Quality of corporate strategy	3		4
Innovativeness	4		7
Quality processes			

4.5 Measurement Alternatives

A number of measurement alternatives for intellectual capital have been suggested in the literature.

The first assumes that the value of the intellectual capital assets is the difference between the market value of the firm and the book value. There are several difficulties with this approach. Firstly, the difference between market and book value is not entirely comprised of intangibles. In addition, company share prices can fluctuate, distorting the value of intangibles. Thirdly, this method provides a single aggregate measure, not allowing for an analysis of the individual components intellectual capital.

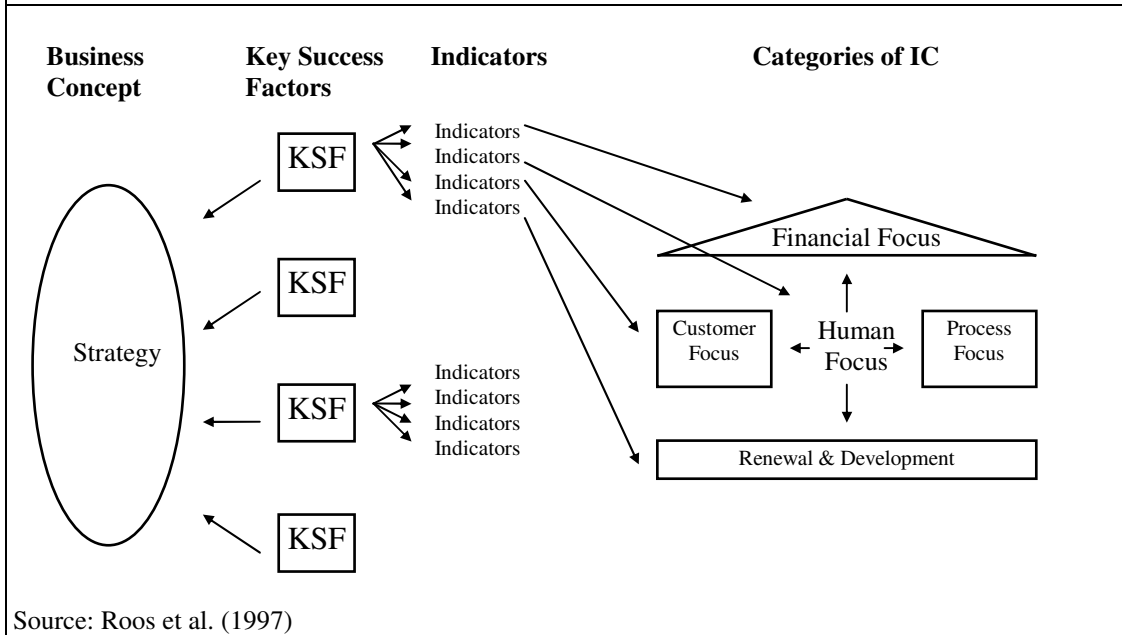
A second approach is to use an intellectual capital index. Key success factors are identified and are weighted to enable a single summary index to be calculated.

The Skandia Navigator is another method of measuring intellectual capital. It consists of a list of 164 different indicators classified under financial, customer, process, renewal and development and human focus.

Roos et al. (1997) have developed the Process Model (Figure 11) for measuring intellectual capital. The following stages are involved:

1. The company's mission is defined in more quantifiable terms, to ensure understanding of what the company is about and where it is going.
2. The long-term goals are used as guidelines for identifying critical success factors.
3. Indicators are then identified which relate to the key success factors.
4. The information from these measures are then allocated to the different intellectual capital categories.

Figure 11: The Process Model



Canibano et al. (1999b) define intangibles in terms of *intangible resources* and *intangible investments*. The intangible resources of a company can be measured at a given moment in time. Intangible resources can be divided into *assets* and *skills*. Assets consist of intellectual property, rights, trademarks and databases, while skills include capabilities and competencies such as human capital. Intangible investments are those activities a company undertakes to acquire or internally produce intangible resources. There are two types of intangible investments. Type A activities are undertaken to acquire, produce or increase intangible resources e.g. training, R&D, patent acquisitions. Type B activities are those which measure or manage intangible resources e.g. a survey to establish employee satisfaction. Figure 12 shows the model developed by Canibano et al. (1999b), which has yet to be tested. It functions as follows:

- Level 0: Stock of intangible resources are measured in terms of assets or skills.
- Level 1: An analysis takes place of whether the activity (type A or B) is carried out or not and the importance the company attaches to that activity.
- Level 2: The cost of the activity, in financial terms, is considered and whether that cost is an investment or an expense of the period.
- Level 3: The model inquires if the company analyses the effects of the costs identified at the second level.

Figure 12: Analysis of Intangibles: A model

INTANGIBLE RESOURCES: Account of stock at a given moment

Categories Level	Assets	Skills
O: Starting point/ending point	Financial indicator	Non-financial

INTANGIBLE INVESTMENTS: Activities during a given period

Type of Activities Level	A: Investments to acquire or produce intangible resources	B: Investments to measure and manage intangible resources
1: Developed	Non-financial indicator	Non-financial indicator
2: Cost figured out	Financial indicator	Financial indicator
3: Effect assessed	Non-financial indicator Financial indicator	Non-financial indicator Financial indicator

Source: Canibano et al. (1999b)

The Skandia Navigator and the models proposed by Roos et al. (1997) and Canibano et al. (1999b) measure intellectual capital using numerous intellectual capital indicators. The Skandia Navigator measures intellectual capital by means of a long list of intellectual capital indicators. The other two models have different approaches for identifying a set of suitable intellectual capital indicators. Roos et al. (1997) links the company strategy to the indicators. Canibano et al. (1999b) does not use this as a starting point but instead begins by taking stock of the company's intangible resources. The Process Model categories indicators according to the Skandia Navigator Framework, whereas Canibano et al. (1999b) makes the distinction between intangible resources (assets and skills) and intangible investments (those to acquire / produce intangible resources and those to measure and manage intangible resources). Canibano et al. (1999b) makes a clear

distinction between financial and non-financial indicators, which is not incorporated in the Process Model.

4.5.1 Financial Indicators

The use of financial measures is made easier through the availability of existing documentation. It is the most familiar form of measurement to both external and internal decision-makers. It also allows for a high degree of comparability between firms. The main drawbacks of financial measures are that they are based on historical data and are also dependent on the continuity of existing markets for its products. In addition, by using discounted NPVs for capital investment decisions the future is systematically devalued.

4.5.2 Non-financial Indicators

If we measure the new with the tools of the old, we will not “see” the new (Sveiby, 1998b). Sveiby (1998b) advocates the use of non-financial indicator for measuring intellectual capital assets. Intellectual capital is essentially non-monetary in nature. Therefore, if information about intellectual capital is to be useful and practical to managers a comprehensive non-financial system is required, as the traditional accounting system is no longer adequate. Bournemann et al. (1999) were also of the opinion that there were major differences between financial accounting and the measurement of intellectual capital. The traditional accounting system is historic and focuses on monetary amounts, while intellectual capital is future oriented and focuses on qualities, making it difficult to value such assets in monetary terms.

Research to date has yet to conclude on how to best measure intellectual capital. The studies of indicators show that companies rank their importance differently. The importance and use of non-financial indicators was supported in the research (Sveiby, 1998b; Bournemann et al., 1999). The models suggest that companies themselves should decide which intellectual capital indicators to use. However, this approach does not allow for consistency among firms, thus leading to low comparability and a difficulty in creating a standard which does not allow different interpretations.

5. METHODOLOGIES IN PRIOR RESEARCH

Table 3 lists the research methodology employed in empirical research studies of intellectual capital. The main methods of data collection are case studies, interviews, questionnaires and surveys of annual reports. Other secondary methods such as focus groups, survey of accounts, interviews and case studies on a smaller scale also provided a means of gathering information.

Table 3 also summarises the type of company selected - company size, industry and other common characteristics of samples. Many of the companies selected to take part in the research were knowledge-based firms known for their efforts in managing their intellectual capital. Samples consisted of small numbers of firms - three companies for some of the case studies.

5.1 Case studies

Case studies were the most popular method for data collection - used in eight research studies examined. Johanson et al. (1999b) and Johanson (1999) used qualitative exploratory case studies. A sample of 11 large / medium-sized Swedish companies were selected because they were considered to be experienced and advanced in their measurement of intangibles. Semi-structured interviews and internal documents were used to analyse the measurement and control process. The Danish Agency for Trade and Industry (1999) is conducting case studies of 19 companies.

Achten (1999) employed a case study approach in his research of the transparency of intangible production assets based on three medium-sized enterprises - developers / producers of flower bulbs, branded software and seeds - took part in the study. A case study approach, involving three enterprises with between 200-600 employees, was used by Andriessen et al. (1999). The companies were mainly service-providers (electrical engineering, transport and financial services) and were fairly knowledge-intensive with a large number of graduate employees. The study was conducted in close co-operation with the companies. The research took about ten weeks to complete. Each company was required to make 30 to 50 hours available for interviewing. Specialists devoted between 100 to 200 hours to the research project.

Backhuijs et al. (1999) also used a case study approach. A core team from each of the three participating businesses was set up to work with the project team. Canibano et al. (1999b) based their research on only one company. As a supplementary method of data collection, Guthrie et al. (1999) is conducting seven case studies, in addition to an extensive survey of annual reports.

5.2 Questionnaires and Interviews

Questionnaires were also popular, employed in five of the research projects. The main problem associated with questionnaires is low response rate. Bournemann's et al. (1999) mailed 650 questionnaires to companies, with a return rate of 45, of which, 40 could be used for interpretation. The sample of 40 companies was representative of different sized enterprises and across different industries. Findings were supplemented by surveys of annual reports and interviews. Miller et al. (1999) surveyed by questionnaire 226 managers in four diverse Canadian companies. Two focus groups provided an additional method for obtaining more detailed data. Each group consisted of 7-10 people. Pre-set questions were sent to participants prior to the group meeting. The groups were structured in such a way as to facilitate flexibility in answering questions.

Bukh et al. (1999) conducted their research on 23 firms working with the Danish Agency for Development of Trade and Industry. The firms were interviewed twice a year in 1998 and 1999. In addition, a questionnaire was completed by the firms. The researchers also had access to internal documents such as agendas, meeting notes and preliminary versions of intellectual capital statements.

Hoogendoorn et al. (1999) interviewed various officials from three sample organisations. In addition, some of the companies views were then recorded by means of a questionnaire.

The Danish Trade and Industry Development Council (1997) conducted a study of ten intellectual capital accounts of Scandinavian companies. It was carried out by means of an interviewing process. Five questions were posed to the companies, to enable a comparison of their intellectual capital accounts. Prior to the study, a preliminary study of four companies was carried out.

5.3 Survey of Annual Reports

Guthrie et al. (1999) also surveyed the annual reports of 20 Australian companies. They also conducted seven case studies to get a more in-depth understanding of how companies can manage their intellectual capital. Brennan (1999) replicated Guthrie et al's. (1999) methodology. A survey of accounts approach was used as a secondary method of data collection by Bournemann et al. (1999).

6. CONCLUSION

With some research projects still in progress, proposals for developing guidelines and accounting standards for intellectual capital are at an early stage. Despite this, some of the possible implications of such a standard (if developed) are briefly discussed in this section.

The primary goal of much of the research is to establish a set of guidelines for managing, measuring and reporting on intellectual capital. One of the first steps in this process is to examine the intellectual capital frameworks. Most researchers agree that intellectual capital should be classified under the following three headings - internal, external and human capital. However, the relationship between these classification categories differ across the frameworks.

Intellectual capital must then be measured in a way that is useful for decision-making. Intellectual capital indicators provide a means of measuring intellectual capital variables. Research is important for developing a set of indicators to adequately measure intellectual capital. Sveiby points out that non-financial measures in some cases may prove to be more useful. However, a reporting framework with non-financial measures alongside financial measures is needed. One such model is that developed by Canibano et al. (1999b).

6.3 Policy Implications

The standard setting bodies are currently faced with the task of creating appropriate accounting regulations to adequately reflect the value of intangibles. With most current accounting systems failing to record the value of intangible assets, new guidelines are

required. However, managers, investors and other stakeholders have conflicting interests which need to be considered in the policy setting process.

6.3.1 Standards - Mandatory/Voluntary

The International Accounting Standards Committee and other national standard setting bodies have taken a very conservative approach to accounting for intangibles. It is unlikely that the standard setters will take the lead in developing a standard for intellectual capital. The main difficulty associated with setting a standard is measuring intellectual capital. A set of indicators which values intellectual capital and allows for comparability among firms has yet to be identified. Thus, a set of intermediary guidelines for companies may be the most appropriate for the present.

Grojer and Johanson (1999) suggest that a compulsory standard could potentially be more harmful, when intellectual capital is undergoing a period of rapid change. A voluntary standard would be more appropriate, which can be changed / abandoned when necessary. Grojer and Johanson (1999) advocate voluntary standardised disclosure for intellectual capital to increase knowledge about the subject.

Sveiby (1998) proposes the first possible standard for measuring and presenting intellectual capital, involving the following steps:

1. The organisation monitors and presents itself using a scorecard approach with indicators.
2. Intangible assets are classified under three headings: external to the organisation, internal to the organisation and individual.
3. Indicators of financial or tangible assets are presented in a fourth category.
4. Indicators both financial and non-financial.
5. The indicators are presented together in a separate section or supplement.
6. The traditional accounting system and the rest of the annual report remains unchanged.

6.3.2 Guidelines

The MERITUM project expects to produce a set of guidelines for reporting intellectual capital. A sample of companies is currently being studied to establish best practice.

Ferrier and McKenzie (1999) propose the introduction of an Enterprise Information and Self-evaluation Kit. The purpose of the kit is to help formalise and speed up the dissemination process by creating an accessible bank of information which companies can draw on. If successful, its benefits would include reduced costs for enterprises and best practice approaches would become quickly and widely used. This would increase comparability between firms. If used effectively, it is hoped that the kit can provide the opportunity for organisations to learn from each other about the measuring and reporting of intellectual capital.

6.3.3 Auditing

Auditing intellectual capital information would make it more credible, improving users reliance on it. Such assets, due to their nature, cannot be audited in the same manner as tangible assets. New procedures to validate the measurement techniques for intellectual capital need to be established. Grojer and Johanson (1999) suggest that new auditing methods is an area requiring research.

6.4 Needs of Capital Markets and Disclosure to Competitors

Brabazon (1997) points out that intellectual capital is an important source of competitive advantage for companies. However, capital markets are increasingly interested in information about intellectual capital. Grojer and Johanson (1999) point out that the disclosure of information about intellectual capital would improve the efficiency of the capital markets. The cost of capital would be reduced as greater transparency increases stock prices. However, Grojer and Johanson (1999) suggest that companies are reluctant to do this for a number of reasons. Companies may underestimate the importance of intellectual capital assets and choose not to disclose them. On the other hand, the data may be too important to disclose. Studies to date (Guthrie et al., 1999; Brennan, 1999) show that companies are slow to report on their intellectual capital, and when they do, it is usually in the form of a qualitative statement.

As there are no mandatory standards for intellectual capital, information disclosed voluntarily is also available to competitors, and competitive advantages can quickly disappear. Therefore, the needs of the capital markets need to be balanced with the risk of competitors losing a competitive edge.

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