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Paula Kujansivu

Intellectual Capital Management

Understanding Why Finnish Companies Do Not Apply Intellectual
Capital Management Models



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ABSTRACT

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Keywords: application, intellectual capital, intellectual capital management, model, practice

In recent years intellectual capital research has introduced a number of models to support and guide managers towards the management of their company’s intellectual capital. However, there is a lack of practical applications of the proposed models. The objective of this research is to understand why companies do not apply models that are commonly known in the intellectual capital literature. The focus is on Finnish companies.

The general research objective is divided into four research questions taking different perspectives on the same phenomenon: the importance of intellectual capital and its management, the applicability of intellectual capital management models, the suitability of typical general management approaches for intellectual capital management and factors affecting the application of intellectual capital management models. The research questions are studied through eight scientific publications and adopting diverse research methods. The empirical material includes interviews, a large amount of quantitative data from the financial statements of companies and case studies in which action research was used.

The results suggest that intellectual capital is important in Finnish companies (in terms of its monetary value and its impact on productivity) and managers wish to have tools to support intellectual capital management, particularly internal management purposes. The research shows that four common intellectual capital management models, the Calculated Intangible Value, the Value Added Intellectual Coefficient, the Meritum Guidelines and the Danish Guidelines, are applicable in practice. However, intellectual capital management can also be applied by integrating it into business process management or balanced performance measurement. The decision whether to use an intellectual capital management model is affected by numerous factors, e.g. managerial need, existing management systems and resources available.

The main contributions of the research are the practical applications of the rarely used intellectual capital management models and descriptions of how to apply intellectual capital management in a company without any intellectual capital management model. Empirical evidence on the relevance of intellectual capital to Finnish companies and its linkage with productivity and profitability are also valuable contributions. A further contribution of the research is the identification of the factors affecting the application of intellectual capital

management models. Moreover, the research sheds light on the relevance of developing a separate field of intellectual capital research.

TIIVISTELMÄ

Viimeisten vuosien aikana aineettoman pääoman (engl. intellectual capital) kirjallisuudessa on esitelty paljon malleja, joilla tuetaan ja ohjataan johtajia yrityksen aineettoman pääoman johtamisessa. Mallien soveltamisesta käytäntöön ei kuitenkaan ole kokemuksia. Tämän tutkimuksen tavoitteena on ymmärtää, miksi yrityksissä ei sovelleta malleja, jotka ovat yleisesti tunnettuja aineettoman pääoman kirjallisuudessa. Tutkimuksessa keskitytään suomalaisiin yrityksiin.

Yleinen tutkimustavoite on jaettu neljään tutkimuskysymykseen, jotka tarkastelevat samaa tutkimusongelmaa eri näkökulmista: aineettoman pääoman ja sen johtamisen tärkeys, aineettoman pääoman johtamismallien sovellettavuus, tyypillisten yleisten johtamistapojen soveltuvuus aineettoman pääoman johtamiseen sekä tekijät, jotka vaikuttavat aineettoman pääoman johtamismallien soveltamiseen. Tutkimuskysymyksiin vastataan kahdeksan tieteellisen artikkelin avulla hyödyntäen erilaisia tutkimusmenetelmiä. Työn empiirinen aineisto sisältää haastatteluja, laajan tilinpäätöstietoihin perustuvan aineiston ja useita tapauksia, joissa on sovellettu toimintatutkimusta.

Tulosten mukaan aineeton pääoma on tärkeä suomalaisille yrityksille sekä rahallisen arvon että tuottavuusvaikutusten näkökulmasta. Johtajat kokevat tarvitsevansa työkaluja aineettoman pääomansa johtamisen tueksi, erityisesti sisäiseen kehitystyöhön. Tutkimus osoittaa, että neljä aineettoman pääoman johtamismallia, Calculated Intangible Value, Value Added Intellectual Coefficient, Meritum Guidelines ja Danish Guidelines, ovat sovellettavissa käytäntöön. Aineettoman pääoman johtaminen voidaan kuitenkin toteuttaa myös linkittämällä se prosessijohtamiseen tai tasapainotettuun suorituskyvyn mittaamiseen. Useat eri tekijät, kuten johtamisen tarve, käytössä olevat johtamisjärjestelmät ja resurssit, vaikuttavat päätökseen aineettoman pääoman johtamismallin hyödyntämisestä.

Tutkimuksen keskeisinä kontribuutioina ovat harvoin käytettyjen aineettoman pääoman johtamismallien soveltaminen käytäntöön sekä kuvaukset aineettoman pääoman johtamisen toteuttamisesta ilman varsinaista aineettoman pääoman johtamismallia. Empiiriset osoitukset aineettoman pääoman merkityksestä suomalaisissa yrityksissä sekä sen yhteydestä tuottavuuteen ja kannattavuuteen ovat myös merkittäviä kontribuutioita. Tutkimuksessa on myös määritetty aineettoman pääoman johtamismallien soveltamiseen vaikuttavia tekijöitä. Lisäksi tutkimus tuo uutta tietoa erillisen aineettoman pääoman tutkimuskentän merkityksestä.

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Lahti, July 2nd 2008

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- I Lönnqvist, A., Kujansivu, P. and Sillanpää, V., Intellectual Capital Management Practices in Finnish Companies, *International Journal of Innovation and Regional Development* (accepted for publication).
- II Kujansivu, P. and Lönnqvist, A. (2007) Investigating the Value and Efficiency of Intellectual Capital, *Journal of Intellectual Capital*, Vol. 8, No. 2, pp. 272–287.
- III Kujansivu, P. and Lönnqvist, A. (2007) How Do Investments in Intellectual Capital Create Profits? *International Journal of Learning and Intellectual Capital*, Vol. 4, No. 3, pp. 256–275.
- IV Väisänen, J., Kujansivu, P. and Lönnqvist, A. (2007) Effects of Intellectual Capital Investments on Productivity and Profitability, *International Journal of Learning and Intellectual Capital*, Vol. 4, No. 4, pp. 377–391.
- V Lönnqvist, A. and Kujansivu, P. (2007) Designing and Implementing an Intellectual Capital Management System: Applying the Meritum Guidelines in Practice, *International Journal of Knowledge Management Studies*, Vol. 1, Nos. 3/4, pp. 276–291.
- VI Kujansivu, P. and Lönnqvist, A. (2008) Business Process Management as a Tool for Intellectual Capital Management, *Knowledge and Process Management*, Vol. 15, No. 3 (forthcoming).
- VII Mettänen, P. (2005) Design and Implementation of a Performance Measurement System for a Research Organization, *Production Planning & Control*, Vol. 16, No. 2, pp. 178–188.
- VIII Kujansivu, P. (2008) Operationalising Intellectual Capital Management – Choosing a Suitable Approach, *Measuring Business Excellence*, Vol. 12, No. 2, pp. 25–37.

PART I: INTRODUCTORY ESSAY

1 INTRODUCTION

1.1 Motivation

An organisation's intellectual capital is composed of various intangible resources, such as employee's competence, organisation's image, customer relationships, business processes and management philosophies. Intellectual capital plays an important role in companies' and other organisations' value creation (e.g. Carlucci et al., 2004; Skoog, 2003). Furthermore, the competitive advantage and success of companies (e.g. productivity, growth and performance) depends heavily on their ability to manage their intellectual capital (e.g. Arora, 2002; Bontis, 1998; Chen et al., 2004; O'Regan & O'Donnell, 2000; Teece, 2000; Wiig, 1997a). It is suggested that more than half of the value created by a company comes from the management of intellectual capital (e.g. Dzinkowski, 2000). Other kinds of benefit obtained from the management of intellectual capital are profit generation, strategic positioning, customer loyalty, cost reductions and improved productivity (Harrison & Sullivan, 2000). Thus, in light of the literature, it is necessary to manage intellectual capital in order to make sure that it is utilised efficiently.

As a concept intellectual capital management is fairly new and ambiguous. It can be used to refer to various activities in an organisation (see e.g. Edvinsson & Sullivan, 1996), such as identification, measurement, valuation, acquisition and reporting intellectual capital. In recent years the intellectual capital literature has produced numerous models to support activities. However, the practice of applying these models seems to be a fairly new issue in many companies. Managers have acknowledged the importance of their intellectual capital but the management emphasis and the attention given is usually far less (e.g. Ordóñez de Pablos, 2004b; Wiig, 1997a). The foregoing is supported by the findings of the study carried by the author in 2006. Once the need for managing intellectual capital is recognised, how do you choose among many alternative models suggested by different sources (Bontis et al., 1999)?

In general, the relationship between management research and management practice is problematic. The management research community is geared towards developing the capability to produce ever more scientifically credible research output. At the same time the practitioner community is increasingly concerned with results-oriented, practically useful guidance. (MacLean & MacIntosh, 2002) However, many typical general management approaches, such as balanced performance measurement and total quality management, seem to have attained practice and they have been applied in companies and other organisations (see e.g. Terziokowski et al., 1996). Why is it not the case with intellectual capital management models?

The goal of this thesis is to understand why companies do not apply models that are commonly known in the intellectual capital literature. The focus is on Finnish companies. The thesis is based on eight scientific papers and consists of two parts. Part I contains four

chapters. Chapter 1 is the introduction for this research. In order to understand the multifaceted research field, this chapter provides various viewpoints to the theme. In Chapter 2 the definition of the research problem and questions are presented. The scope of the research and the methodological setting are also included in Chapter 2. In the end of Chapter 2 the composition of the papers and brief summaries of them are provided. Chapter 3 presents the results in relation to the posed research questions. A summary of the findings is included in Chapter 3. Finally, Chapter 4 contains concluding remarks and discussion on the results provided in the previous chapter. It summarises the contribution of the thesis and presents remarks concerning the evaluation of the research. In addition, practical implications and further research suggestions are proposed. The original publications are presented in Part II, at the end of this thesis.

1.2 Concepts

1.2.1 Intellectual capital

Science continually creates new concepts, combining and separating objects with new names (Takala & Lämsä, 2005). The concept of intellectual capital¹ emerged in the early 1990's and in the past decade² it has become a commonly studied research area³ (see e.g. Nonaka & Peltokorpi, 2006). As a research field intellectual capital is somewhat unestablished and it can be regarded as a research theme rather than an independent discipline (Zambon, 2006). According to Kianto (2007) the research theme of intellectual capital is characterised by a lack of consensually defined boundaries.

Intellectual capital is used to refer to various intangible sources of value, such as employees' expertise, publicity and organisation's values. Although the concept of intellectual capital has received much attention there is a lack of consensus on its components and definitions (Huang et al., 2007; O'Regan & O'Donnell, 2000). It is possible for the same concepts to have different meanings in different contexts (Takala & Lämsä, 2005) and between different people (Emory, 1985, p. 24; Näsi, 1980, p. 6). However, the terminology related to the theme can be very confusing (see e.g. Andriessen, 2001; Petty & Guthrie, 2000). Marr (2005, p. xiv) states that there is "little agreement and much confusion regarding the definition". Consequently, in recent years many researchers (e.g. Andriessen, 2006; Jørgensen, 2006) still endeavoured to clarify the concept.

¹ The term "intellectual capital" was first published by John Kenneth Galbraith (see e.g. Edvinsson & Sullivan, 1996).

² Many researchers (e.g. Edvinsson, 2002, pp. 29–31; Petty & Guthrie, 2000; Sullivan, 2000) have analysed the development of the research theme and succeeded in providing summaries of historical overviews. Therefore, it is not relevant to present the development of intellectual capital research in this context.

³ At present there are two quite recent publications that focus particularly on intellectual capital, *Journal of Intellectual Capital* (established in 2002) and *International Journal of Learning and Intellectual Capital* (established in 2004). There are also many recurrently organised international conferences on intellectual capital, such as *International Conference on Intellectual Capital, Knowledge Management and Organisational Learning* (ICICKM), *International Forum on Knowledge assets Dynamics* (IFKAD) and *Visualising, Measuring, and Managing Intangibles and Intellectual Capital* organised by EIASM.

The concept of intellectual capital is complex for a number of reasons. There is a diverse group of terms that are used to refer to intellectual capital. The following terms are often used interchangeably in the literature to refer to the same phenomenon:

- *intellectual capital* (e.g. Brooking, 1996; Edvinsson, 2002; Edvinsson & Malone, 1997; Petty & Guthrie, 2000; Roos et al., 1997; 2005; Stewart, 1997; 2001; Ståhle & Grönroos, 2000; Thorleifsdottir & Claessen, 2006; Van Buren, 1999)
- *intangible assets* (e.g. Hussi & Ahonen, 2002; Lev, 2001; Sveiby, 1997)
- *knowledge assets* (e.g. Kaplan & Norton, 2004; Marr & Schiuma, 2001; Teece, 2000)
- *intangibles* (e.g. Blair & Wallman, 2001; Lev, 2001; Meritum, 2001).

Intellectual capital is a multi-disciplinary concept and the content of it varies depending on the approach. Most authors use the concept intellectual capital to refer to organisation-wide intangible resources that are combined and valuable to an organisation (e.g. Edvinsson & Malone, 1997; Lev, 2001; Roos et al., 1997). However, some authors (e.g. Ulrich, 1998) regard intellectual capital purely as an individual level construct (e.g. competence of individuals). Chatzkel (2004) suggests that intellectual capital may be approached at different levels, namely individual, company and society levels.

At the company level several ways to divide intellectual capital into its sub-categories have been proposed. Most intellectual capital models (e.g. Jacobsen et al., 2005; Seetharaman et al., 2004; Stewart, 1997; Sveiby, 1997; Wallace & Saint-Onge, 2002) assume three categories concerned with external relationships, with internal infrastructure and with employees. Nevertheless, there are also other ways to divide intellectual capital. For example, according to categorisations by Edvinsson and Malone (1997), Marr and Schiuma (2001) and OECD (1999) the intellectual capital of an organisation contains two main categories, whereas, among others, Brooking (1996) and Van Buren (1999) use four categories for intellectual capital. Despite the number, names and exact content of various categories, the idea remains the same. Categorising intellectual capital helps companies to understand what it is (Huang et al., 2007).

Intellectual capital can also be classified at the basis of its temporal dimension (Swart, 2006). It can be viewed as a static and dynamic phenomenon. Dynamic refers to intellectual capital as something that can create value in the future or has potential to create value whereas static refers to intellectual capital as crucial to company's performance because it is of value in itself. Thus the dynamic dimension of intellectual capital focuses not on the intangible resources per se but on the organisational capabilities to leverage, develop and change intangible resources for value creation (Kianto, 2007). Quite similarly, Ståhle and Grönroos (2000, p. 199) divided intellectual capital into two parts, namely realised and potential intellectual capital. Hussi and Ahonen (2002) discussed generative and commercially exploitable intangible assets. The terms, definitions and categories used by different authors are summarised in the table presented in Appendix 1.

The main categories of intellectual capital have been further divided in many ways. Among others, Carson et al. (2004) identify three main classes (relational, human and structural capital), each of which are further divided into two sub-classes: relational capital is classified into customer and competitor capital, human capital includes personal attributes and skills, and finally, structural capital is divided into fluid and crystallised structural capital. Marr and Schiuma (2001) divide the two main groups further into four sub-classes: stakeholder

relationships, human resources, physical infrastructure and virtual infrastructure. Instead, Huang et al. (2007) expand the three main classes into eight facets. Moreover, sub-classes may include several individual factors (experience, reputation and company's culture etc.).

Although the categorisations as a whole are quite alike, there are also certain differences between various categorisations. For example, most authors include immaterial properties in intellectual capital either as one of the main classes (e.g. Brooking, 1996) or as an individual factor included in the structural capital component (e.g. Stewart, 1997). On the other hand, among others Bontis (1999) excludes immaterial properties from intellectual capital, stating that immaterial property is a protected asset and has a legal definition (unlike the other components of intellectual capital). Another separate part distinguished from the three typical classes is innovation capital (e.g. Van Buren, 1999).

The categorisations are useful when defining and explaining what we are talking about. However, they are not problematic. As Andriessen (2001) states, they may hamper us from seeing the wood for the trees and identifying the effects of combining different types of intangible resources. Thus separating different forms of intellectual capital we may lose the synergy and linkage between the categories. Instead, it is the synergy or interplay between various intangible resources that creates uniqueness, successful performance and wealth – not the individual resources (e.g. Bontis, 1998; Bueno et al., 2006; Gupta & Roos, 2001; Hussi & Ahonen, 2002). There exist cause-effect relationships among various elements of intellectual capital (e.g. Andreou & Bontis, 2007; Wang & Chang, 2005; Wu et al., 2007). It is also important to acknowledge that intellectual capital is context and organisation specific (e.g. Bontis et al., 1999; Edvinsson & Sullivan, 1996) and therefore each organisation should pay attention to their own critical intellectual capital, instead of trying to adjust it to the various groups. Marr and Adams (2004) argue that the different classifications are rather confusing for practitioners who want to apply the concept in practice.

In this research the term intellectual capital is used, since it seems to be the most common term in use to refer to various non-physical, valuable factors of an organisation (cf. Appendix 1). At an organisational level intellectual capital is defined as follows:

Intellectual capital is composed of various intangible sources (related to employees' capabilities, relationships with stakeholders and organisational resources and processes) that create value at present and in the future. It is classified into human, relational and structural capital.

Thus intellectual capital is a collection various resources. For example, competence represents human capital, customer relationships and brands are part of relational capital, and company culture is included in structural capital (see Table 1).

An intangible resource refers to an individual component of intellectual capital.

Table 1. Examples of intangible resources of an organisation

Human capital	Relational capital	Structural capital
<ul style="list-style-type: none">• Competence• Personal characteristics• Attitude• Knowledge• Educational background	<ul style="list-style-type: none">• Relationships with stakeholders• Organisation's image• Brands• Contracts and arrangements with stakeholders	<ul style="list-style-type: none">• Values and culture• Working atmosphere• Processes and systems• Documented information• Immaterial properties

Intellectual capital differs from physical resources in several ways (see e.g. Abernethy et al., 2003). First, intellectual capital is immaterial, non-visible, while machines, facilities and financial capital are concrete. Thus defining a specific intangible resource is often difficult and the definition may vary depending on the definer. Second, intellectual capital is not always owned by the company, for example, in the case of an employee's competencies. Instead, physical resources (e.g. computers) are usually owned by a company or leased. Moreover, as regards intellectual capital, the ownership may be complicated. For example, a company's image is related to a specific company, but still the company does not own its image. Similarly, buying a certain intangible resource (e.g. company culture) may be almost impossible (cf. Kristandl & Bontis, 2007) while physical resources are usually available. However, there are of course exceptions, such as patents and information, which can be purchased.

Third, one advantage related to intangible resources is that they can be utilised at the same time for different purposes. For example, databases may be used by several users or brands may be utilised in various media. Instead, physical resources, such as production machines, are usually kept for a certain purpose. Fourth, another advantage related to intangible resources is that they do not decrease while they are used. Instead, many intangible resources (e.g. knowledge, competence) may even increase. To conclude, intellectual capital and physical capital has many differences. Thus the managerial challenges are different from the situations where physical resources are the key to competitive advantage (e.g. Teece, 2000).

Although intellectual capital differs in many ways from physical capital, there are also similarities. Both are valuable for the company as resources and can be used as input for the production process (e.g. Barney, 1991). In addition, intangible and physical resources are complementary in a company operating as resource bundles (Barney, 1991; Carlucci & Schiuma, 2007). Thus no single physical or intangible resource can be enough for the company to make something valuable. Moreover, the value of intangible resources is often related to their interactions and integrations with organisation's tangible (physical) resources (e.g. Carlucci & Schiuma, 2007).

1.2.2 Intellectual capital management

There seems to be no clear evolutionary path of intellectual capital management as a discipline (Grasenick & Low, 2004). In addition there are as many definitions for the concept as there are actors in the area. This is natural, since intellectual capital covers so many

different intangible resources (see Table 1) that can be managed various ways. In addition, intellectual capital management can be carried out at several organisational levels. In order to understand what is meant by the concept of intellectual capital management in this research, various suggestions for the concept of intellectual capital management are provided first (see Table 2), followed by a definition used in this research.

Table 2. Definitions for intellectual capital management

Author(s) (year)	Definition
Edvinsson (1997)	Intellectual capital management is leveraging human capital and structural capital together. The goal of intellectual capital management is to improve the company's value generating capabilities through identifying, capturing, leveraging and recycling intellectual capital. This includes both value creation and value extraction.
Wiig (1997a)	Intellectual capital management focuses on building and governing intellectual assets from strategic and company governance perspectives with some focus on tactics. Its function is to take overall care of the company's intellectual capital. Intellectual capital management focuses on renewing and maximising the value of the company's intellectual assets.
Nickerson & Silverman (1998)	Intellectual capital management involves the establishment of monitoring, measurement and management practices that secure intellectual assets for use by the company and that scan the environment for competitive threats to / opportunities for these intellectual assets.
Sullivan (1999)	Intellectual capital management is about balancing and aligning the intellectual capital of the company with the company's vision.
Choo & Bontis (2002, p. x)	The strategic management of intellectual capital is concerned not only with the identification and measurements of stocks of organisational knowledge, but also with the control and alignment of knowledge across organisational levels in order to enhance performance.
Ståhle & Hong (2002)	Intellectual capital management is concerned with expressing all practical everyday operations using indicators and measurement instruments in order to understand the influence of intellectual capital on both company's balance sheet and market value.
Marr et al. (2003)	The management of intellectual capital involves: identifying key intellectual capital which drive the strategic performance of an organisation; visualising the value creation pathways and transformations of key intellectual capital; measuring performance and in particular the dynamic transformations; cultivating the key intellectual capital using knowledge management processes; and the internal and external reporting of performance.
Roos et al. (2005, p. 42)	Intellectual capital management is the deployment and management of intellectual capital resources and their transformations (into other intellectual capital resources or into traditional economic resources) to maximise the present value of the organisation's value creation in the eyes of its stakeholders.
Huggins & Weir (2007)	Intellectual asset management provides the means to generate, distribute, and use knowledge in ways that add value to the company, and provide new opportunities to exploit.

The definitions suggested for the concept of intellectual capital management vary. However, certain characteristics seem to be emphasised. First, intellectual capital management is not only concerned with managing various intangible resources (i.e. stocks), but also their transformations (e.g. Choo & Bontis, 2002; Marr et al., 2002; Roos et al., 2005). Second, intellectual capital management takes a balanced and overall view of the intangible resources

of an organisation (e.g. Sullivan, 1999; Wiig, 1997a). Third, many authors emphasise that the focus of intellectual capital management is on value creation (e.g. Edvinsson, 1997; Marr et al., 2003; Roos et al., 2005) or maximising value (e.g. Roos et al., 2005; Wiig, 1997a). In addition, the purpose of intellectual capital management seems to be to enhance business performance (e.g. Choo & Bontis, 2002; Marr et al., 2003). Fourth, according to some definitions, intellectual capital can be carried out at various organisational levels (e.g. Choo & Bontis, 2002). Fifth, it seems important that intellectual capital is aligned with organisations' strategy and vision (e.g. Sullivan, 1999). Finally, there seems to be a multifaceted group of various tasks and functions related to intellectual capital management, such as:

- identification (e.g. Choo & Bontis, 2002; Marr et al., 2003)
- measurement (e.g. Choo & Bontis, 2002; Marr et al., 2003; Nickerson & Silverman, 1998; Ståhle & Hong, 2002)
- control (e.g. Choo & Bontis, 2002)
- alignment (e.g. Choo & Bontis, 2002; Sullivan, 1999)
- deployment (e.g. Roos et al., 2005)
- report (e.g. Marr et al., 2003)
- government (e.g. Wiig, 1997a).

It seems difficult to provide a precise definition for the concept of intellectual capital management, since intellectual capital management can be used to refer to various activities in an organisation (see e.g. Edvinsson & Sullivan, 1996). Thus in this research a very broad definition for the concept of intellectual capital management is used:

Intellectual capital management refers to a managerial activity that takes into account strategically important intangible resources as a whole in order to support value creation and to improve business performance.

Managerial activities include, among others, identifying, measuring, valuating, acquiring and reporting intellectual capital. Strategically relevant intangible resources emphasises the fact that not all intellectual capital can or need to be managed – only that which is important for the success of an organisation. Relevant intellectual capital should be identified in accordance with strategy and vision. Finally, intellectual capital management aims at improving business performance.

In this research, intellectual capital management is not considered as a discrete managerial activity. Instead, it serves the basic managerial processes in a company, namely planning (establishing the objectives), doing (implementing the plans), checking (measuring the progress) and acting on the information (see e.g. Gupta, 2006).

To support intellectual capital management tens of frameworks, models, approaches, methods, guidelines etc. have been introduced in the intellectual capital literature. The fact that the previous terms are used interchangeably reflects the incoherence of the research theme. For example, they can be used to refer to a prescriptive set of things to do or to a graphical presentation (cf. Yusof & Aspinwall, 2000). It also seems that the use of terminology is not even consistent in publications written by the same author. Thus it may be due to the development of the research theme or individual researchers. Because the use of various terms in the literature is not distinct, the author considers the above mentioned terms

as synonyms and hence uses mainly the term model. The following definition for the concept of intellectual capital management model is applied:

An intellectual capital management model refers to a prescriptive set of things to do; to a comprehensive process; to graphical presentation or to a step-by-step guidelines that is developed especially to support intellectual capital management.

It is important to understand the difference between intellectual capital management models and tools: models may be descriptive and normative while tools tend to be more practical and aim to perform specific managerial tasks. In practice, tools are often developed as a result of the application of a model. This research focuses on intellectual capital management models. To shed light on this heterogeneous group, they are examined in Chapter 1.4.

1.3 Intellectual capital and other management disciplines

Although research on intellectual capital and intellectual capital management is by definition quite mature, many intangible resources (e.g. processes, employee's competence) have been studied in other disciplines for many years. Accordingly, many of the intangible resources included in the concept of intellectual capital are managed in companies by using some of the more traditional management approaches, usually those related to functional management tasks. Typical examples are strategic management, human resource management, management accounting and operations management. Actually, what is new in the intellectual capital thinking is the use of intellectual capital as a holistic, umbrella concept which offers a broader view about organisational resources and allows better to understand the potential patterns of coexistence among the subcategories of intellectual capital (Carlucci & Schiuma, 2007). This chapter discusses the linkage between intellectual capital and the previous traditional management disciplines. Each management task is first briefly described. In addition, the relationship between intellectual capital management and the related concept of knowledge management is discussed at the end of this chapter.

Strategic management as a discipline originated in the 1950s and 60s, when among others, Chandler (1962) recognised the importance of coordinating the various aspects of management under one all-encompassing strategy. Prior to this time the various functions of management were separate with little overall coordination or strategy. Its subjects of interest overlap with several other fields, including economics, sociology, marketing, and psychology (Hambrick, 2004). However, strategic management deals with taking an overview, conceiving of the whole rather than just the parts of the situation facing an organisation. Strategic management can be characterised as ambiguous, complex, organisation-wide, fundamental, having long-term implications. (Johnson & Scholes, 1999, pp. 16–17) According to Rumelt et al. (1994) the fundamental question in the field of strategic management is how companies achieve and sustain competitive advantage (see Teece et al., 1997). Probably because of there are a number of contributors in the field – networked with each other (Nerur et al., 2007) – definitions for the concept of strategic management vary (Nag et al., 2007). Nag et al. (2007) suggest the following definition: “The field of strategic management deals with the major intended and emergent initiatives taken by general manager on behalf of owners, involving utilisation of resources, to enhance the performance of firms in their external environments.”

Strategic management includes strategic analysis, strategic choice and strategy implementation. Strategic analysis is the process of trying to understand the strategic position of the organisation in terms of its external environment, internal resources and competences and the expectations and influence of stakeholders. Strategic choice involves understanding the underlying bases guiding future strategy, generating strategic options for evaluation and selecting from among them. Strategy implementation is concerned with the translation of strategy into organisational action through organisational structure and design, resource planning and the management of strategic change. (Johnson & Scholes, 1999, pp. 17–23) According to Mintzberg (1994) the ways of strategic thinking can be divided into descriptive and prescriptive ways. The descriptive way is concerned with describing how strategies are made. By contrast, the prescriptive aspect is more concerned with how strategies should be formulated than with how they necessarily take shape. The literature on strategic management covers many theories and principles to serve strategic thinking, such as the Five Forces by Porter (1979), the Resource-Based View (see e.g. Barney, 1991), Ansoff's (1957) directions for strategy development and six organisational configurations (e.g. Mintzberg, 1980). In addition, the literature includes more practical tools that support various tasks related to strategic management. Examples of the tools are the Strategic Map (Kaplan & Norton, 2000) and SWOT Analysis (see e.g. Lee et al., 2000). To illustrate how strategic management takes into account intellectual capital the resource-based view is briefly analysed from the point of view of intellectual capital.

The theory of the resource-based view of the firm (RBV) is based on the assumption that sustained competitive advantage derives from the resources and capabilities a company controls that are valuable, rare, imperfectly imitable and not substitutable (Barney, 1991). Thus, according to the theory, the success of a company is due to internal resources (e.g. Wright et al., 2001). According to Barney (1991) resources may be divided into three categories, namely physical capital, human capital and organisational capital resources. Physical capital resources include the physical technology used in the company, a company's plant and equipment, its geographic location and its access to raw materials. Human capital resources are composed, among others, of training, experience, judgment and relationships, and the insight of individual managers and employees of the company. A company's organisational capital resources contain, for example, its informal and formal planning, controlling and coordinating systems, informal relations among groups within an organisation and also those in its environment. The human and organisational resources represent many typical elements of intellectual capital. Instead, physical resources are excluded from the concept of intellectual capital. According to Barney (1991) not all resources are strategically important. Only some of them are able to improve the organisation's performance. However, most of the important resources are intangible in nature. Thus, Kristandl and Bontis (2007) suggest that intellectual capital (and intangible resources) can be considered as a subset of strategic resources under the resource-based view. Furthermore, the resource-based view could help to find explanations and suggestions for the management of intangible resources (Kaufmann & Schneider, 2004). On the other hand the intellectual capital perspective may offer a bridge between the conceptual thinking of the resource-based view and practice (Peppard & Rylander, 2001).⁴

⁴ Besides strategic management, the resource-based view has contributed much to the field of human resource management (Wright et al., 2001). Instead, the linkage between the resource-based view and other fields (e.g. economics and finance, and marketing) has not been paid that much attention to (Barney et al., 2001).

Human resource management is a series of activities which, first, enables working people and the organisation which uses their skills to agree about the objectives and nature of their working atmosphere and, second, ensures that the agreement is fulfilled (see e.g. Torrington et al., 2005, p. 14). According to Ehrlich (1997) the trajectory of change facing all businesses also represents a challenge to the human resource management function. He argues that human resource management is not about programmes, instead it is about relationships. Stewart (1997, p. 104) points out that it is imperative that companies treat employees as assets and provide them with appropriate pay, prospects for promotion, skills development opportunities and a work environment that allows autonomy and creativity. Many authors emphasise that human resource management should be linked to the business strategy (e.g. Chiavenato, 2001; Ehrlich, 1997). For example, according to the contingency approach (see e.g. Torrington et al., 2005, pp. 35–39) first, human strategy should fit with the demands of business strategy (vertical integration) and, second, all human resource activities should fit together so as to make a coherent whole, be mutually reinforcing and be applied consistently (horizontal integration). The human resource management literature proposes several practices companies can use in order to manage the various human resource activities, such as the processes of selection, training or appraisal. Examples of these practices are interviews, education and courses, coaching, mentoring, e-learning and 360° feedback (e.g. Torrington et al., 2005, pp. 144–158; 392–402; Ulrich, 1997)

Human resource accounting is a process of identifying and measuring data about human resources and communicating this information to interested parties (American Accounting Association, 1970), such as managers and investors (Ebersberger, 1981). Armstrong (1988) prefers the following definition: “human resource accounting is whatever anybody wants to do to measure the cost benefits of managing human resources”. Human resource accounting is considered reasonable, because people are a valuable resource to a company so long as they perform services that can be quantified and because the value of a person as a resource depends on how he or she is employed (e.g. Barcons-Vilardell et al., 1999). Although human resource accounting has been available for many years (interest in human resource accounting appears to have reached its zenith in the 1970s) it has never been operationalised in any full blown way (Dawson, 1994). The subject has also been referred to as human assets accounting.

Clearly, human resource management is closely related to intellectual capital. The linkage can be approached from at least two perspectives. First, human resource management focuses on employees and their skills – issues that are an important part of intellectual capital, namely human capital. For example, according to Edvinsson and Malone (1997, pp. 34–35), an organisation’s human capital include the knowledge, skills, experience and innovativeness of employees. Human capital is typically not owned by a company. When an employee leaves the company the human capital possessed by the employee follows him or her. Second, besides focusing on various human capital factors the objective of the human resource management function is to create and maintain practices and processes for developing the above-mentioned intangible resources (e.g. mentoring, 360° feedback). These practices and processes can be regarded as part of the structural capital of an organisation (cf. Table 1).

Human resource management takes into account many of the intellectual capital factors (especially those included in human capital). In addition, human resource management captures a wide range of practices for developing these factors. However, even though many

authors emphasise the strategic role of human resource management, it is questionable whether human resource management is adequate for managing specific intellectual capital factors from a strategic perspective. Human resource management focuses more on the development of specific human capital factors at operative level. According to Jääskeläinen et al. (2006) there seems to be a gap between the company-level information needs and the operative information that already exists within the human resource management process.

Management accounting refers to a collection of practices (Chenhall, 2003) or activities, including collecting, classifying, processing, analysing and reporting information to managers (Kaplan & Atkinson, 1998, p. 1). Different tasks in a company, such as decision-making, strategy development and performance measurement, are supported by management accounting information (Kaplan & Atkinson, 1998, p. 12). Management accounting is supported by various management accounting and management control systems. A management accounting system refers to the systematic use of management accounting to achieve some goal, whereas a management control system is a broader term that also encompasses other controls such as personal control (Chenhall, 2003). According to Bjørnenak and Olson (1999) management accounting is nowadays becoming more diversified in scope and system dimensions. The literature covers many models for designing a management accounting system. Some of the most familiar include Activity-Based Costing, Life-Cycle Costing, Target Costing and the Balanced Scorecard (e.g. Bjørnenak & Olson, 1999; Kaplan & Atkinson, 1998). The role of management accounting is constantly undergoing changes. Ittner and Leitner (2002) state that management accounting is in a somewhat early stage of its evolution and has not yet succeeded in producing an integrated set of theories and empirical results. In recent years non-financial measures have gained a lot of attention (see e.g. Vaivio, 1999) by emphasising that financial measures, should be complemented with non-financial measures.

The Balanced Scorecard (BSC) by Kaplan and Norton (1992; 1996) is one of the best known and most used performance measurement models. It provides a comprehensive framework that translates a company's, vision and strategy into a coherent set of performance measures. The idea is that a constructed measurement system consists of a linked series of measurement objectives (or success factors) and measures that are consistent and mutually reinforcing forming cause and effect relationships. The Balanced Scorecard includes four perspectives: financial, customer, internal business process, and learning and growth. Financial objectives are related, among others, to revenue growth, productivity improvement and cost reduction. The customer perspective focuses, for example, on share, retention, satisfaction and acquisition of targeted segments. The internal business process perspective focuses on objectives related to both the innovation process (e.g. measures related to research and design and new products) and the operations process (e.g. time, quality and cost measurements). Finally, the objectives in the learning and growth perspective provide the infrastructure to enable ambitious objectives in the other three perspectives, such as employee capabilities, information systems capabilities, and motivation and empowerment.

The Balanced Scorecard contains many components of intellectual capital. The learning and growth perspective especially consists of factors that can be characterised as intangible. Thus the learning and growth perspective seems to be the fundamental dimension to evaluate and manage intellectual capital (Carlucci et al., 2004). In addition, customer and internal business process perspectives include some factors of intellectual capital, such as customer satisfaction

and factors related to the innovation process (Lönqvist, 2004, p. 53). The Balanced Scorecard claims that there should be a comprehensive view of the organisation's situation and that there should be attention to intangibles and knowledge – issues that are also emphasised with regard to the concept of intellectual capital (Mouritsen et al., 2005). Thus, the Balanced Scorecard (and probably also other balanced performance measurement systems) appears to be applicable to support the management of intellectual capital since it covers some of the intangible factors of business (see e.g. de Gooijer, 2000; Lönqvist et al., 2006; Wu, 2005). Moreover, intellectual capital related objectives can be easily suggested for the four perspectives of the Balanced Scorecard (e.g. Drew, 1999). Although the Balanced Scorecard was not originally developed to focus on intellectual capital, it has been “adopted” into the intellectual capital literature (Huang et al., 2007).⁵ In recent years the developers of the model have also paid attention to intellectual capital (see Kaplan & Norton, 2004). Adopting the Balanced Scorecard for measuring and managing intellectual capital has also been criticised, for example because it is too static (e.g. Voelpel et al., 2006).

The field of *operations management* has had a long history under a variety of different names – production management, industrial management, factory management (e.g. Meredith, 2001). In earlier decades, the term operations management referred primarily to manufacturing production, but over time the field has expanded to include service systems as well. Examples of operations management practices and philosophies are supply chain management, enterprise resource planning (ERP), just-in-time (JIT) and material requirement planning (MRP). (See e.g. Bayraktar et al., 2007) One form of operations management practices is total quality management (TQM), which has received a growing amount of attention in the last two decades (e.g. Jung & Wang, 2006). It is widely accepted that total quality management is based on three principles: customer focus (every decision is taken with the customers needs in mind), continuous improvement (continuous efforts to improve the organisation, its products and its services) and integral approach (total quality management concerns every aspect of the organisation) (Garaedts et al., 2001).

Many models have been developed worldwide in order to give substance to the concept of total quality management, such as ISO-9000 (International Organization for Standardization, 2008) and the EFQM Excellence Model (EFQM, 2003). These models are based on the idea of improving quality in order to improve competitiveness and business results. Although the main focus of the models is on quality, they are comprehensive and include various elements, some of which overlap with those presented in intellectual capital management models (Lönqvist, 2004, p. 73). Various quality systems have many similar characteristics (Hardjono et al., 1997, p. 53) and therefore the linkage between intellectual capital and total quality management is discussed in light of the EFQM Excellence model.

The EFQM Excellence model introduced for assessing organisations for the European Quality Award is now the most widely used organisational framework in Europe. The model can be used in a number of different ways, such as for self-assessment, to benchmark with other organisations a guide to identify areas for improvement and as a structure for the organisation's management system. The model is based on nine criteria. Five of these are *enablers* and four are *results*. The enabler criteria cover what an organisation does and the

⁵ The literature on intellectual capital subsumes many studies discussing the linkage between intellectual capital (management) and the Balanced Scorecard (e.g. Allee, 1999; Bontis et al., 1999; Bukh et al., 2002; Mouritsen et al., 2005; Pike & Roos, 2004).

results criteria cover what an organisation achieves. Results are caused by enablers, which are improved using feedback from results. Thus the model is based on the premise that “excellent results with respect to Performance, Customers, People and Society are achieved through Leadership driving Policy and Strategy, that is delivered through People, Partnerships and Resources, and Processes”. (EFQM, 2003)

As Lönnqvist (2004, p. 74) argues, the model includes many common elements of intellectual capital, and the five enablers (i.e. Leadership, People, Policy & Strategy, Partnership & Resources and Processes) can be interpreted in terms of the three classes of intellectual capital:

- Excellent leaders develop and facilitate the achievement of the mission and vision. Thus Leadership can be considered as a component of structural capital.
- Excellent organisations manage, develop and release the full potential of their people at an individual, team-based and organisational level. Typically, people are considered as human capital, but this component also represents aspects of structural capital (e.g. rewarding systems).
- Excellent organisations implement their mission and vision by developing a stakeholder focused strategy. Policy and strategy are elements of structural capital.
- Excellent organisations plan to manage external partnerships, suppliers and internal resources. Partnerships represent the relational capital of an organisation, whereas (internal) resources may also refer to factors included in structural capital.
- Excellent organisations design, manage and improve processes. Processes and other management practices are considered as structural capital of an organisation.

In conclusion, some of the perspectives of the model address the intangible resources of an organisation (Carlucci et al., 2004). The EFQM Excellence model (and many other quality management models) suggests that many aspects of intellectual capital should be paid attention to in order to improve the competitiveness and business results.

In recent years, *knowledge management* has gained a lot of interest among practitioners. A lot of research has also been carried out on the theme (Nonaka & Peltokorpi, 2006; Serenko & Bontis, 2004). It seems, however, that no agreed definition of knowledge management has so far emerged (Nonaka & Peltokorpi, 2006; Tiago et al., 2007). Davenport and Prusak (1998, p. 107) claim that knowledge management is the processes of capturing, distributing, and effectively using knowledge. According to Wiig (1997b) knowledge management is systematic, explicit and deliberately building, renewal, and application of knowledge to maximise a company’s knowledge-related effectiveness and returns from its knowledge assets.

Sometimes knowledge management and intellectual capital management are considered to be synonymous (see e.g. Arora, 2002; Salojärvi, 2005b, p. 3). However, the concepts differ as to how they are focused. Knowledge management is more focused on processes, such as knowledge creation, renewal, transformation and codification, while intellectual capital management focuses on identifying, understanding, assessing and developing an organisation’s intangible resources. Both managerial approaches can have strategic, tactical and operational perspectives. According to Ståhle and Hong (2002) knowledge management is concerned with the practical means of leadership and management which aim at improving the capability of an organisation to transform knowledge into added value. In addition, “knowledge is a part of intellectual capital, intellectual capital is much more than knowledge”

(Roos et al., 1997). Thus, knowledge management captures a narrower area (i.e. information and knowledge), whereas intellectual capital management also includes other issues such as brands, customer relationships and business processes.

There are also many similarities between knowledge management and intellectual capital management approaches. Common features in these two management approaches are a strong emphasis in knowledge-related resources and the aim to improve a company's activities by developing knowledge-related assets. As also acknowledged in the analysis of the intellectual capital concepts, many authors recognise the knowledge nature of intellectual capital (see Appendix 1). Actually knowledge management and intellectual capital management are partly overlapping. For example, if a company applies some practices developed within knowledge management (e.g. knowledge sharing methods) the value of intellectual capital (particularly structural capital) will probably become higher.

Traditional management disciplines have many positive features in relation to intellectual capital management. For example, a lot of research has been carried out in other fields for many decades (with the exception of knowledge management). In addition, it seems that many organisations are quite familiar with the terms and practices related to these management approaches. Many companies have also used, for example, human resource management practices for a long time and hence practical experiences have been reported (see e.g. Ulrich, 1997; Yeung & Berman, 1997). Besides, in many organisations there is a certain person (or a unit) responsible and hired especially for management accounting, strategic, human resource and operations management activities.

In conclusion, it is not clear how the management of intellectual capital factors differs when they are managed along with traditional management functions and in the context of intellectual capital management. For example, what is the difference between planning education for employees in the context of human resource management and intellectual capital management? How does the management of processes vary within operations management and intellectual capital management? Perhaps the comprehensive view covering several intangible resources (in contrast to specific functional focus on a selected set of resources) might be one factor separating intellectual capital management from functional management activities. But then: what is the difference between strategic management and intellectual capital management in terms of acknowledging intellectual capital?

1.4 Review of the models for measuring and managing intellectual capital

1.4.1 Scope of models

Guthrie et al. (2003) indicate that the intellectual capital research area can be divided into several branches of research, each with its own set of problems to be addressed and with its preferred theories and methodologies. In order to understand the extensive research carried out on intellectual capital management, the various models developed are presented. Even though this research focuses on the management of companies' intellectual capital, the models suggested for the macro-level examination of intellectual capital are also reviewed. This is justified, because in the literature, the term intellectual capital management model (or

framework, method etc.) may also refer to a model that is, for example, used to measure a nation's intellectual capital. Thus the review should help to understand the multifaceted research theme and also to position this research. Hence, in the following examination, the distinction is first made based on the level of examination: intellectual capital management models are discussed from micro and macro level perspectives⁶. Both of these are further divided into smaller parts.

Intellectual capital management models used at company level can be classified into different streams. The classification used here is based on the categorisation by Andriessen (2004a). His main idea is that various intellectual capital models can be classified according to which organisational problem they are designed to solve. However, Andriessen's classification has been adapted to better suit the purposes of this research. Finally, intellectual capital management models are divided into the following three branches:

- Models for external reporting or disclosing intellectual capital
- Models for the (monetary) valuation of intellectual capital
- Models to support internal management.

Most macro-level models are designed to support intellectual capital measurement (e.g. the measurement of a nation's knowledge or wealth creation capacity). For that reason, in the context of macro-level models, the use of the term intellectual capital measurement model is more appropriate than the term intellectual capital management model. According to Hervás-Oliver and Dalmau-Porta (2007) models developed to measure intellectual capital from the macro level point of view can be divided further into two groups. They propose the following categorisation: models that use intellectual capital terminology (based on Edvinsson & Malone's Skandia Navigator) and models that do not use intellectual capital terminology. Models designed for measuring nations' and other regions' intellectual capital are presented using the two above mentioned groups.

It should be pointed out that the difference between various perspectives is not totally clear. On the contrary, they are partly overlapping. For example, some of the models may be suitable for measuring a nation's intellectual capital but also a company's intellectual capital. Moreover, certain models developed for reporting a company's intellectual capital to external stakeholders also provide support for the company's internal management. Nevertheless, the categorisation presented above provides a comprehensive idea of the models and is used as an outline for the following review. The aim of the review is to provide the reader with an integrated understanding of the various models designed for intellectual capital management.⁷

⁶ Other approaches could also have been chosen. However, this division suits the needs of this research. For example, Mouritsen (2006) has analysed intellectual capital research through two approaches – ostensive and performative, whereas Han & Han (2004) classified intellectual capital studies in empirical tests based on accounting and practical development and adaptation of intellectual capital reports.

⁷ The purpose is not to present a systematic overview of the literature on intellectual capital management. Instead, examples of previous work are provided. The review is focused on the most recent literature on intellectual capital.

1.4.2 Micro-level models

Intellectual capital management at micro-level contains a variety of models. The discourse is quite disorganised, since the terms, such as “management”, “measurement”, “valuation” and “assessment”, are used interchangeably and in different purposes. According to Andriessen (2004a) there is some confusion about the distinction between valuation and measurement.

Models that support the management of intellectual capital at organisational level can be divided into three groups (see Chapter 1.4.1). The first two groups focus on the intellectual capital of a company from the external (e.g. shareholder’s, investor’s) point of view whereas the last group concentrates on intellectual capital and its management within a company. Similarly, Kaufmann and Schneider (2004) distinguish two different forces – external and internal – by which companies are motivated to measure and manage their intellectual capital. Next, various models are reviewed in light of the three perspectives identified above. In order to obtain an understanding of the context, the review contains supplementary discussion on the topics.

External reporting or disclosing intellectual capital has been one of the most commonly studied issues in intellectual capital research. Disclosing intellectual capital has been approached from two directions: The first type of studies are based on the assumption that other reports (e.g. annual reports) contain some of the intellectual capital elements and can be utilised in the external reporting of intellectual capital. Many studies have used annual reports as a source document, with content analysis as their methodology for analysing the relevant information (Abeysekera, 2006; Guthrie & Petty, 2000).⁸ Abeysekera (2006) has pointed out that it is difficult to accept the credibility of comparisons between earlier studies. While (most) studies have used a similar coding framework to analyse intellectual capital disclosures, the results are different, because, e.g., the composition of the sample varies. In addition, Abeysekera criticises the use of annual reports as a source document since they may not reflect the objective reality of the company. Hence, annual reports are used by companies to establish their desired position among stakeholders.⁹

The second part of the research proposes disclosure models that are designed especially for intellectual capital. The existing literature contains various guidelines for constructing a specific intellectual capital report (to be used either internally or externally). According to Mouritsen et al. (2004) the purpose of an intellectual capital statement is often two-fold, as it functions as a communication tool used to communicate (e.g. to customers and partners) how

⁸ For example, Abdolmohammadi (2005) studied Fortune 500 companies, Abeysekera (2007) and Abeysekera and Guthrie (2004) analysed large listed firms in Sri Lanka, Bontis (2002) focused on Canadian corporations, Bozzolan et al. (2003) studied Italian listed companies, Brennan (2001) analysed knowledge-based Irish listed companies, Goh and Lim (2004) concentrated on Malaysian profit-making public listed companies, Guthrie and Petty (2000) and Guthrie et al. (2006) focused on the largest listed Australian companies, Vandemaele et al. (2005) analysed companies from the Netherlands, Sweden and UK and Vergauwen and van Alem (2005) studied French, Dutch and German public listed companies.

⁹ Statistical techniques are used to a limited extent to study the association between intellectual capital disclosure practices and other factors, such as the level of board independence, firm age, level of leverage and firm size (White et al., 2007), firm size, managerial ownership, firm age and level of technology (Cordazzo, 2007), underpricing (Singh & Van der Zahn, 2007) and price-sensitive company announcements (Dumay & Tull, 2007). In these studies intellectual capital disclosure measure is usually based on content analysis.

the company works to develop its intellectual capital in order to generate value and as a management tool used internally in the company. Many of these guidelines have been developed in projects and are the result of co-operation between researchers and companies.

- *Guidelines for Managing and Reporting on Intangibles (Intellectual Capital Report)* (also known as the Meritum Guidelines) is an outcome of the MERITUM Project funded by the European Union. The Meritum Guidelines attempt to provide a useful guide for companies willing to disclose information on the intangible determinants of their value creation capability. In addition to advice for reporting, the Meritum Guidelines is a comprehensive model assisting companies in the identification, measurement and control their intellectual capital. An intellectual capital report is composed of three parts: a vision of the company, a summary of intangible resources and activities and a system of indicators. (Meritum, 2001)¹⁰
- *Intellectual Capital Statements – The New Guideline* (also known as the Danish Guidelines) is a result of co-operation coordinated by the Danish Ministry of Science, Technology and Innovation¹¹. It recommends companies to construct an intellectual capital statement through four phases: a knowledge narrative, management challenges, initiatives and indicators. Thus it also contains extensive instructions for measuring and managing intellectual capital. (Danish Ministry of Science, Technology and Innovation, 2003)
- *Intellectual Capital Statement – Made in Germany* was developed by the Intellectual Capital Statement Project Group and was piloted in 14 German small and medium-sized companies. Based on the guidelines the intellectual capital statement is drafted in six process steps (i.e. initial situation, intellectual capital, evaluation, indicators, communication, monitoring). (Federal Ministry of Economics and Labour, 2004)
- *Putting Intellectual Capital into Practice – Nordic Harmonised Knowledge Indicators (PIP)* is based on the joint effort of the 21 participating companies. The PIP approach is an open source framework and proposes three steps: assess, manage and report. PIP was developed for small and medium-sized companies in the Nordic ICT industry. (Claessen, 2005; Thorleifsdottir & Claessen, 2006)

Besides the previous four guidelines, models that aim at constructing an intellectual capital report include, among others, *the 3R Model for Intellectual Capital Statements* by Ordóñez de Pablos (2004a) and “the building blocks” presented by van der Meer-Kooistra and Zijlstra (2001).

Only few studies discuss companies’ current intellectual capital disclosure practices. A survey, organised by the Nordic Industrial Fund (2003, pp. 11–12), contained a question on the nature of external communication about intellectual capital in Nordic companies concluding that it is most common to describe intellectual capital using narratives and stories from the company. Gallego and Rodríguez (2005) have used questionnaires to examine the

¹⁰ The Guidelines for Managing and Reporting on Intangibles (Intellectual Capital Report) is discussed more in detailed in Paper V.

¹¹ The Intellectual Capital Statements – The New Guideline is a revised version of the 2000 edition (see Danish Agency for Trade Industry, 2000). In the second phase of the project (started in 2001) industry organisations together with around 100 companies and public organisations tested the original guideline. A research team led by Professor Jan Mouritsen, Copenhagen Business School, brought together and processed their many experiences. (Danish Ministry of Science, Technology and Innovation, 2003) The model is presented in Appendix 2.

reasons for compiling an intellectual capital report in Spanish companies, whereas Ordóñez de Pablos (2002; 2005) analysed the content of existing intellectual capital reports of companies from different countries.

In summary, reporting intellectual capital externally has been studied a lot and many alternative models to support constructing an intellectual capital report have been proposed. However, there still remains much work to be done. Palacios and Galván (2007) argued that governments should promote the development of a commonly accepted guideline so that researchers, consultants, politicians and professionals working in the area of intellectual capital can achieve the necessary and desired degree of comparability. Standardisations of terminology and guidelines for the definition, usage and interpretation of indicators would be an important further step towards a common baseline (Edvinsson & Kivikas, 2007; Grasenick & Low, 2004). Nowadays companies do not have to report any intellectual capital related information. Instead other motives must be present, such as expected benefit from disclosure or demands from stakeholders, like shareholders, creditors or employees (e.g. Vergauwen & van Alem, 2005). Based on Guimón's (2005) results, intellectual capital reports are relevant for credit risk analysis and could eventually have a positive impact on credit decisions, as they facilitate the evaluation of the company's relative competitiveness and provide good image of the company's management team. However, not all researchers share the same view. For example, Corzazzo (2005) stated that the environmental and social reports could serve as a support for the development of intellectual capital reporting, because these reports contain a lot of information on intellectual capital. Thus having overlapping reports is not reasonable.

The (*monetary*) *valuation of intellectual capital* has attracted quite a lot of attention among researchers. It has been commonly accepted that the current accounting practices, such as International Financial Reporting Standards (IFRS), are inadequate for the valuation of intellectual capital (e.g. Augier & Teece, 2005; Dzinkowski, 2000; Lev et al., 2005; Sudarsanam et al., 2005). The regulatory accounting bodies only capture a part of the intellectual capital of a company and what is commonly regarded as intellectual capital would not pass the accounting recognition test (Lev et al., 2005). According to Vergauwen and van Alem (2005) the IFRS has even reduced the amount of intangibles recognised in financial statements. Due to the inadequacy of the accounting practices, alternative models for the valuation of intellectual capital have been introduced.

Market-to-book value is the most widely known measure for the value of the intellectual capital of the company (see e.g. Dzinkowski, 2000) and has been used as a proxy for the value of intellectual capital in many studies (Augier & Teece, 2005; Ghosh & Wu, 2007; Sudarsanam et al., 2005). The method has come in for a lot of criticism, since not all overvaluation of corporate assets can be explained by intangible factors of an internal nature. Instead, a significant portion can be explained by external factors (e.g. general economic cycle). (Valladares Soler & de Oro Clestino, 2007) Other models that have been used to value intellectual capital in practice (see Ghosh & Wu, 2007; Kennedy, 1998; McClure, 2003) are, among others, *Tobin's Q* (developed by James Tobin, see Dzinkowski, 2000) and the *Calculated Intangible Value (CIV)*¹² by Stewart (1997, pp. 227–230).

¹² CIV is described in Paper II.

To evaluate the (monetary) value of intellectual capital the Knowledge Advisory Services team of KMPG The Netherlands developed the *Value Explorer* (Andriessen, 2005) and Litschka et al. (2006) presented the *Plexus* model. The *Value Added Intellectual Coefficient* (VAIC™)¹³ (e.g. Pulic, 2000; 2004) is also regarded as a suitable method for the valuation of companies' intellectual capital (Starovic & Marr, 2003). In addition, *real options* has been suggested as a suitable valuation model for intellectual capital (Sudarsanam et al., 2005; 2006) or for one part of intellectual capital – intellectual properties (Chang et al., 2005).

Intellectual capital can be utilised and developed several ways to *support the internal management* of a company. The main assumption is that intellectual capital is not managed properly, that it needs more attention and the intangible resources need to be managed differently than other resources (Andriessen, 2004a). Several models to be used internally to support the management of intellectual capital have been introduced in the literature. These include the following:

- *FIVA* (Green & Ryan, 2005)
- *Guidelines for Managing and Reporting on Intangibles (Intellectual Capital Report)* (Meritum, 2001)
- *IC model for research organisations* (Leitner & Warden, 2004)
- *IC Model of the Knowledge Firm* (Edvinsson & Sullivan, 1996)
- *ICMP* (Pike et al., 2005; Roos et al., 2005)
- *ICMS model* (Brown et al., 2005)
- *IC Rating™* (Jacobsen et al., 2005)
- *Intangible Assets Monitor* (Sveiby, 1997)
- *Intellectual Asset Management Portfolio* (Klaila & Hall, 2000)
- *Intellectual Asset Model* (McConnachie, 1997)
- *Intellectual Capital Audit* (Brooking, 1996)
- *Intellectual Capital Management Model* (Van Buren, 1999)
- *Intellectual Capital Statements – The New Guideline* (Danish Ministry of Science, Technology and Innovation, 2003)
- *Intellectual Potential* (Nilsson & Ford, 2004)
- *Intellectus Model* (see e.g. Bueno et al., 2006)
- *Knowledge Assets Dashboard* (Marr et al., 2004a)
- *Knowledge Assets Map and Value Creation Map* (Marr & Schiuma, 2001; Marr et al., 2002; 2004b)
- *Knowledge Assets Value Spiral* (Carlucci & Schiuma, 2006)
- *Knowledge Audit Cycle* (Marr & Schiuma, 2001)
- *(Skandia) Navigator* (Edvinsson & Malone, 1997)
- *Strategic Knowledge Benchmarking System* (Viedma Marti, 2004b)
- *Putting Intellectual Capital into Practice* (Thordeifsdottir & Claessen, 2006)
- *Value+* (Bygdås et al., 2004)
- *Value Chain Scoreboard* (Lev, 2001)
- *Weightless Wealth Toolkit* (Andriessen, 2004b).

Although the literature captures tens of alternative models the practical application of these models within companies and other organisations has not been much reported. According to Kaufmann and Schneider (2004) there are only few examples of empirical work. The current

¹³ VAIC™ is described in Paper II.

literature does not seem to provide many empirical studies on how intellectual capital management is executed in practice (i.e. operationalised) or how a specific model is actually applied in companies.

The foregoing was also discovered in the study carried by the author in 2006. The study was carried out using the systematic review method (see e.g. Cook et al., 1997; Denyer & Neely, 2004; Tranfield et al., 2003).¹⁴ Altogether 581 articles were analysed. The results of the study support the claim that there is a lack of empirical studies on how intellectual capital management is carried out in practice. The practical examples of applying the many intellectual capital management models presented in the literature are not common. The findings relevant from the point of view of this research are summarised below (the results are based on studies on 215 papers out of 581¹⁵):

- Around half of the studies were empirical and half theoretical in nature.
- 59 percent of the empirical studies were case studies – 41 percent were statistical.
- Empirical studies utilised interviews (26 %), questionnaires (23 %) and analyses of documents (38 %) for data collection – only few (5 %) studies were based (entirely or partly) on observation.
- Only few (seven out of 67) case studies applied action research (e.g. Peppard & Rylander, 2001; Ståhle & Hong, 2002).
- More than half of the case study papers reviewed (e.g. de Gooijer, 2000; Gupta & Roos, 2001) focused on constructing a model, framework or an approach for intellectual capital management in theory (in some cases the studies include some testing of the model in practice).

Nevertheless, the literature includes some studies that refer to the application of a model in practice. Many of these studies include descriptions of the final results (e.g. a management system that has been designed). Instead, they lack the descriptions and explanations for various actions related to the development of the intellectual capital management system. Examples of such studies are those by the Danish Ministry for Trade and Industry (2000, pp. 60–73), the Danish Ministry of Science, Technology and Innovation (2002, pp. 8–19), Klaila and Hall (2000), Thorleifsdottir and Claessen (2006) and Viedma Marti (2004b). However, there seems to be few experiences reported extensively (e.g. Jacobsen et al., 2005; Marr et al., 2004b; McConnachie, 1997; Mouritsen et al., 2002; Nilsson & Ford, 2004; Roos et al., 2005). It should be acknowledged that all the previous practical applications were carried out by those participating in developing the specific model. In addition, the literature contains some practical descriptions of intellectual capital management initiatives which have been carried out without any specific model (see e.g. McConnachie, 1997; Petrash, 1996).

¹⁴ Systematic reviews are generated to answer specific, often narrow questions in depth. The sources used are usually comprehensive and clearly specified, and the literature review is selected by certain criteria. In addition, the methods are well documented for easy reproduction. The study was conducted utilising the process framework presented by the Centre for Reviews and Dissemination (2001). Conducting a review contains five phases: identification of research, selection of studies, study quality assessment, data extraction and monitoring progress and data synthesis. Two journals – *Journal of Intellectual Capital* and *Journal of Knowledge Management* – were searched manually to find potential papers. The study is reported as its entirety in Kujansivu (2006).

¹⁵ These 215 articles discussed intellectual capital management at strategic level. Instead, development and utilisation of intellectual capital at operative level are not taken into account. (Cf. the framework presented in Paper V)

Overall, the intellectual capital literature suggests models for intellectual capital management, but does not provide much evidence of companies actually having applied them. In addition, the mixture of models is quite confusing. Some of the models developed apparently help to answer the question “what is intellectual capital and intellectual capital management” (e.g. Edvinsson & Malone, 1997), whereas some others answer “how to manage intellectual capital” and provide an overall way forward (e.g. Brown et al., 2005) (cf. Yusof & Aspinwall, 2000).

1.4.3 Macro-level models

The role of intellectual capital is of vital importance to every nation (Von Mutius, 2005) and other territories (Medina et al., 2007). According to Bontis (2004) the intellectual capital of a nation includes the hidden values of individuals, companies, institutions, communities and regions that are the current and potential sources for wealth creation. Tomé (2004) also states that intellectual capital is regarded as a tool of wealth creation and economic development. Many models are claimed to be appropriate for measuring the intellectual capital of nations or regions.

The first type of models focuses on measuring national or regional intellectual capital utilising intellectual capital terminology. That is to say, models consist of various components that form intellectual capital (e.g. structural and human capital). These indices have been constructed offering a ranking which shows the national (or regional) intellectual capital. For example, the *National IC Performance Index* (see e.g. Edvinsson & Bounfour, 2004), the *National Intellectual Capital Index* (NICI™) by Bontis (2004), the *Regional Intellectual Capital Index* (RICI) by Schiuma et al. (2008) and *Intellectual Asset Index* (Huggins & Weir, 2007) are included in this group.

Besides the previous measures, the *Value Added Intellectual Coefficient* (VAIC™) methodology (e.g. Pulic, 2000; 2004; 2005) has been used for measuring intellectual capital of nations. The model has been applied in comparing European Union member states (International Business Efficiency Consulting L.L.C., 2003, pp. 6–7; Pulic, 2005) and in Greek (Mavridis, 2005a), Singaporean (Van der Zahn et al., 2004), Taiwanese (Chen et al., 2005) and Croatian (Pulic, 2005) data. Part of the application of the model has been limited to a specific industry or sector, e.g., the banking sector (e.g. Goh, 2005; Mavridis, 2004; 2005b; Yalama & Coskun, 2007).¹⁶

The second type of work for measuring intellectual capital at macro-level focuses on intellectual capital measurement issues with “non-intellectual capital” categories and terminology. In other words, the models do not comprise the main components of intellectual capital. Among others, Viedma Marti has done a lot of work in this area. For example, he

¹⁶ Many of the earlier studies are based on the company-level data and summarised for various industries or regions to describe its intellectual capital. Besides, aiming to measure the intellectual capital, the studies applying the VAIC™ methodology may include examination of the relationship between intellectual capital measures and financial measures (see. e.g. Chen et al., 2005; Yalama & Coskun, 2007) and intellectual capital and board structure (e.g. Ho & Williams, 2003). Williams (2001) analysed the relationship between intellectual capital performance and disclosure practices using the VAIC™ method.

introduced the *Social Capital Benchmarking System* (SCBS) (Viedma Marti, 2004a), the *Region's Intellectual Capital Benchmarking System* (RICBS) (Rodriquez & Viedma Marti, 2006), *Cities' Specific Intellectual Capital Model* (CSICM) and the *Cities' Intellectual Capital Benchmarking System* (CICBS) (Viedma Marti, 2005). Hervas Oliver and Dalmau Porta (2006) developed the *Intellectual Capital Cluster Index* (ICCI®) and based on the previous the *Intellectual Capital Regional Index* (ICRI) (Hervas-Oliver and Dalmau-Porta, 2007). North and Kares (2005) presented the *Ignorance Meter*. In addition, Pöyhönen and Smedlund (2004) proposed a model for assessing intellectual capital creation in regional clusters, whereas Medina et al. (2007) introduced a model for the measurement of intellectual capital in a small island territory.

Even though the discussion above utilised the classification provided by Hervas-Oliver and Dalmau-Porta (2007) the differentiation between the models in the two groups is not so clear. At least in practice it does not necessarily matter whether the common intellectual capital terminology and basic groups are used or not. The various elements which form the intellectual capital of a nation and are used in calculation still remain the same.

It should be acknowledged that along with many specific intellectual capital measurement models (which either use or do not use intellectual capital classes) models that relate to the measurement of national or regional intellectual capital can be found. These models have emerged from economic disciplines not directly focused on intellectual capital. However, they contain many elements that are part of intellectual capital. Examples of these models are the following:

- The *Global Competitiveness Index* (GCI)¹⁷ developed for the World Economic Forum by Sala-i-Martin. The GCI is composed of nine pillars: Institutions, Infrastructure, Macroeconomy, Health and Primary Education, Higher Education and Training, Market Efficiency, Technological Readiness, Business Sophistication and Innovation. (World Economy Forum, 2006, pp. xiii–xv)
- The *World Competitiveness Scoreboard* is included in the World Competitiveness Yearbook (WCY) produced by the Institute for Management Development (IMD). The model divides the national environment into four main competitiveness factors: economic performance, government efficiency, business efficiency and infrastructure. (Rosselet Mc-Cauley, 2007)
- The *European Innovation Scoreboard* (EIS) is the instrument developed by the European Commission, under the Lisbon Strategy. The indicators of EIS are assigned to five categories: Innovation Drivers, Knowledge Creation, Innovation & Entrepreneurship, Application and Intellectual property. (Innometrics, 2006).
- The *World Knowledge Competitiveness Index* (WKCI) is provided by the Centre for International Competitiveness founded by Robert Huggins Associates. The index is an integrated benchmark of the knowledge capacity, capability and sustainability of the leading regions across the globe utilising 19 knowledge economy benchmarks, such as patent registrations, education expenditure and information and communication technology infrastructure. (Centre for International Competitiveness, 2007)

¹⁷ Previously the World Economy Forum provided the *Growth Competitiveness Index*, which was composed of three component indices, namely the Macroeconomic Environment Index, the Public Institution Index and the Technology Index (World Economy Forum, 2005, pp. xiii–xix).

The four competitiveness indices described above are based on several components, many of which include intellectual capital related factors. Examples of those are public R&D expenditures, tertiary education, community trademarks, employment and technological infrastructure. Thus these indices provide some kind of an idea of the intellectual capital of nations and regions¹⁸.

1.4.4 Synthesis of various models

In light of the previous discussion (Chapters 1.3, 1.4.2 and 1.4.3) a classification of various models for intellectual capital management is proposed. The matrix presented in Figure 1 illustrates the classification. It shows that models can be used in either micro or macro-level examination. On the other hand, some of the models were developed within intellectual capital research theme, whereas the others emerge from other management disciplines.

	Designed for intellectual capital management	Not designed for intellectual capital management
Micro-level examination	Valuation (e.g. CIV) External reporting (e.g. Danish Guidelines) Support internal management (e.g. Knowledge Assets Value Spiral)	e.g. Balanced Scorecard, EFQM Excellence Model
Macro-level examination	Utilise intellectual capital structure and terminology (e.g. NICI, RICI) Do not use intellectual capital structure and terminology (e.g. SCBS, ICCI)	e.g. Global Competitiveness Index, European Innovation Scoreboard

Figure 1. Classification of models for intellectual capital management

Regarding each and every model the classification is not as unambiguous as presented in the figure. Instead, some models, such as the CIV could have been placed in two classes. However, the classification provides a simple illustration of the diverse group of models that may be used for the management of intellectual capital.

¹⁸ Based on the *Global Competitiveness Index 2007–2008* Finland is in the sixth position (World Economy Forum, 2007), based on the *World Competitiveness Scoreboard 2007* Finland is in the 17th position (Institute for Management Development, 2007) and based on the *Summary Innovation Index* in the *European Innovation Scorecard 2006* Finland ranks third (Innometrics, 2006).

2 RESEARCH DESIGN

2.1 Research problem and questions

Intellectual capital is an important source of wealth creation in companies. Therefore, it is necessary to manage these important resources in order to make sure they are utilised efficiently. A lot of theoretical work has been done aiming at designing models for intellectual capital management (see Chapter 1.4.2). A wide variety of models to support different managerial tasks, such as reporting, measurement, valuation and development of intellectual capital are available. However, research on intellectual capital management from an empirical perspective still seems to be insufficient (Wu et al., 2006). There appears to be a wide gap between the theory and practice: companies do not seem to be using these intellectual capital management models. At least there is a lack of reported practical experiences of the application of those models. Nilsson and Ford (2004) also identified a gap between the approach of academic researchers to the subject and companies' practical application of the idea. In addition, according to Marr and Chatzkel (2004), it is important to test the theories. Thus there is a considerable need to combine theoretical approaches with companies' real situations.

The gap may result from several problems. For example, the application of these models may be difficult (or even impossible) if they are too theoretical. According to Han and Han (2004) only few applicable models have been proposed. There may also be some confusion about which model to apply in a particular situation. There are a number of managerial needs that may be supported and also a heterogeneous group of models available. An alternative explanation for the gap may be that managers do not consider intellectual capital important as such and therefore do not need any intellectual capital management models.

Even though intellectual capital as a research theme is quite mature, its individual components have been studied a lot in other disciplines for years and managers have been developing these components (see Chapter 1.3). For example, human resources management concentrates on various issues related to employees, such as recruitment, compensation, the evaluation of employee performance, promotions and payrolls. Many management models and practices have been developed within general management disciplines that may also be suitable for managing intellectual capital (e.g. the Balanced Scorecard). Hence, in some situations it may be unnecessary to use a specific intellectual capital management model to support the operationalisation of intellectual capital management. The foregoing could also be an explanation for why companies do not apply these models.

This research deals with the observation above: the intellectual capital models presented in the intellectual capital literature are not used in companies (see Figure 2). However, managers need tools and techniques to manage their intellectual capital (e.g. Marr et al., 2002). Such tools should help to answer questions, such as: What kind of intangible resources do we have?

Are these intangible resources increasing or decreasing? How are they developed? (Mouritsen et al., 2004) To simplify, the research suggests that intellectual capital should be managed using specific intellectual capital management models. If companies do not apply the models, from the academic point of view they are not managing their intellectual capital holistically and in a structured way. From managers' perspective the problem is quite different. It is not known if managers even need these models to support intellectual capital management in their organisations or if the models are applicable in practice.

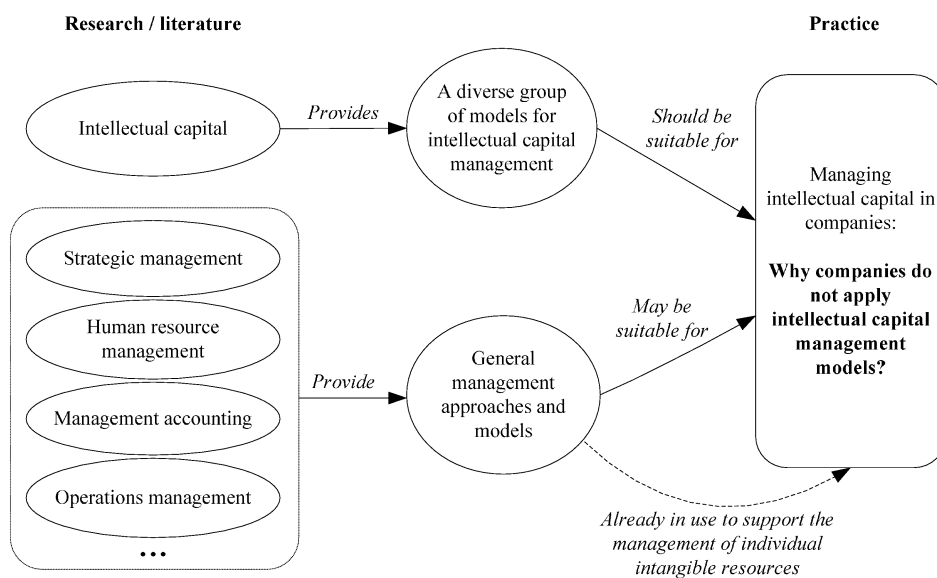


Figure 2. Starting point and research problem

This research aims *to understand why companies do not apply models that are commonly known in the intellectual capital literature*. In this research the phenomenon is examined in Finnish companies. Although the literature shows a gap between the development and the practical use of intellectual capital management models, the research objective has its main origins in the author's own understanding of the theme. The main focus of this thesis has been evolving in recent years in the course of carrying out the research and writing the papers it contains. The final decision about the main objective was supported by the findings of the empirical evidence gathered from the research projects in which the author has been involved.

As the question above is rather broad and complex to be approached as such, it is divided into four research questions:

1. *Are intellectual capital and its management not important for companies?*
2. *Are models that are commonly known in the literature not applicable in practice?*
3. *Can intellectual capital management be applied in practice through typical general management approaches? If so, how?*
4. *What factors affect the choice of whether to apply a model that is commonly known in the literature to support intellectual capital management or not?*

Answering the four questions posed should provide reasons for why companies do not apply intellectual capital management models.

First, it is generally stated that intellectual capital and its management are important for companies. The first question examines the current state of Finnish companies. A possible explanation for not applying the intellectual capital models is that intellectual capital is not after all important in terms of its value and effect on productivity and profitability. It is also questioned whether managers even wish to have tools for intellectual capital management.

The second research question focuses on applying four models that are commonly known in the intellectual capital literature in practice. The purpose is to test if they are even applicable. Two valuation models, namely the Calculated Intangible Value and the Value Added Intellectual Coefficient, and two models to support the internal management of a company, namely the Meritum Guidelines and the Danish Guidelines, are applied. Difficulties in applying the models may indicate that managers consider these models too complicated or theoretical and therefore do not use them.

Third, another explanation may be that many companies already have some other management system in use. Thus many general management systems may also provide a basis for intellectual capital management. In order to study the previous assumption, the suitability for managing intellectual capital of two typical general management approaches, namely business process management and balanced performance measurement, is examined.

Finally, it is assumed that operationalising intellectual capital management may be carried out various ways. The fourth question addresses the situation in which a suitable way to operationalise intellectual capital management is chosen. The focus is to find out if there are some factors that affect the choice of whether to use an intellectual capital management model.

It should be noted that the four research questions are quite different in nature. Actually, the first two research questions are possible explanations for the fact that companies do not apply the models, while the latter two are more underlying factors for the issue. For the sake of simplicity, all four questions are referred to as possible explanations.

By answering the research questions (1–4) and addressing the obvious problem (i.e. models developed within research are not applied in companies) this research critically considers the entire intellectual capital discourse. Moreover, this research questions the relevance of intellectual capital research as an applied research field.

2.2 Scope of the research

The first limitation of this research is related to the intellectual capital management models researched. Two categories of models, focused on two different domains, have been developed in the literature (cf. Figure 1). In this research, the attention is focused on those used at micro-level – i.e. models that support companies' intellectual capital management.

This study seeks to understand why Finnish companies do not apply intellectual capital management models. Since the objective is broad, it is approached through four possible explanations (research questions). Hence, other possible explanations are excluded from this research. For example, an explanation could be the following: even if a model (developed from theoretical point of view) is potentially useful from practical point of view it is not known to practitioners. This limitation, however, enabled the author to examine the four questions in more detail than if there had been several explanations to be studied. On the other hand, the four questions provide knowledge from different perspectives of the phenomenon studied.

Due to a large number of alternative intellectual capital management models, four models are chosen for more specific examination. They represent various types of models: two of them are designed for the valuation of company's intellectual capital, whereas the other two provide support for both external reporting of intellectual capital and internal management. These models were chosen because they had not earlier been applied as a whole in Finnish companies by other than the people who had participated in the development of the model (cf. Hussi, 2001). However, Salojärvi (2005a) used the first part of the Meritum Guidelines in identifying the intellectual capital in three Finnish companies but not the model as a whole. The choice was also affected by practical reasons¹⁹.

This research focuses on the application of models. In terms of models to support the internal management of a company, application usually refers to the design of an intellectual capital management system (e.g. identifying intellectual capital and designing the development activities). Instead, the implementation of these management systems is not examined. Implementation means putting systems in place (cf. Bourne et al., 2000). As regards valuation models, application usually means execution of the various steps suggested in the model.

Concerning common management approaches (cf. research question 3) only two typical approaches were chosen for examination (i.e. business process management and balanced performance measurement). Other typical common approaches could also have been chosen, such as total quality management. This limitation was also partly due to practical reasons.

This research focuses on Finnish companies. However, each piece of empirical data (described in Chapter 2.3) has its own target group. The quantitative data consists of small and medium-sized companies and large companies representing the eleven largest industries in Finland. In the interview data, the target companies were among the 500 biggest Finnish companies (based on turnover). Finally, the case studies were conducted in different types of organisations instead of companies only. This choice was mostly due to a practical reason: the case companies and organisations participated in larger research projects and the author had access to the data. It was, however, considered justified for the purposes of the case studies. This research does not discuss the results or effects of applying a certain model (e.g. developed management system), which would probably have been affected by the different

¹⁹ These models have been studied in two large research projects carried out in the *Performance Management Team* (Mittaritiimi) at Tampere University of Technology. A research project *IC Toolbox – Intangible Assets and Productivity* carried out in 2004–2007 examined methods and processes for applying intellectual capital management. The project was mainly financed by the Finnish Workplace Development Programme (Tykes) and involved seven Finnish organisations. Another project was funded by The Finnish Work Environment Fund and the six companies from Tampere region it addressed. The project ran during the period 2006–2007.

characteristics of an organisation (e.g. public, knowledge-intensive, not-for-profit). Instead, the interest is in the process of applying a model, which in turn should not be so very different in different types of organisations. Hence, for the sake of simplicity the term company is used in the following chapters. If the term organisation is used, it is because the author wants to emphasise that the examination was carried out in a public or other not-for-profit organisation. To conclude, this research in its entirety does not emphasise any specific industry or of a certain size.

2.3 Research methods

The purpose of this part is to describe the empirical material used in this research. In addition, the analysis methods used in the empirical examination are presented. Hence, the term research method is used to refer to both data gathering methods and to data analysis methods. The aim is to describe how this research is carried out and why the certain choices have been made.

This research includes four questions which are different in nature. However, what is common to all questions is that they are mainly empirical. This was regarded as reasonable, since a purely theoretical approach would not provide enough understanding of the research phenomenon. In this research the four questions posed are answered by means of various types of empirical data and by using different analysis methods. Using multiple research methods provides a more comprehensive understanding of the research phenomenon by examination from different perspectives (Birnberg et al., 1990). The relationships between the four questions and different empirical data (A–D) utilised to answer the questions are presented in Figure 3.

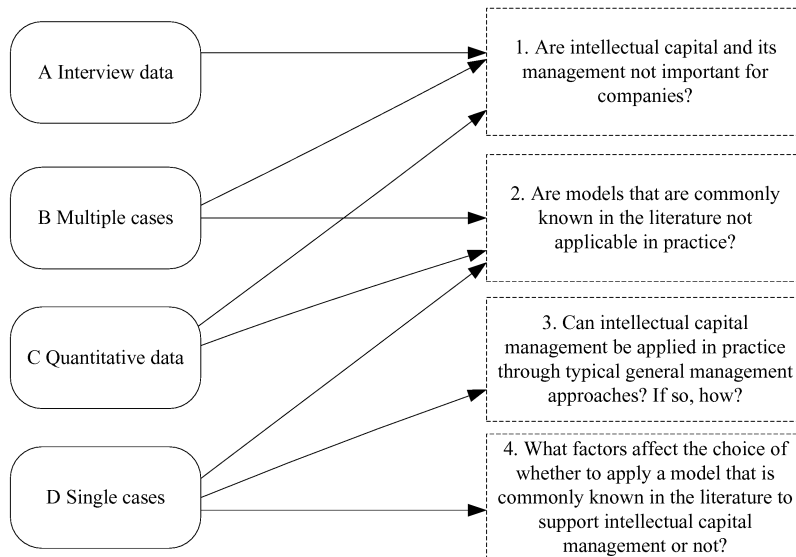


Figure 3. Orientation basis for the empirical material (A–D) in relation to the research questions (1–4)

It should be acknowledged that certain data may provide answers to more than one question and correspondingly a single question may be answered based on several types of empirical material. Table 3 summarises information regarding different empirical material (A–D).

Table 3. Summary of the empirical material used

	A Interview data	B Multiple cases	C Quantitative data	D Single cases
<i>Number of units in the data</i>	35 companies	10 companies	20,000 companies	Four organisations
<i>Data source /gathering methods</i>	Interviews	Multiple cases – action research	Data base from the Statistics Finland, based on the financial statements of companies	Single cases – action research
<i>Period</i>	Certain situation (2007)	Around one year (2006–2007)	Three years (2001–2003)	Around one year (2003–2006)
<i>Analysis methods</i>	Extracting frequent answers (subjective assessment)	Analysis of the early phases of the development project; similarities with the results of the interview study were identified (subjective assessment)	Statistical methods (objective)	In-depth descriptions of three cases (subjective assessment) / Three cases are discussed in light of the factors identified in the literature (subjective assessment)
<i>Role of the researcher</i>	Empiricist (outside)	Participative observer (inside)	Data analyst (outside)	Participative observer (inside)
<i>Characteristics of the research</i>	Descriptive Qualitative	Descriptive Qualitative	Exploratory Quantitative	Descriptive Qualitative

As shown above, a variety of empirical data and analysis methods are used in this research. As a whole this research can be considered to be hermeneutic research rather than positivistic (see e.g. Gummesson, 2000, pp. 177–178). Instead of trying to explain causal relationships, this research uses a more personal interpretative process to understand the phenomenon, i.e. why companies do not apply intellectual capital management models. Other typical characteristics of the hermeneutic paradigm are, among others, focus on specific cases, application primarily of qualitative data, recognition of subjectivity and close involvement of the researcher. In the following, a more thoroughly description of each data and methods used in analysing the data is provided.

A Interview data

The first research question consists of two parts: the importance of intellectual capital as such and the importance of intellectual capital management. In order to be able to answer the second part of the question it was considered necessary to find out how managers wish to

develop intellectual capital in their companies and what kind of intellectual capital management tools are most desired. In addition, the aim was to find out the current status of intellectual capital management in Finnish companies.

Since there is a lack of existing data on intellectual capital management practices and needs in Finnish companies it was necessary to gather primary source data. According to Emory (1985, p. 157) there are two alternatives for gathering primary source data – observation and survey (or question) – which both have their own strengths and weaknesses. The purpose was to collect managerial views of intellectual capital management practices and development needs from many respondents and therefore the survey was more appropriate for data gathering than observation. The choice was also supported by the fact that surveys tend to be more efficient and economical (Emory, 1985, p. 158): surveys enable a large amount of data to be collected with rather small financial and time resources. It is natural that the selection of the research method is influenced by time and cost (e.g. Hannabuss, 1996).

The target companies were randomly selected from among the 500 biggest Finnish companies (based on turnover) in 2005. During spring 2007 a total of 50 companies were contacted and 35 of them participated in the study. The most common reason for refusal was haste in the everyday business. This is a typical practical problem with surveys (Hannabuss, 1996).

Surveying can be carried out by face-to-face interviewing, by telephone, by mail, or by a combination of these (e.g. Emory, 1985, p. 159; Hannabuss, 1996). It was decided to use telephone interviewing, because it is less expensive and time-consuming than face-to-face interviewing and still enables the interviewer to ask extra questions, which is not easy by email. In each company, the company's human resource manager was contacted. He or she was asked to find a person responsible for managing intellectual capital. Thus managers or directors responsible for human resources formed the biggest group of respondents.

Interviews may vary from informal to fully structured, having many stages between these forms. The study is always much affected by how formal it is, that is to say how far predetermined questions and open questions are provided. (Hannabuss, 1996) It was assumed that even though the concept of intellectual capital management (and intellectual capital) is not used in many companies there are most likely some practices already in use which can be considered intellectual capital management. According to Chatzkel (2001) most companies manage their intellectual capital, but they do not put a label on it. Thus it was deemed reasonable to use open questions in most cases in order to enable respondents to answer in their own words. The last question (“Which of the issues listed below are important targets for developing your company during the next two years?”) was structured (eight alternatives were provided), but it also contained an option to answer other than suggested. The questions included in the interview are presented in Paper I. Selecting the questions was based on the researchers' judgment regarding the relevant aspects of intellectual capital management and thus, the questions are not based directly on any theoretical issue. Rather they are intended to elicit the practical status of intellectual capital management practices and needs.

It is important that respondents should be provided with enough information, such as what the study is about, the purpose of the study, how the information is to be used, and what is expected of the respondent (Emory, 1985, p. 162; Hannabuss, 1996). Since the concept of intellectual capital is fairly new and not unambiguous, it was considered significant to explain

to the respondents the content of intellectual capital in the researchers' view. Therefore, the respondents were sent the list of questions as well as the content of intellectual capital (cf. Table 1) by email before the interview took place.

The telephone interviews took about 15 minutes each. Each interview was documented into a response form during the phone conversation. Another alternative would have been to write the information down as notes and immediately afterwards to write up the notes. Because the questions were formulated in advance, it was easy to write down answers to each question asked.

The analysis methods used for the data are quite simple, since the aim was to describe intellectual capital management practices and needs in companies. The data was analysed by noting the issues observed most often in different companies under each interview question. Analysis of the data required subjective assessment by the researchers. The questions asked were mainly open-ended and therefore the analysis of the responses required personal interpretation. This is typical in qualitative research. Adopting Kulmala's (2003, pp. 21–22) presentation of various roles of the researcher in relation to phenomenon to be studied (originally by Evered & Reis Luis, 1991) the role of the researcher can be characterised as empiricist. The researchers' position was outside the research subject's point of view.

B Multiple cases

The interview data provided information about what managers think about intellectual capital management practices and future needs in their company. However, just asking managers for their opinions would not reveal the whole truth. To find out what the most important issues really are that management is actually willing to invest in, a multiple case study was carried out.

Case studies (single or multiple) are used in order to study in-depth a certain phenomenon in selected cases. They emphasise the rich, real-world context in which the phenomenon occurs (Eisenhardt & Graebner, 2007). Case research was also chosen because it enriches not only theory, but also the researchers themselves (Voss et al., 2002). It was reasonable to use multiple cases (instead of a single case), because it enabled a broader exploration and a more robust view of the phenomenon (e.g. Yin, 1994, p. 45). Multiple cases augment external validity, but require more resources and allow less depth per case than single cases (Voss et al., 2002). According to Yin (1994, p. 45) multiple cases can be considered as discrete experiments. In this case study multiple cases of actual intellectual capital management development needs (i.e. what managers are willing to invest in) were examined.

In case research random sampling is not an appropriate way to choose cases. Instead, cases are chosen so that they are particularly suitable for illustrating a specific phenomenon. According to Eisenhardt and Graebner (2007) a few additional cases can significantly affect the quality of the emergent theory. This data included ten intellectual capital management development projects carried out in Finnish companies during the period 2006–2007. The exact number (ten) was mainly due to practical reasons: two large research projects including these development projects were ongoing at the time of this study and the author had an access to all of the cases. Thus it was unnecessary to exclude some of the cases from the data.

Moreover, the choice of which case to exclude would have been difficult to make. It was acknowledged, however, that to conduct multiple cases requires more resources and time for the researchers than to conduct a single case (cf. Yin, 1994, p. 45).

Case studies may use various data sources including interviews, survey data and observations (e.g. Eisenhardt & Graebner, 2007; Gummesson, 2000, p. 3; Yin, 1994, pp. 79–90). The main data gathering method used in the cases was *action research*. According to Gummesson (2000, p. 116) action research is the most demanding and far-reaching method of doing case study. It is a method in which a researcher participates in an organisation's activities and examines an ongoing situation. Action research always involves two goals: to solve a problem and to contribute to science (Coughlan & Coughlan, 2002). Actually, action research is a process of joint learning in which the researcher is not solving the problem *for* the others but *with* the others (Ottosson, 2003). An advantage related to action research is that it can also produce results that are relevant to practitioners, that are applicable to unstructured or integrative issues and that contribute to theory (Westbrook, 1995). Action research can also include all types of data gathering methods (Coughlan & Coughlan, 2002). The main working method within action research was workshops.

The ten companies in which an action research project (focusing on developing intellectual capital management) was carried out were different from those interviewed. Dissimilar companies representing different industries were chosen, since it provided a wide range of experiences. In each company similar phases in the intellectual capital development work were carried out. At the beginning of the development project each company appointed a group that participated in the project. The group of people usually included three people from the company and two researchers as facilitators.

In multiple case studies the researchers discuss only the issues that are replicated across most or all of the cases (cf. Eisenhardt & Graebner, 2007). The analysis of the data focused only on the early stages of the development projects, i.e. choosing which parts of intellectual capital a company begins to develop. Thus, answers to the question “what are the most important issues related to intellectual capital management that managers are actually willing to invest in?” were obtained. The chosen objectives were analysed by the researchers. Furthermore, similarities between the needs resulting from the interviews were identified. Since each company decided what kind of an intellectual capital management objective to focus on in the project (instead of choosing from the list), analysis of the objectives in relation to the interview results required personal interpretation by the researchers.

In addition to examining the actual needs for the development of intellectual capital management (i.e. providing answers to the first research question), these action research projects provided experience of the operationalisation of intellectual capital management in practice. To support the operationalisation of intellectual capital management in four (out of the ten) companies a particular intellectual capital management model – the Danish Guidelines – was applied. Thus, according to the data answers to the second research question (i.e. Are the models applicable?) are also provided.²⁰

²⁰ The development projects (in which the Danish Guidelines were applied) are not reported in detail as a whole in this thesis. Only the early phases of the project are described in Paper I.

In these development projects, the role of the researcher can be characterised as that of a participative observer (cf. Kulmala, 2003, pp. 21–22). Actually, most development projects included two researchers. Acting as participative observers has both advantages and disadvantages. The negative aspects are that it is expensive in terms of resources as well as heavily dependent on the competence and capability of the individual researcher to cooperate. On the other hand, having more than one researcher participating in the projects probably improved the reliability and coverage of the data. (Cf. Gummesson, 2000, pp. 134–135)

C Quantitative data

This part of the research is based on positivistic research paradigm (see Gummesson, 2000, pp. 177–188). The aim was to describe the importance of intellectual capital in Finnish companies. This objective concentrates on generalisation and abstraction instead of understanding the research phenomenon in a specific context.

In order to achieve the objective, a need for a large quantitative data that comprises information from the financial statements of Finnish companies was perceived. There are two main information sources available: the primary data from the original sources collected especially the task at hand, whereas studies made by others for other purposes represent secondary data (e.g. Emory, 1985, pp. 135–137). Primary data sources would not have been reasonable, because, first, it would be too expensive and time-consuming to gather information on the thousands of companies and, second, the companies would not even have allowed the researcher to collect such information. Secondary data may be used in situations where one cannot collect primary data (Emory, 1985, p. 136). Secondary data gathered by Statistics Finland²¹ was used. The data can be classified as statistical in nature (cf. Emory, 1985, p. 137).

Using secondary data naturally imposes some limits on the research. The most important limitation according to Emory (1985, p 136) is that the information does not meet the specific needs for the study, since the material has been collected by others to their own purposes. From the point of view of this research, that is not a significant problem. Most of the measures calculated are grounded on various components found in the data. Only few measures needed to be adapted. In addition, the data was gathered by a reliable actor and therefore the accuracy of the information should not be doubted. Another disadvantage of secondary data is that the information is often out of date (Emory, 1985, p. 136). To avoid the problem, the data used included the latest reported information at the time the study was conducted.

How large a quantity of data to use is always difficult to determine. This data set included all Finnish companies covering the eleven largest industries of Finland, namely business services; chemical; construction; electricity, gas and water supply; electronics; food; forest; metal refining; transportation, storage and telecommunications; vehicle manufacturing; and wholesale and retail. Companies employing fewer than five employees or operating for less

²¹ Statistics Finland operates administratively under the Ministry of Finance, but is fully and independently responsible for its activities, services and statistics. Statistics Finland combines collected data with its own expertise to produce statistics and information services for the needs of society promotes the use of statistics and develops national official statistics. (Statistics Finland, 2007)

than six months a year were excluded. In order to examine the longitudinal perspective and possible time lags information about the companies over a three year period was taken into account. Finally, the data comprised information from the financial statements of around 20,000 Finnish companies during the period 2001–2003.

Positivistic research typically applies statistical and mathematical techniques for quantitative processing of data (Gummesson, 2000, p. 178). The applicability of various statistical techniques depends much on the nature of the variables used. All the variables examined were ratio-scaled (and non-discrete). Table 4 summarises the factors examined and variables used to measure them²².

Table 4. Variables used for different factors

Factor	Variable
Investments in intellectual capital	Relative R&D expenses Relative development expenses
Value of intellectual capital	Calculated Intangible Value (CIV) CIV / value of tangible assets ²³
Efficiency of intellectual capital	Value Added Intellectual Coefficient (VAIC™) Intellectual Capital Efficiency (ICE)
Productivity	Value-added / number of employees
Profitability	Return on Investments (ROI)

The importance of companies' intellectual capital was examined via three sub-questions: What is the value of intellectual capital; what is the efficiency of intellectual capital; and do investments in intellectual capital create profits?

The value and efficiency of intellectual capital were described using *average values*. Other descriptive figures, such as mode, median, fractiles or variances, would also have been suitable. However, in the author's understanding the average value provided an adequate description of the prevailing situation.

To examine the relationships between different variables there are several statistical testing options. In general, statistical testing is about accepting or rejecting a hypothesis based on the basis of sampling information alone. Since any sample will surely differ from its population, one must judge whether or not these differences are statistically significant. A difference is statistically significant if there is good reason to believe that the difference does not represent random sampling fluctuations only. (Emory, 1985, p. 351) As already mentioned, the scales and continuity of the variables under examination set limits for statistical methods. Since all variables examined used were ratio-scaled there were many options. The third sub-question (i.e. do investments in intellectual capital create benefits?) was explored using correlation and

²² The variables are presented in more detail in Papers II, III and IV.

²³ The relative values are calculated by dividing the values of intellectual capital (using CIV) by the values of tangible assets (cf. Kennedy, 1998).

regression analysis as statistical methods. The use of the two analysis methods is discussed briefly below.

First, the data was examined by using *correlation analysis*. In the first phase the aim was to find out if there was any linear relationship between various variables (e.g. relative R&D expenses and ROI). The analysis included various possible routes from intellectual capital investments to profitability. In this context, the possible time-lag was ignored. Pearson's correlation coefficient was used to determine the association between different measures. Thus Pearson's correlation coefficient summarises the linear relationship between two studied variables having ranked categories (e.g. ratio-scaled) (e.g. Nummenmaa et al., 1997, pp. 160–161).

In the next phase of the correlation analysis, the purpose was to take into account the longitudinal perspective. This examination focused only on the variables related to investments in intellectual capital and their outcomes (i.e. productivity and profitability). Both Pearson's and Spearman's correlation coefficients were computed. Spearman's correlation is actually a special form of Pearson's correlation and suitable in cases when the data is not normally distributed (e.g. Emory, 1985, p 389). Correlation analysis gave the first insight into which variables might be worth investigating more thoroughly. The correlations were calculated using time-lagged observations.²⁴

The aforementioned correlation analyses revealed the existence of a possible linear dependency between investments in intellectual capital and a company's productivity and profitability. To ascertain more precisely how different intellectual capital investments influence the productivity and profitability of the company, *regression analysis* was also applied to the data. Multiple regression is often used to develop a self-weighting estimating equation by which to predict values for a criterion variable from values for several predictor variables (Emory, 1985, p. 396). In this context the aim of the regression analysis was to provide as simple a model as possible to show how and when intellectual capital investments benefit the company.

As is typical in positivistic research, the role of the researcher in this examination was external, i.e. the researcher acted as a spectator and maintained a distance between the object and herself (cf. Gummesson, 2000, pp. 178–179). Moreover, the author did not take part in the action. The role of the researcher can be described as that of a data analyst (cf. Kulmala, 2003, pp. 21–22).

D Single cases

Single-case research typically exploits opportunities to explore a significant phenomenon under rare or extreme circumstances (Eisenhardt & Graebner, 2007). According to Yin (1994, pp. 38–39) rationales for a single case are, among others, when it represents a critical case for testing a certain theory or when it represents a unique case. This research uses single cases to

²⁴ A five percent significance level was assumed (cf. Nummenmaa et al., 1997, p. 42–43). For absolute values of correlation coefficient, 0–0.19 is regarded as very weak, 0.2–0.39 as weak, 0.4–0.59 as moderate, 0.6–0.79 as strong and 0.8–1 as very strong correlation.

provide answers primarily to research questions three and four. In addition, one case is also utilised to be able to answer the second research question. In total, four single cases were examined.

Single cases were considered an appropriate approach partly for practical reasons. As Yin (1994, p. 40) argues, conducting a single case study is rationale if the researcher has an opportunity to observe and analyse a phenomenon previously inaccessible to scientific investigation. During the period 2003–2006 the author was able to participate in development projects carried out in four Finnish organisations²⁵. These development projects were different from those in the multiple case material. The data for each case was gathered using action research (action research was already discussed in the context of multiple case data). All four cases examined provided the researcher with a different situation on applying intellectual capital management (see Table 5).

Table 5. Single cases

	Name of the organisation	Application of intellectual capital management
<i>Case 1</i>	Finnish Tax Administration	Application of the Meritum Guidelines
<i>Case 2</i>	Alko Inc.	Through business process management
<i>Case 3</i>	Work Efficiency Institute	Utilisation of balanced performance measurement
<i>Case 4</i>	Joint Municipal Authority for Health Care in the Jämsä Region	Concentration on employee competence

Case 1 provided answers to the second research question. In the case organisation one common intellectual capital management model (the Meritum Guidelines) was applied in practice. Two knowledge-intensive units (together employing about 200 people) of the non profit organisation took part in the development work. Based on the case study, the applicability of the model was examined.

Based on Case 2 and Case 3 the third question – is it possible to apply intellectual capital management without an intellectual capital management model and how to do it? – was answered. Case 2 is about connecting intellectual capital management with business process management. The case company is a large company (employing in total about 2,500 employees) having a monopoly in its own industry. Case 3 represents a situation in which intellectual capital management is applied through a performance measurement system. The case organisation is a not-for-profit organisation of which three knowledge-intensive departments (each employing about 30 employees) took part in the development work. To the best of the author’s knowledge, intellectual capital management had not previously been applied in Finnish organisations using the above-mentioned approaches.

An analysis of these three cases was conducted by the author (and also by another researcher). In a single case study, the challenge of presenting rich qualitative data is addressed by simply presenting a relatively complete rendering of the story within the text (Eisenhardt & Graebner, 2007). Thus all individual cases are described in-depth as a story to provide an

²⁵ as part of the research projects *IC Toolbox* and another earlier project funded by the Finnish Productivity Programme.

understanding of the particular case in a particular context. Compared to multiple cases, single cases are interpreted in more detail. Therefore, in single case studies interpretation plays an important role. Data needs to be interpreted by researchers having their own preconceptions and opinions.

In order to examine the fourth research question of this research Case 1, Case 2 and Case 4 were analysed further. The analysis of the cases can be characterised as theory building (see e.g. Eisenhardt & Graebner, 2007). The key purpose was to develop a theory (actually a framework) of factors that affect the decision on the type of approach chosen for intellectual capital management. In order to develop a theory, theoretical sampling is appropriate (Eisenhardt & Graebner, 2007). It means that cases are selected because they are particularly suitable for illuminating and extending relationships and logic among constructs. Thus three cases in which a suitable approach to intellectual capital management was chosen in practice were explored. These cases provide various perspectives on the choice situation (cf. Table 5).

The choice related to the approach to intellectual capital management in terms of each three case was discussed from different perspectives. These perspectives were identified first in light of the existing literature. Hence, each case was analysed from four aspects. Possible similarities and alternative explanations were examined. The analysis was made by the author according to her own interpretation. However, the results were assessed and approved by another researcher who also participated in the development projects.

In all four cases the researcher (or two researchers) acted within the action research project as a facilitator. In relation to the phenomenon researched (i.e. application of intellectual capital management) the researcher can be placed inside, representing a participative observer (cf. Kulmala, 2003, pp. 21–22).

2.4 Research structure

This research consists of eight research papers²⁶. In practice, various empirical material (A–D) is used in the different papers. Figure 4 summarises the relationships between the empirical material, papers and research questions. Thus the papers form an entity which enables the author to answer to the four research questions formulated.

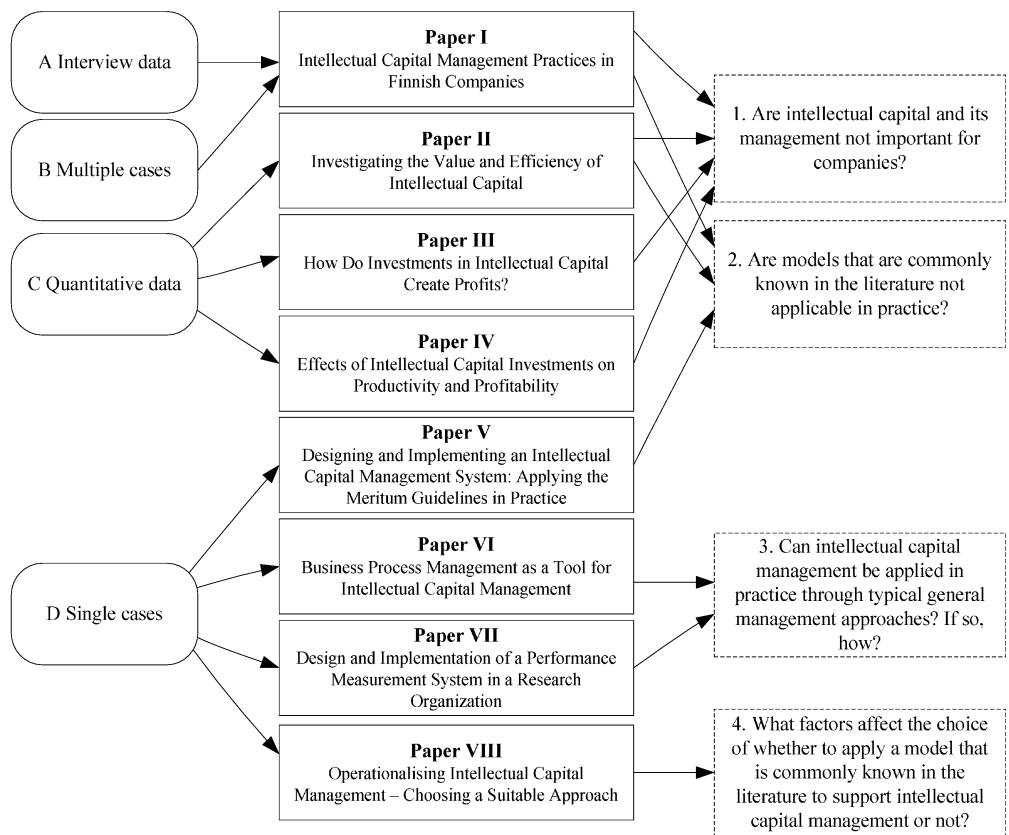


Figure 4. Composition of the papers

²⁶ Original publications are presented in Part 2 of this thesis.

The eight papers form a core part of the contribution of this research. Brief summaries of the papers are presented next.

I Intellectual Capital Management Practices in Finnish Companies

Lönnqvist, A., Kujansivu, P. & Sillanpää, V.

International Journal of Innovation and Regional Development (accepted for publication)

This paper describes the current status of intellectual capital management in Finnish companies, how managers wish to develop intellectual capital in their companies and what kind of tools for the management of intellectual capital are most desired. The study applies two different methods: interviews and action research. The result shows that companies are performing various management activities related to intellectual capital as part of different organisational functions, while a specific intellectual capital management activity does not usually exist. Companies would like to obtain managerial tools for the purposes of internal development of intellectual capital, while external purposes do not seem to be as necessary. The paper concludes that the intellectual capital management models could be useful and possibly beneficial for companies who are interested in obtaining a holistic view of their intellectual capital. However, they seem to be slightly detached from the managerial needs.

II Investigating the Value and Efficiency of Intellectual Capital

Kujansivu, P. & Lönnqvist, A.

Journal of Intellectual Capital, 2007, Vol. 8, No. 2, pp. 272–287

The paper applies the Calculated Intangible Value (CIV) and the Value Added Intellectual Capital (VAIC™) measures in a large set of data. The measures enable a description of the value and efficiency of intellectual capital in Finnish companies to be presented. Moreover, the relationship between CIV and VAIC™ is analysed. The study provides research with experiences of the application of the little used CIV measure and the VAIC™ measure and the industry level analysis of the importance of intellectual capital in companies.

III How Do Investments in Intellectual Capital Create Profits?

Kujansivu, P. & Lönnqvist, A.

International Journal of Learning and Intellectual Capital, 2007, Vol. 4, No. 3, pp. 256–275

The objective of the paper is to determine how investments in intellectual capital are transformed through various stages into profits. First, three various routes from intellectual capital investments to profitability are constructed in light of the literature review. Second, these routes are empirically examined. Relationships are studied using a large Finnish data and suitable measures for each of the studied factors. Contrary to expectations, the empirical results failed to provide a clear answer to the research question. The results show no linear dependency between investments in intellectual capital and profitability. However, the study contributes to the research community's understanding of the complex relationship.

IV Effects of Intellectual Capital Investments on Productivity and Profitability

Väisänen, J., Kujansivu, P. & Lönnqvist, A.

International Journal of Learning and Intellectual Capital, 2007, Vol. 4, No. 4, pp. 377–391

This paper presents how investments in intellectual capital affect a company's productivity and profitability. A theoretical framework for the relationships between intellectual capital investments and productivity, and intellectual capital investments and profitability is presented along with a review of the earlier research. The empirical part consists of an examination of the relationships by statistical methods using a large data set of Finnish companies. The empirical examination takes into account the possible time lag between the investment and its impact on productivity and profitability. The results of this study provide evidence that investments in

intellectual capital do indeed yield benefits, but these benefits may come with a delay. In addition, these benefits are dependent on the types of investments and the type of profits expected. This study contributes to the discussion on the relationships between intellectual capital investments and productivity.

V Designing and Implementing an Intellectual Capital Management System: Applying the Meritum Guidelines in Practice

Lönnqvist, A. & Kujansivu, P.

International Journal of Knowledge Management Studies, 2007, Vol. 1, Nos. 3/4, pp. 276–291

This paper illustrates how an intellectual capital management system can be designed and implemented using the Meritum Guidelines. The research method used within the case study is action research. In addition to the description, the study provides information about the issues that are specific in applying intellectual capital management systems in contrast to other business performance management systems.

VI Business Process Management as a Tool for Intellectual Capital Management

Kujansivu, P. & Lönnqvist, A.

Knowledge and Process Management, 2008, Vol. 15, No. 3 (forthcoming)

This paper discusses whether business process management is applicable for managing intellectual capital. The authors carried out an action research project in a case company in which business process management has already been applied for some years. The application of intellectual capital management alongside business processes management is described and analysed. The study contributes to the prior research by illustrating how intellectual capital management can be operationalised without utilising any specific intellectual capital management model.

VII Design and Implementation of a Performance Measurement System for a Research Organization

Mettänen, P.

Production Planning & Control, 2005, Vol. 16, No. 2, pp. 178–188

This paper describes an action research project in which a performance measurement system was designed and implemented in a case organisation. As a result of the project a performance management system containing a number of intellectual capital factors and their measures was constructed. The paper also analyses what kind of challenges are related to the design and implementation process of a performance measurement system. The study contributes to the intellectual capital research by illustrating how a traditional business performance measurement system (i.e. system not designed specifically for intellectual capital management) can also support intellectual capital management.

VIII Operationalising Intellectual Capital Management – Choosing a Suitable Approach

Kujansivu, P.

Measuring Business Excellence, 2008, Vol. 12, No. 2, pp. 25–37

The aim of the paper is to understand the situation in which a suitable approach to intellectual capital management is adopted and the factors affecting the choice. First, considering the existing literature factors influencing the choice of approach in intellectual capital management are proposed. Second, three cases in which a suitable approach to intellectual capital management is chosen in practice are examined. As a result of this study, and in light of the literature and the cases, a framework containing factors influencing the choice of approach to operationalising intellectual capital management is proposed. The results suggest that there are at least six factors affecting the choice of the approach. This study contributes to the

disorganised discussion of many alternative models for intellectual capital management suggesting that there is no single way to develop a management system for intellectual capital.

Six of the eight papers were written in cooperation with a co-author or two co-authors. In Table 6 the role of the present author in the case of a co-authored paper is described.

Table 6. Role of the present author in co-authored papers

Paper	Role of the author
I Intellectual Capital Management Practices in Finnish Companies	<ul style="list-style-type: none"> • Participated in planning the interviews • Planned the case studies with the first author • Worked as a facilitator in four of the case studies • Wrote and reviewed the paper together with the co-authors
II Investigating the Value and Efficiency of Intellectual Capital	<ul style="list-style-type: none"> • Made the research plan with the co-author • Coordinated gathering the measurement results • Coordinated the writing of the paper • Wrote and reviewed the paper together with the co-author
III How Do Investments in Intellectual Capital Create Profits?	<ul style="list-style-type: none"> • Made the research plan with the co-author • Coordinated gathering the measurement results • Coordinated the writing of the paper • Wrote and reviewed the paper together with the co-author
IV Effects of Intellectual Capital Investments on Productivity and Profitability	<ul style="list-style-type: none"> • Made the research plan with the second co-author • Wrote and reviewed the paper together with the co-authors
V Designing and Implementing an Intellectual Capital Management System: Applying the Meritum Guidelines in Practice	<ul style="list-style-type: none"> • Made the research plan with the co-author • Worked as one of the two facilitators during the action research • Wrote and reviewed the paper together with the co-author
VI Business Process Management as a Tool for Intellectual Capital Management	<ul style="list-style-type: none"> • Made the research plan with the co-author • Worked as one of the two facilitators during the action research • Coordinated the writing of the paper • Wrote and reviewed the paper together with the co-author

3 RESULTS

3.1 Are intellectual capital and its management not important for companies?

Intellectual capital is important and valuable for most companies. This is supported by the results achieved by analysing the large quantitative data (C). The results show that the value of the intellectual capital of an average Finnish company is approximately half of the value of the tangible assets of the company. The monetary value of an average company's intellectual capital is about 3.6 million Euros. The calculations are based on the CIV methodology.

Intellectual capital is organisation-specific (e.g. Bontis et al., 1999; Edvinsson & Sullivan, 1996). Thus the importance of intellectual capital varies with industry (cf. Miles et al., 1998). In Finland, the greatest value of intellectual capital (measured with CIV) can be found in the electronics industry companies. Instead, the least average value of company's intellectual capital appears in the construction industry. Considering the value of a company's intellectual capital in relation to the value of the company's tangible assets in the electronics industry and business services intellectual capital is even more valuable than the tangible assets (see Figure 5). In comparison, the least relative values of a company's intellectual capital appear in electricity, gas and water supply, metal refining and forest industry.

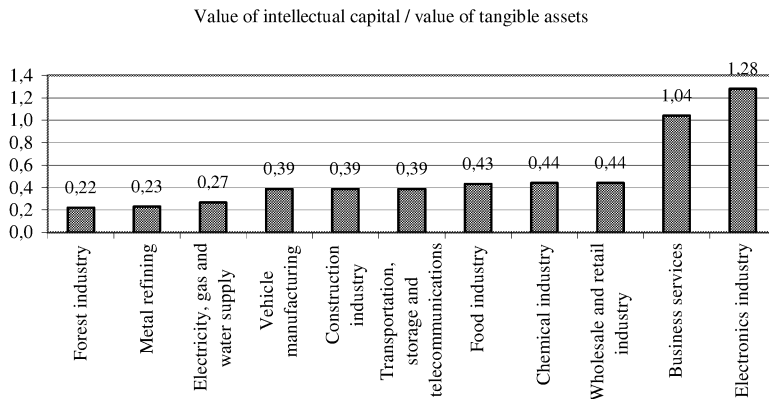


Figure 5. Relative value of intellectual capital in an average company in different industries

These findings were to be expected, since the electronics industry and business services can be characterised as knowledge-intensive while the latter industries are perceived as primary production industries. In knowledge-intensive industries intangible resources such as

competencies and stakeholder relationships are important, whereas in business services especially physical resources, such as facilities and machines, may not be as important. Stewart (2001, p. 23) and Sveiby (1997, p. 19) have also pointed out that most of the key resources of knowledge-intensive companies are intangible. Even though the relative intellectual capital value is rather low in some industries the monetary value of intellectual capital may still be very significant (e.g. 21.6 million Euros in electricity, gas and water supply). Thus intellectual capital may be important for a company in terms of absolute or relative value.

It should be noted that the average value of companies' intellectual capital within the electronics industry is most probably affected by the value of Nokia's intellectual capital and that of other successful companies' in industry. Another important issue to be noted is that although a company represents primary production industries (e.g. construction and metal refining) much of its production is nowadays located abroad (e.g. in China or India). Thus more knowledge-intensive operations, such as product development and after market services, are carried out in Finland. Because of this, boundaries between knowledge-intensive and primary production industries are not entirely clear.

There are no earlier studies that have applied the CIV method to a large sample (in Finland or internationally) and therefore no comparisons can be made. On the other hand, Finland is one of the most innovative countries in Europe (Innometrics, 2006). Thus the value of intellectual capital in Finnish companies is presumably higher than in companies in many other countries, such as those in southern Europe.

As presented earlier in this research, CIV is not the only measure available to describe the value or the importance of the intellectual capital of a company. The variation of the importance of intellectual capital between different industries is also shown when applying other measures, namely VAICTM (and its sub-component ICE). VAICTM describes how efficiently a company utilises all its resources (tangible and intangible), whereas ICE describes how efficiently a company utilises its intellectual capital only. Thus various measures provide slightly varied results. In general, based on VAICTM, there seems to be more variation between different industries than when using the ICE measure. The measurement results achieved are in line with some of the findings of the earlier study carried out by International Business Efficiency Consulting, LLC (2003, p. 11). Instead concentrating on Finland, the study focused on European countries. Both results indicate that companies in the electricity, gas and water supply are the most efficient in utilising their intellectual capital. Instead, companies in the construction industry are not as efficient in utilising their intellectual capital as companies in other industries.

The importance of intellectual capital can be discussed in terms of how it relates to company's financial results. The literature suggests that intellectual capital affects a company's productivity and profitability. For example, it has been estimated that an investment in intellectual capital would create twice as much benefit to a company when compared to a similar investment in a physical asset (e.g. Abernethy & Wyatt, 2003). However, the relationship between these factors is complex (e.g. Ross, 2002). It is unclear how investments in intellectual capital actually affect productivity and profitability – if they have an influence at all. In addition, intellectual capital investments may directly affect

productivity and profitability. On the other hand, the influence may be indirect, that is to say, investments in intellectual capital affect productivity and profitability through various phases.

The preliminary results (based on the quantitative data C) indicate that there is no linear relationship between intellectual capital investments (measured with R&D expenditures and overall intellectual capital investments) and profitability. There may be several reasons for this, such as the fact that the possible time lags were not taken into account. It is also possible that investments in intellectual capital do not have a relationship with profitability because many investments in intellectual capital fail. It is also possible that the relationship between the intellectual capital investments and profitability is non-linear (cf. Huang & Liu, 2005).

However, the results suggest that intellectual capital investments do indeed improve the value of intellectual capital, which in turn leads to higher productivity. Moreover, productivity increase has a positive effect on profitability. It should be acknowledged that in many situations the associations observed are weak. In addition, the analysis carried out does not verify the direction of the relationships. Earlier findings support the previous result. For example, Chen et al. (2005) provided evidence that R&D expenditures have a positive effect on a company's profitability. Moreover, Rheem (1995) emphasises the relationship between R&D investments and productivity growth. A study carried out by Bontis et al. (2000) showed that there is a positive relationship between human capital and customer capital; customer capital in turn has an effect on structural capital and finally, there exists a positive relationship between structural capital and business performance.

Further analysis of the data also took into account the possible time-lag between intellectual capital investments and benefits. The results provide evidence on that intellectual capital investments do yield benefits, but these benefits may come with a delay. These benefits, however, are dependent on the types of investments made and the type of profits expected (cf. Table 4). More specifically, the direct impact of R&D expenditures on productivity is negative. The negative effect diminishes over time and reduces by half within two years. This implies that in general some time must pass before the positive changes in productivity made by R&D investments can be seen. Hall and Mairesse (1995) also pointed out that the question of timing of R&D investments and the output which it affects is problematic.

The addition of advertising, IT and programming and immaterial property expenses to the R&D expenditure component (describing overall intellectual capital investments) clearly diminishes the negative impact caused by pure R&D investments. Ross's (2002) results regarding the relationship between intellectual capital investments and its financial results supports the findings of this study by showing that IT investments have a slightly negative correlation with financial performance.

The results show a linear relationship between intellectual capital investments (measured by R&D investments and overall IC investments) and profitability. However, intellectual capital investments were not able to predict a company's profitability. No obvious explanation was found for this finding.

Besides the results obtained by analysing the quantitative data (C) the importance of intellectual capital was also touched on in the interviews (A). These results also show that most managers regard intellectual capital as an important factor of business, since only four

companies (out of 35 companies) did not recognise intellectual capital as an important factor in business or as an entity.

Since intellectual capital is an important factor of business, it should be managed properly. However, the results obtained from the interview data (A) and the multiple cases (B) indicate that intellectual capital is not managed comprehensively and systematically in Finnish companies. Both empirical material show that companies have a fairly varied set of various development activities and measures in place related to intellectual capital (e.g. competence surveys, working environment analysis). Nevertheless, these tools are often related to a specific intangible resource (e.g. employee competence or customer relationships), not intellectual capital as a holistic issue. Hence, companies seem to be managing intellectual capital to some extent, but the management is not comprehensive.

However, Finnish managers consider intellectual capital management an important issue and need tools to support it. According to the interviews the development of measures for intellectual capital seems to be the most important development target in the near future. Managers are also interested, among others, in linking intellectual capital management into an existing management system. On the other hand, reporting intellectual capital to external interest groups or evaluating the monetary value of intellectual capital is not considered so important. Figure 6 shows the importance of various development targets (responses from 35 interviewees in total).

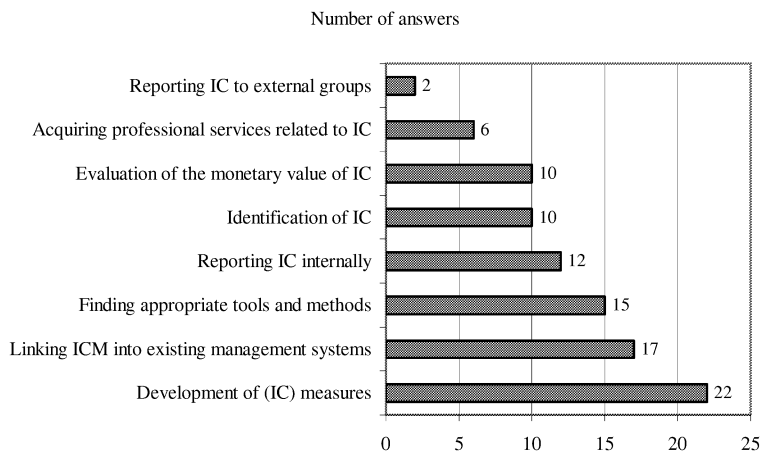


Figure 6. Importance of intellectual capital management development targets

The multiple cases (B) revealed similar results. The development of intellectual capital measures was regarded as an important aspect of the intellectual capital management work in most companies. In addition, it was also considered important to integrate intellectual capital management development with other management systems or initiatives. Companies wish to focus on internal management purposes and none of the ten companies wanted to concentrate on measuring the monetary value of intellectual capital or external reporting of intellectual capital. The fact that ten companies were willing to participate in the research projects and

start a development project in their own organisation also implies that intellectual capital management is an important issue.

To sum up, companies would like to obtain managerial tools for purposes of internal development of intellectual capital. Valuation and external reporting, however, are not considered as important (cf. Chapter 1.4.2).

3.2 Are models that are commonly known in the literature not applicable in practice?

Academics have introduced a disorganised group of models for intellectual capital management. However, the practical application of these models has not as gained as much attention. Are the models even applicable in practice? This part of the research concentrates on the application of four different models proposed suitable for intellectual capital management, namely Calculated Intangible Value (CIV), Value Added Intellectual Coefficient (VAICTM), the Meritum Guidelines and the Danish Guidelines. These models were chosen because they represent various types of intellectual capital models. CIV and VAICTM are developed mainly for valuing and assessing a company's intellectual capital. Both models can be used in company-to-company or business-unit-to-business-unit comparisons (Pulic, 2004; Stewart, 1997, p. 229). Thus, they can be used, among others, to support benchmarking between various companies or to comparing different business units. To study the applicability of these two models, they were applied to a large company-level data (quantitative data C). This was considered reasonable because at the same time it was possible to evaluate the intellectual capital of Finnish companies (see Chapter 3.1).

According to the descriptions²⁷, both the Danish Guidelines and the Meritum Guidelines apparently support the internal management of companies, but also provide a suitable way to create an intellectual capital report for either internal or external use. In addition, they provide guides for defining measures for intellectual capital. These two models also have other similarities (e.g. Palacios & Galván, 2007), among others, suggesting that organisation-specific intellectual capital related to the company's business objectives should be identified and managed. However, the way the intangible resources are identified differs in the models. To test the applicability of the models the Meritum Guidelines were adopted to a single organisation (D) and the Danish Guidelines were applied to four companies (B) along with intellectual capital management development projects.

To the best of the author's knowledge there are no criteria available specifically for a sound intellectual capital management model. Instead, the literature includes several criteria concerning the individual measures for intellectual capital (see e.g. Lönnqvist, 2004). Because the lack of proper criteria for intellectual capital management models this research utilises the criteria suggested by Yusof and Aspinwall (2000). They have proposed seven characteristics that should be used as a guide when developing a suitable and applicable total quality management framework (especially for a small company). In the author's understanding,

²⁷ The Meritum Guidelines are described in-detail in Paper V. The Danish Guidelines are described in Appendix 2.

intellectual capital management and total quality management have many common features (see Chapter 1.3) and therefore these criteria can be useful in this context. The author has chosen the most important and relevant characteristics under the examination. Finally, an intellectual capital management model that is applicable should have the following four characteristics:

- It is simple, systematic and easily understood.
- There are clear links between the elements presented.
- It represents a road map for implementation.
- It is general enough to suit different contexts.

The four intellectual capital management models are briefly discussed in light of the abovementioned criteria. It should be acknowledged that the chosen criteria by no means cover all possible characteristics of an applicable intellectual capital management model, but many of the most relevant ones.

Calculated Intangible Value (CIV)

CIV is based on the assumption that a company's premium earnings, i.e. the earnings greater than those of an average company within the industry, result from the company's intellectual capital. The calculation of CIV is described step-by-step and can be divided into six phases²⁸. Based on the guides, the data needed for the calculation can be found in the financial statements of companies. In practice too, CIV was easy to calculate and the data was easily obtained from the financial statements. However, the data needed for calculating the average return on tangible assets within each industry (i.e. the fourth phase of the model) required rather more work. That company-level information was not publicly available and therefore the calculation needed to be carried out by an official actor (Statistics Finland). Finally, all six steps were carried out and the value of the intellectual capital of the companies was assessed.

Overall, CIV provided a systematic way for calculating the value for intellectual capital. The various steps also seem simple enough to carry out. However, since the model is based on information from the financial statements of companies, it is somewhat difficult to find out how the final result of CIV i.e. the value of intellectual capital is actually composed. On the other hand, CIV is straightforward and does not seem to require much interpretation by the person applying it. As regards its suitability for various contexts, experiences showed that CIV is appropriate for different types of companies (i.e. in terms of the size or industry). On the other hand, according to the calculation principles, the execution of the model is possible if and only if the return on tangible assets of the company is greater than the return on tangible assets in the industry. Consequently, the model is not suitable for the valuation of the intellectual capital of all kinds of companies.

²⁸ The six steps are presented in Paper II.

Value Added Intellectual Coefficient (VAIC™)

The execution of VAIC™ (and its subcomponent ICE) also seems quite simple on paper. The calculation of VAIC™ is carried out according to the instructions through several phases²⁹. The method is based on two resources, namely capital employed and intellectual capital. Both resources play a significant role in the value adding of a company and are considered to be investments. In theory calculation seems easy, but in practice some problems arose. In a simplified manner, VAIC™ comprises of three parts: capital employed efficiency, human capital efficiency and structural capital efficiency. However, the calculation of these components was rather confusing and it was difficult to understand the explanations provided. For example, the linkage between human capital and structural capital appeared unclear. The data needed for some of the components (or sub-components) was fairly easy to find, since the determinations were clear and unambiguous. However, some other components (i.e. depreciation, amortisation) were not as easy to calculate directly from the financial statements. Therefore there was a lot of discussion going on with the specialists about what to include and exclude in a specific component. After all the components had been defined, the calculation of VAIC™ as such was easy and systematic. As in the case of CIV, VAIC™ does not appear to be a context-specific model, but is applicable in various companies.

Meritum Guidelines

According to the Meritum Guidelines the management of intellectual capital consists of three main phases: identifying the intangibles (i.e. intellectual capital), defining the performance measures and actions (based on measurements). Furthermore, the guidelines suggest that the first phase (i.e. identification of the intangibles) includes the following steps: the identification of the strategic objectives, critical intangibles, intangible resources and activities that are likely to affect those resources, and the definition of support activities. Although the model is said to be suitable for organisations of any kind, the application was considered problematic in the case organisation, which is a small organisation (two units of a larger organisation). The experiences showed that the model included too many steps (especially in the first phase) and the linkage between various steps was not clear enough. The model was deemed not well suited for small organisational units, since the process scatters attention over too many details and the terminology may moreover not be suitable for the needs of a small unit.

It can be stated that overall the Meritum Guidelines work in practice: they can be modified according to the needs of an organisation. The terms can be renamed to better suit the needs for the company. For example, in the case organisation, ‘strategic objectives’ was renamed ‘development objectives’. Moreover, the Meritum Guidelines can be simplified: in the case organisation the process covered only the following phases: identifying development objectives, intangible resources and activities. These three main steps provided a general frame for the development work and finally, the management system created was considered sound.

²⁹ The various phases are presented in Paper II.

Danish Guidelines

The Danish Guidelines suggest that intellectual capital management includes four phases: knowledge narrative, management challenges, initiatives and indicators. Experiences gained from the four companies show that these phases also work in practice. The content of various phases is clearly presented and they proceed logically. However, the model was still simple and easy to follow. Moreover, the Danish Guidelines enabled different organisational needs and situations to be taken into account. At the time of applying intellectual capital management there were other management initiatives taking place in the companies, such as a change management process. The idea was to support these initiatives by applying intellectual capital management. The model was slightly modified to suit the needs in all four companies. Thus the model was found to be dynamic and suitable also in practice.

Table 7 summarises the four models in relation to the four characteristics recommended for an applicable model.

Table 7. Summary of the applicability of the models

	CIV	VAIC™	Meritum Guidelines	Danish Guidelines
<i>Simple, systematic and easily understood</i>	+	+ Simple, systematic – Not easily understood	+ As a whole – For the first phase	+
<i>Clear links between elements</i>	–	–	–	+
<i>Represents a road map for implementation</i>	Six steps	Step-by-step guides	Three phases	Four phases
<i>General enough to suit different contexts</i>	+ Companies in different industries and different sized – If the return on tangible assets of the company is not greater than the return on tangible assets in the industry	+ Companies in different industries and different sized	+ Provides a general process – Requires case-specific modification	+ Provides a general process – Requires case-specific modification

Given the experiences gained, these four models can be applied in practice. However, each model has its own weaknesses and strengths in terms of applicability. There are also some issues to be considered related to the results. The experiences show that CIV and VAIC™ can be put into practice by an external actor. Consequently, the models were not applied within each company. This was considered reasonable, since the application of these models is suggested to assist in the valuation of companies' intellectual capital, and in addition, in comparing different companies. Hence, they are not aimed at the internal management of a company. On the other hand, the Meritum Guidelines and the Danish Guidelines were applied within organisations. This was reasonable, because such models were deemed necessary in

light of the interviews. It should, however, be noted that the results in terms of the two models are not fully comparable because the first one was applied in one organisation whereas the other one was applied in four companies.

3.3 Can intellectual capital management be applied in practice through typical general management approaches? If so, how?

Many other management approaches, such as total quality management or balanced performance measurement, also cover some of the factors of intellectual capital (see Chapter 1.3). In theory intellectual capital management could be applied using these more traditional management models and approaches. In this research the purpose was to find out whether two management approaches are applicable for managing intellectual capital. The examination is based on two separate single cases³⁰ (D). First, the application of intellectual capital management through business process management is discussed. This is followed by a discussion on whether the application of intellectual capital management is possible by adopting balanced performance measurement.

According to Lee and Dale (1998) *business process management* is structured, analytical, cross-functional and continuous improvement of processes. Furthermore, it can be considered as a customer-focused approach to the systematic management, measurement and improvement of all company processes through cross-functional teamwork and employee empowerment. The case company had started applying business process management about two years prior to starting the application of intellectual capital management. Thus a lot of development work had already been carried out with the processes. In addition, process management was already a part of the company's routines. Therefore, it was reasonable to integrate intellectual capital management with business process management. Finally, the intellectual capital management development work included seven of the company's 14 business processes, which it was decided to develop individually.

Despite the fact that no specific intellectual capital management model (of those presented in the literature) was adopted, the work followed a certain design. In order to integrate intellectual capital management with business process management, the following phases were carried out (considered suitable in light of the researchers' experience):

1. Identification of important aspects of intellectual capital
2. Determination of relevant development targets related to intellectual capital
3. Design of the development work.

The three phases were executed individually in each process. Identification of intellectual capital was accomplished by analysing the interviews with the process owners, whereas the determination of the development objectives was done by the process owners based on the researchers' suggestions. Finally, the development work was designed in workshops. However, the practical development of the business processes was carried out along with the day-to-day work by the process owner and the process personnel.

³⁰ In order to be able to answer the question, only the early phases of the work are discussed. The cases are reported in-detail in Papers VI and VII.

Given the experiences gained from the case it is possible to identify a company's intellectual capital by analysing its business processes and to identify the relevant development objectives related to intellectual capital. Managing intellectual capital through business process management appears to be to a great extent practical work concentrating on resources and activities. Actually, the concrete work carried out in the case organisation eventually consisted of fairly typical process development activities. The case demonstrated that business process management provides a suitable way to carry out intellectual capital management. The literature lacks prior empirical evidence of the integration of intellectual capital with business processes and therefore comparisons to the similar studies cannot be made.

Applying the idea of *balanced performance measurement* the measures chosen by the companies should be a mixture of financial figures and non-financial ones, derived from the strategic objectives (e.g. Atkinson, 2000; Kaplan & Norton, 1992; 1996) and represent different perspectives (e.g. Adams & Neely, 2002; Kaplan & Norton, 1992). The case organisation had recognised a need for a performance measurement system to support organisation's development and its employees. The reason for this was that the organisation was knowledge-intensive in nature and employees were its most important resource. Other intellectual capital issues that arose before the actual development work and that needed to be taken into account in the measurement system included focus on customer relationships and ability to learn. Thus the main purpose in designing a performance measurement system was not to apply intellectual capital management as such.

The development of a balanced performance measurement system was started with a clean sheet. The design of the balanced performance measurement system adapted Leinonen's process model (see Hannula et al., 2002) and contained the following phases:

1. Clarifying the strategy
2. Defining the success factors
3. Defining and evaluating the measures
4. Determining the reporting principles and the data sources.

Within various phases certain principles of the Balanced Scorecard (Kaplan & Norton, 1992; 1996) and the Performance Prism (Neely et al., 2002) were utilised. The four phases were mainly carried out in workshops.

Even though the focus of the work was not on intellectual capital, intellectual capital played a significant role. As a result, a total of 15 success factors representing five perspectives were identified. 12 of them were related to intellectual capital. Three of these factors were part of human capital (e.g. competence), six of them were part of relational capital (e.g. positive publicity) and four of them were related to structural capital (e.g. project management). Furthermore, most of the measures determined were non-financial in nature.

The case study illustrated that designing a balanced performance measurement system may also pay quite a lot of attention to intellectual capital – at least in a knowledge-intensive organisation. Moreover, the performance measurement system designed may contain many measures for intellectual capital. According to the experiences gained from this case, balanced performance measurement also seems applicable to support intellectual capital management. The results of earlier studies also support these findings. Hasan and Tibbits (2000) applied the Balanced Scorecard in a public utility. They showed that the measurement system designed

includes many measures for intellectual capital and concluded that the Balanced Scorecard provides a suitable framework for managing intellectual capital. Bose and Thomas (2007) in turn applied the model in a large manufacturing company. They too considered the Balanced Scorecard a valuable model particularly suitable for measuring intangible resources. Moreover, the measurement system developed included in total 19 measures, most of which were related to intellectual capital. On the other hand, Mouritsen et al. (2005) argue against integrating intellectual capital and the Balanced Scorecard.

Intellectual capital management does not necessarily require any specific intellectual capital management model. Instead, in some situations it may be reasonable to combine intellectual capital management with some other management practices. The two cases have demonstrated that it is possible to integrate intellectual capital management with business process management and balanced performance measurement. It was also shown that the application of intellectual capital management through some other management model or approach can be carried out either by updating or strengthening an existing management system with intellectual capital aspects or starting off to develop a new intellectual capital management system using a general management model.

Combining intellectual capital management with general management approaches has many advantages. For example, an additional intellectual capital management system may require more resources and cause adverse effects from the management control perspective. In addition, in contrast to discussing intellectual capital management, the focus could be on familiar issues. On the other hand, integrating intellectual capital management with general management approaches may pose a challenge to achieve an overall picture of company's intellectual capital.

3.4 What factors affect the choice of whether to apply a model that is commonly known in the literature to support intellectual capital management or not?

There are differences in requirements case by case that poses challenges from the intellectual capital management point of view (Nilsson & Ford, 2004; Teece, 2000). Intellectual capital management can be operationalised in various ways, for example, by exploiting some model presented in the intellectual capital literature (see Chapter 3.2) or by integrating it into other management approaches (see Chapter 3.3). The challenge is to decide which approach to choose in a certain situation. Three cases were examined to identify the factors that should be taken into consideration when starting intellectual capital management. The literature and three cases revealed six factors that vary from situation to situation and therefore should be considered in the beginning of operationalising intellectual capital management. They are:

- Challenge or managerial need to apply intellectual capital management
- Knowledge of various models available for intellectual capital management
- Existing management systems and ongoing projects
- Resources available
- Initiator for the intellectual capital management
- Use of external support.

First, the initial reason for applying intellectual capital management may vary. The literature shows that the purpose may, for example, be reporting intellectual capital to external stakeholders or measuring intellectual capital (e.g. Andriessen, 2004a). On other hand, the need for intellectual capital management may be based on some general management challenge (e.g. the imminent retirement of large age groups). The cases also showed that managerial need to operationalise intellectual capital is situation-specific. In one of the cases the initial purpose was to react to the structural changes that were ongoing in the organisation, and thus to identify and control the intellectual capital of an organisation as a whole and to learn how to operationalise intellectual capital management. Instead, in another case the starting point was the fact that many employees were about to retire, causing many risks related to competence. To avoid these, the competence of employees needed to be identified and measured. Thus intellectual capital management initiative may also be focused on certain parts of the company's intellectual capital, such as competence (cf. Harrison & Sullivan, 2000).

Second, at the time it is decided to operationalise intellectual capital management somehow, a manager has many alternative models to choose from to support it. Since the literature reports tens of models developed for various tasks (e.g. valuation, report, internal management), it may be difficult to know which model is most suitable – or whether to utilise any model. Bontis et al. (1999) also argue that there is no universally best tool: there are only tools that are more or less suitable to specific situations and organisations. Similarly, Brown et al. (2005) state that no single model will suit all companies. Therefore, sufficient knowledge about various models and their possibilities is essential. In all three cases external assistance (researchers whose expertise is intellectual capital management) was used to guide the decision making situation.

Third, many companies are already using some management system or approach (e.g. total quality management, business process management or value chain). According to Lönnqvist (2002, p. 80) more than half of the Finnish companies are using the Balanced Scorecard or some other measurement model. If there already exists a workable and proper management approach, it might be reasonable to integrate intellectual capital management with it (cf. Davenport & Prusak, 1998, p. 165), for example, by adding intellectual capital factors to those approaches. One case company had started applying business process management, which seemed to work in practice and was already part of the company's routines. In this case the starting point was to operationalise intellectual capital management through business process management. Besides already implemented management systems, other ongoing development projects might also provide an appropriate way to take into account intellectual capital and intellectual capital management by paying more attention to intellectual capital and its specific features on these projects.

Fourth, resources available is one of the most critical factors that influence all development work in organisations (cf. Minarro-Viseras et al., 2005). Naturally, financial resources usually impose limits on development work. In one of the three cases financial resources clearly affected the decision on how to operationalise intellectual capital management. In addition, the human resources available should be considered i.e. the level of resources the organisation will commit to the management of intellectual capital (cf. Harrison & Sullivan, 2000). Besides lack of time resources, there may not be enough competence within an organisation to operationalise intellectual capital management. In these situations it might be reasonable to

enlist external expertise (e.g. consultants). The three cases also showed that external support may be reasonable if there is a lack of time or competence resources for operationalising intellectual capital management.

Fifth, the three cases showed that the initiator of development work within the organisation can influence the choice. In all three cases, his or her work assignment and own interests influenced the focus and limits of the intellectual capital management, and ultimately the approach selected (cf. Harrison & Sullivan, 2000). For example, in one of the cases, the development manager (responsible for the intellectual capital management project) wanted to focus on intellectual capital and its management as a whole, instead of concentrating on a specific intangible resource (e.g. competence, brands).

Sixth, all three cases revealed that external support affects the choice of how to operationalise intellectual capital management. However, the strength of the emphasis seems to be dependent on other factors identified. For example, in one of the cases the researchers had great influence over choice (i.e. to approach intellectual capital comprehensively and to use the Meritum Guidelines). Instead, in another case the choice (i.e. to integrate intellectual capital management with business process management) was only supported by the researchers, but originally proposed by the people in the company. Finally, in the third case a need to identify and measure competence was expressed by the representatives of the organisation but specified by the researchers.

The relevant literature and the three cases permit the conclusion that at least six factors may affect the choice when deciding what kind of an approach to use for operationalising intellectual capital management. It is natural that the factors are not discrete but related to each other. These factors can be used as a guideline when deciding how to operationalise intellectual capital management in one's own company.

3.5 Summary

The purpose of this research is to understand why Finnish companies do not apply the many intellectual capital management models introduced in the literature. First, the importance of intellectual capital and its management were questioned. The findings of the papers do not support this assumption; on the contrary intellectual capital and intellectual capital management appear to be important in Finnish companies. The main findings are the following:

- The value of the intellectual capital of an average Finnish company is approximately half of the value of the tangible assets of the company. In certain industries (e.g. business services) companies' intellectual capital is even more valuable than their tangible assets.
- Intellectual capital investments may generate improvements in productivity, but these benefits may come with a delay.
- At present, companies are not managing their intellectual capital as a whole. However, they have quite a wide range of activities and measures related to intellectual capital in use.

- Managers would like to have managerial tools for purposes of the internal development of intellectual capital. Instead, valuation and external reporting are not considered important.

The second explanation proposed was as follows: models that are commonly known in the intellectual capital literature are not applicable in practice. The results failed to support the assumption. The papers demonstrated how to apply CIV, VAIC™ and the Meritum Guidelines. In addition, the early phases of the application of the Danish Guidelines were presented. Thus the four models appear to be applicable in practice.

- The CIV and VAIC™ methods are quite simple and easy for an external actor to apply to a large company-level data set. However, the linkages between the final results (i.e. value and efficiency of intellectual capital) and their components are somehow difficult to understand.
- The Meritum Guidelines includes various phases that work in general. However, the phases needed adaptation and they were slightly simplified to suit the needs of the organisation.
- The Danish Guidelines seem to work in practice. Nevertheless, some modification was needed in all companies. The model appears to be dynamic and suitable in various contexts.

The third research question implies that specific intellectual capital management models are not used, because intellectual capital management can be carried out using general management approaches. The results obtained support the explanation. Two papers illustrated that operationalising intellectual capital management does not necessarily require a specific model suggested in the intellectual capital literature.

- Already implemented business process management can provide a reasonable way to carry out intellectual capital management. Intellectual capital management can be applied in each process individually through the following steps: identification of important aspects of intellectual capital, determination of relevant development targets and design of the development work.
- A balanced performance measurement system may be an appropriate tool to support intellectual capital management – through it had not been designed especially for intellectual capital management. The design of the measurement system provided a way to identify important intellectual capital and measures for it. It was carried out through the following steps: clarifying the strategy, defining the success factors, defining and evaluating the measures and determining the reporting principles and data sources.

The fourth research question focuses on the assumption that there may be certain factors affecting the choice of whether to apply a model presented in the intellectual capital literature or not. The findings show that the decision on how to operationalise intellectual capital management – to use a model or not – depends on a number of factors. At least the following factors should be considered at the beginning of operationalising intellectual capital management: challenge or managerial need to apply intellectual capital management, knowledge of various models available for intellectual capital management, existing management systems and ongoing projects, resources available, initiator for the intellectual capital management and the use of external support.

The answers to the four research question are summarised in Figure 7. The first assumption on intellectual capital and its management not being important for Finnish companies does not seem to hold true. At the same time, the second assumption (i.e. models are not applicable) was disproved for four models that are commonly known in the intellectual capital literature.

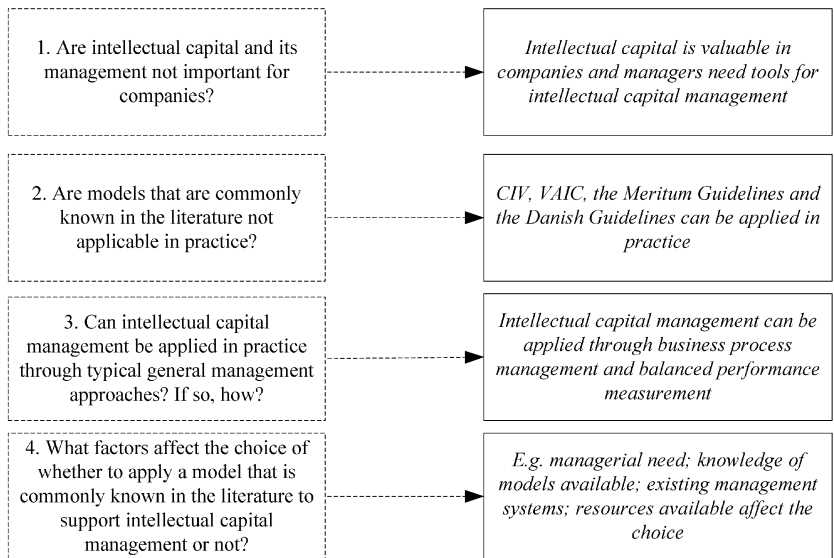


Figure 7. Answers to the research questions

Nevertheless, the third and fourth explanations gained some support. This research showed that intellectual capital management can be carried out using typical general management approaches and therefore does not necessarily need any specific intellectual capital management model. In addition, intellectual capital management models may not be suitable in all situations and there are certain factors that should be taken into consideration when deciding whether to apply an intellectual capital management model.

4 CONCLUSIONS AND DISCUSSION

4.1 Contribution of the research

4.1.1 Contribution to prior research

Prior research has paid a lot of attention to developing models for the management of intellectual capital, yet the earlier literature does not provide much evidence of the practical applications of these models. It therefore seems that companies are not adopting the models to support their intellectual capital management. The objective of this research was to understand why companies do not apply models that are commonly known in the intellectual capital literature. The contribution of this research is based on the examination of the research topic by means of the four research questions.

This research extends earlier research by providing new knowledge about the relevance of intellectual capital and its management in Finnish companies. First, the research enhances knowledge about the current state of the value of companies' intellectual capital. It also shows how companies' intellectual capital investments are related to their productivity and profitability. The analysis is based on a large company-level data set and also includes an industry-level comparison. This type of research has not previously been carried out in Finland. Second, this research enhances knowledge about Finnish companies' current intellectual capital management practices, and particularly their actual needs for intellectual capital management by describing what managers actually wish to develop as regards intellectual capital management.

This research makes a contribution by applying in practice four models well known in the literature but quite little adopted. To the best of the author's knowledge these models have not earlier been applied in Finland to the same extent. The two specific valuation models (CIV and VAIC™) were applied to a large company level data set. The application of rarely used CIV especially can be considered a valuable contribution. As regards CIV methodology, this research supports the utilisation of relative CIV (which can be calculated by dividing CIV by the values of tangible assets) when illustrating the importance of companies' intellectual capital.

One of the contributions of the research is the detailed description of the application of the Meritum Guidelines in one organisation. The description enhances knowledge about the practical use of one of the models most commonly referred in the literature. Even though the presentation is quite descriptive in nature, it can be considered a valuable contribution due to the small amount of research published on the actual application of the many intellectual capital management models developed.

Most of the literature on intellectual capital management suggests that intellectual capital management should be adopted using a specific intellectual management model. The study contributes to prior research by providing two in-depth demonstrations of adopting intellectual capital management without any intellectual capital management model, i.e. by integrating intellectual capital management into typical common management approaches (business process management and balanced performance measurement). Thus the research demonstrates that intellectual capital management does not necessarily require any intellectual capital management model.

This research has shown that intellectual capital management should be designed case-by-case and that there are many factors affecting the choice of how to operationalise intellectual capital management. The contribution the research makes is the presentation of a framework containing various factors that should be taken into consideration at the time of operationalising intellectual capital management. In addition, using the framework researchers can improve their models to better cater for various situations. Instead of trying to develop a model that suits the needs of different companies and managerial situations, situation-specific factors should be acknowledged.

In addition to the previous contributions, this research has also contributed to the intellectual capital discourse in valuable ways. The earlier literature shows that the linkage between intellectual capital and its future benefits is complex. This research has made a contribution by increasing the research community's understanding of the relationships between intellectual capital investments, productivity and profitability. This research in particular extends the examination of the relationships from the level of companies in general to the level of different industries and different-sized companies.

In Chapter 1 the complex and heterogeneous literature on intellectual capital management models is introduced and a classification for the models provided. Therefore, this research contributes to the earlier literature by clarifying the multifaceted area of research. The research does not develop a new, alternative model. Instead, it utilises the existing literature and combines the theoretical models presented in the literature.

And finally, the research contributes to the disorganised discussion of many alternative models for intellectual capital management suggesting that not all models are even suitable for the needs of managers – and they do not need to be. The research showed that managers especially wish to have models to support internal development work. Some of the models (e.g. the Meritum Guidelines) offer a manager a holistic structure and process to introduce intellectual capital management and to develop a management system for intellectual capital. These models can be useful in situations when there is a need to start intellectual capital management from the scratch. However, it makes no sense to utilise any model if there is already a useful management system or approach in place in an organisation. In this case, the existing system can be complemented with intellectual capital aspects. On the other hand, the findings of this research imply that managers do not need models to support the valuation of intellectual capital. Actually, as the research showed, such models may be more appropriate for external use. For example, investors can utilise CIV in benchmarking and comparing different companies or researchers may use them in order to understand intellectual capital factors and their relationships and to compare them between various types of companies.

4.1.2 Contribution to management practice

The starting point of this research was quite practical: companies are not using the intellectual capital management models presented in the literature. Therefore, it is reasonable to discuss the contribution of the research also from a managerial point of view. The results of this research may be considered valuable for at least four reasons.

First, this research is important for identifying the problems or strengths of different industries in Finland regarding the importance of companies' intellectual capital. The industries in which companies have a lot of or little intellectual capital were identified, both in absolute and relative terms. In addition the analysis highlighted the industries in which companies outperformed or underperformed in utilising their key resources (both tangible and intangible). The information may be useful for Finnish managers but also for other stakeholders, such as investors. Moreover, the results of this research may help decision-makers to identify and justify important intellectual capital investments in their respective industries and give them an understanding of the possible returns these investments might yield.

Second, managers (in Finland and other countries) can benefit from the results when the operationalisation of intellectual capital management is relevant. The framework presented can be used as a "checklist" when deciding how to operationalise intellectual capital management in one's own organisation. In addition, the findings may be useful for managers because they can learn from three real situations in which a suitable approach to intellectual capital management was chosen.

Third, the research provides practitioners with three in-depth descriptions of how intellectual capital management can be introduced. Furthermore, examples of how to adopt a holistic intellectual capital management model, how to integrate intellectual capital into business process management, and how to take intellectual capital into account in a balanced performance measurement are introduced. Even though these experiences are based on individual cases they may be useful in similar contexts.

Fourth, another practical contribution of this research is the encouragement for managers to start developing intellectual capital management practices in their own organisations. The results show that the models known in the intellectual capital literature can support the work. However, intellectual capital management can be operationalised without these models and exploiting company's other management systems. The findings also revealed that, after all, intellectual capital management is quite regular development work related to important intangible resources but having a comprehensive view on these resources.

4.1.3 Relevance of intellectual capital research

Intellectual capital as a research theme emerged in the 1990's. It was realised that intellectual capital is the main competitive factor in today's business. Since the beginning researchers around the world have defined the concept and proposed a variety of models to support the

management of intellectual capital. The literature discusses intellectual capital as a new phenomenon. It is something that needs to be measured and managed in order to be successful. The practice, however, is different. Companies do not discuss intellectual capital and do not seem to need any discrete management systems for it. On the contrary, intellectual capital factors (e.g. customer relationships, working atmosphere) are managed in companies through traditional management systems and approaches.

Developing a new concept does not mean that the phenomenon as such is new. New publications and international conferences focusing especially on intellectual capital do not indicate that the object of the research is new. Actually, the objects of management are the same as in traditional management disciplines. Instead the viewpoint is somewhat different: using the concept of intellectual capital offers a holistic view about company's intangible resources. Similar cases can be found in the earlier management research. For example, in recent years, networks, brands and trust are treated as if they were something new and therefore in need of study.

The relevance of intellectual capital as an applied research field can be questioned. This research does not criticise the importance of intellectual capital for companies. Instead, the question is whether the concept of intellectual capital management is needed and whether a company needs new models for intellectual capital management.

Most likely intellectual capital management will never become a classic like the use of management information systems (MIS) or diversification (see e.g. Miller et al., 2004). Obviously, intellectual capital management cannot be considered a management fad, either. According to Gibson and Tesone (2001) management fads are widely accepted innovative interventions in the organisation's practices designed to improve some aspect of performance. Known examples of management fads are total quality management and business process reengineering. It is uncertain whether intellectual capital management ever will be widely accepted among practitioners. Perhaps the management of factors included in intellectual capital does not even need to be carried out as the most part of intellectual capital literature suggests. Perhaps there are other ways for taking into account intellectual capital factors. Intellectual capital, however, as a concept provides managers with a new way of thinking. The concept enables us to focus on all critical factors – not only those that are tangible. Probably intellectual capital thinking can be used in other management classics or fads.

4.2 Assessment of the research

4.2.1 Validity

At a general level the validity³¹ of the research is concerned with the question of whether the researcher is studying the phenomenon she or he purports to be studying (e.g. McKinnon, 1988). Hence, the validity of this research means the level at which the phenomenon – the fact that companies do not apply intellectual capital management models – was studied. The validity can be criticised, because the phenomenon was only examined from the four

³¹ often referred to as internal validity (see e.g. Emory, 1985; Yin, 1994)

perspectives and therefore many other approaches (i.e. explanations) were omitted from the research. Choosing these specific perspectives was mainly because this research consists of several papers written and published individually and partly randomly in recent years. If the research had been a monograph the perspectives examined would most likely have been different. On the other hand, the structure of this research can also be considered as a strength when evaluating the results. In total eight papers discuss the research phenomenon from different angles.

Some criticism can also be made regarding the research methods used. The same phenomenon could have been examined using different data and methods allowing more informative results as to why companies do not apply intellectual capital management models. For example, simply interviewing managers and asking about the issue could have provided useful results. However, the choice regarding the research methods was affected by practical limitations. The opportunity for the author to participate in a large research project enabled her to gather data, analyse data and write papers. The research methods and the reasons for choosing them were discussed in Chapter 2.3.

Validity is impaired if the design and/or conduct of the research is such that the researcher is *unintentionally* studying either more than or less than the phenomenon claimed to be studied (e.g. Gummesson, 2000, p. 91; McKinnon, 1988). Consequently, the validity of this research as a whole does not seem to be a problem. However, there are several issues that should be considered when evaluating the validity of the results in terms of each research question.

The first research question was examined by means of three different sets of empirical material: the importance of intellectual capital for companies was studied using quantitative data, whereas the importance of intellectual capital management for companies was researched using interviews and multiple cases. The validity of a measure refers to the extent to which a test measures what a researcher actually wishes measure (e.g. Emory, 1985, p. 94). Thus the soundness of the measures used for describing the importance of intellectual capital (e.g. CIV, VAIC™) in the quantitative data is debatable. The measures are based completely on financial information, which only captures a part of the company's intellectual capital (cf. Andriessen, 2004b, p. 290). The results based on the VAIC™ methodology especially should be discounted. Nazari and Herremans (2007) have also acknowledged the insufficiency of the VAIC™ methodology and therefore developed it further to take better into account various intellectual capital components. Nevertheless, Chaharbaghi and Cripps (2006) claim that intellectual capital cannot be reduced to a calculable number that establishes whether a company's intellectual capital has increased or diminished. The measures used for intellectual capital investments also apply to only a small portion of all the possible intellectual capital investments (e.g. R&D, advertising), and by no means capture the whole essence of intellectual capital. Thus the validity of the results regarding the importance of intellectual is not optimal. However, no perfect solutions exist for obtaining information about intellectual capital that is simultaneously valid and comparable between companies.

The validity of the results regarding the importance of the intellectual capital management for companies is affected by many issues. There are some factors affecting the quality of the interview data. The questions selected for the interview were not based directly on any theoretical issue, but on the researchers' judgement. However, in the author's own experience, most of the relevant aspects of intellectual capital management were included. Moreover,

other factors may have impaired the quality of the interview data, such as the choice of contacting human resource managers first to find out who is the right person for the interview and how well the respondents understood the questions. The possibility of the latter problem was acknowledged and minimised by explaining the questions, if necessary. In terms of the multiple cases, action research was the main method for data gathering. The fact that researchers participated in the action research projects may have had an impact on the choice regarding the companies' development targets for intellectual capital management. This in turn impairs the validity of the research.

The second research question focused on the applicability of intellectual capital management models in practice. An issue to be noted regarding the validity of the research is the selection of criteria used. The applicability of the models was assessed utilising four characteristics. These characteristics were chosen by the author and decision was affected by her personal judgement. They were, however, considered appropriate, because the aim was not to compare the applicability of the models to each other. Instead, these four characteristics provided a sound frame for presenting the results in brief and enabled answers to the research question posed.

The third research question discussed the application of intellectual capital management through general management approaches instead of by using an intellectual capital management model. The findings are based on two single cases in which action research projects were carried out. According to Lukka and Kasanen (1995) one of the most important characteristics of a successful case study is that it can convince the reader of the validity of the case description and analysis, i.e., it makes a credible impression. Both cases are described fairly thoroughly in the original publications (Papers VI and VII) in order to make it possible for the reader to assess the validity of the findings. Moreover, Paper VI was written in co-operation with the other researcher who participated in the project. The case described in Paper VII written by the present author is reviewed and confirmed by the other researcher, which should improve the validity of the research.

The fourth research question encompassed the factors affecting the choice of approach to intellectual capital management in light of the literature and three individual cases. The fact that these cases represent actual situations in operationalising intellectual capital management should positively affect the validity of the research. Each choosing situation is described as carefully as possible, in order to provide a reader with an understanding of the situation in Paper VIII. In addition, the descriptions were approved by another researcher who was also involved with the cases.

4.2.2 Reliability

Reliability concerns whether the researcher is obtaining data on which she or he can rely (e.g. McKinnon, 1988). It concerns whether the same results would have been obtained if the research was carried out by someone other than the author, using her or his methods (Gummesson, 2000, p. 185). This research as a whole contained different data and analysis methods. It is therefore justified to discuss the reliability of this research in connection with various empirical material.

The reliability regarding the interviews (A) as a whole can be criticised, because most of the questions were open-ended and required personal interpretation from the respondents. This was considered reasonable, because the researchers did not want to lead the respondents too much, but to access the perspective of the person being interviewed (cf. Hannabuss, 1996). However, the question concerning the future needs for intellectual capital management was structured: eight intellectual capital management development objectives were provided of which each was answered with “yes” or “no”. The fact that these answers did not need to be interpreted should improve the reliability of the research.

This research incorporated many cases (B and D), in which action research was the main research method used. It seems unlikely that the same results would have been achieved by some other researcher, because the present researcher has influenced the results by participating in the action research projects in the organisations (cf. Lönnqvist, 2004, p. 238). McKinnon (1988) mentions two main threats to the quality of research in a participative observation: observer bias and data access limitations. The first means that the researcher may have a selective perception and interpretation of what she or he sees or hears. Similarly, according to Westbrook (1995), subjectivity is the main methodological weakness of action research. In practice there were two researchers in each step of the development work. The fact that the plausibility of results rests on the credibility of more than one researcher should improve the reliability of the research (McKinnon, 1988). Another threat may refer to the fact that the researcher is only on site for a limited period of time and can not observe what happened before or after her stay. This, however, is a typical limitation in doing field research.

Besides affecting the reliability of all cases included in this research, the author’s subjective interpretation clearly affected the results regarding the applicability of intellectual capital management models. The applicability of models was assessed by the author using four criteria. Naturally, another researcher would probably have achieved somewhat different results. The same problem may occur in the analysis of the factors related to the choice of a suitable approach for intellectual capital management.

There are also other issues that should be considered when evaluating the reliability related to the findings achieved based on the cases. First, it can be questioned whether the size of the sample in terms of a specific research question is adequate to answer the question. Regarding the importance of intellectual capital management, ten cases (B) were studied. The purpose was to identify the issues observed most often (in the interviews) and then to identify similarities between the case study results and the interview results. Hence, the number of cases can be considered adequate for sufficient reliability. Instead, the reliability of the results regarding the applicability of intellectual capital management models is problematic. Only four different models were examined (material B, C, D). It is impossible to know if other models are applicable, i.e. whether an additional application would have yielded new information. In order to find out whether intellectual capital management can be applied through common management approaches single cases with two different approaches were examined (D). In the author’s understanding, an additional case of either of the approaches would not have improved the reliability of the research. Finally, to be able to answer the last research question three cases (D) were analysed. These cases represented different situations. Because case numbers are typically small, a few additional cases may affect the quality of the

results (Eisenhardt & Graebner, 2007). It is unclear whether an additional case would have provided with more reliable information.

As a whole, the reliability of the results gained from the quantitative data (C) is good. Several issues affected the reliability of the results. First, the results are based on a large sample (20,000 companies) which improves their reliability. Second, the data can be considered reliable as all the information in the data is publicly available. Besides, the information was provided and calculations made by a reliable actor (Statistics Finland). Third, the results are based on statistical methods and therefore likely to be objective. There are, however, some weaknesses related to the study. For example, the results regarding the relationship between intellectual capital investments and their benefits are based on data for the period 2001–2003. The findings might have been more informative if data had been available for more than three years. In addition, despite uniform accounting standards, companies may use them in different ways. Therefore, information related to different companies (e.g. ROI) can be based on different principles.

As a whole, the reliability of this research is fairly good. The contribution of this research rests on eight papers published (or accepted for publication) in international journals. Hence, each paper has been peer-reviewed, which attests their high quality. This in turn reflects the reliability of the results.

4.2.3 Generalisability

When evaluating the generalisability of the results note should be taken that this research as a whole aimed at *understanding* the phenomenon rather than describing it. However, few issues regarding the generalisation of results related to the four research questions studied should be pointed out.

First, the results regarding the importance of intellectual capital for companies were gained via statistical methodologies. In positivistic research the term external validity of research findings is often used to refer to their ability to be generalised to or across groups, settings and times (e.g. Birnberg et al., 1990; Emory, 1985, p. 94; Yin, 1994, p. 33). The sample used in this research included about 20,000 companies from the eleven largest industries. The data can be considered representative enough. Hence, the findings can be applied to companies representing those industries. Instead, it is unclear whether the results apply to companies in other industries in Finland. Moreover, since companies with fewer than five employees were excluded from the research, the results may not apply to micro-companies. Longitudinal data from a three-year period also endures generalisability. Overall, it can be argued that the results have a high external validity (generalisability).

Second, the importance of intellectual capital management was examined by means of two qualitative data sets. Although the total number of companies covered in these studies is not very high (45), the material can be considered to provide a fairly good overview of Finnish companies. Moreover, the findings based on the interviews should be applicable among the 500 biggest Finnish companies (based on turnover), because the participating companies were randomly chosen from the target group and the response rate was 70 percent. In a multiple

case study replication logic is often used to achieve generalisable results (Yin, 1994, p. 33). It can be argued that ten cases of actual intellectual capital management needs (in data B) should be sufficient replications. Multiple cases should improve external validity (e.g. Voss et al., 2002).

Overall, the results related to the importance of intellectual capital and its management obtained in this research provide a relatively good view of the situation in Finnish companies. Instead, nothing can be said about situation in companies in other countries. Moreover, the results may not apply to other types of organisations, such as knowledge-based public organisations, in which the managerial situations and challenges are somewhat different (cf. Rantanen et al., 2007).

Third, the possibility to operationalise intellectual capital management without a specific intellectual capital management model was examined via two single cases. The idea of single case studies is to provide in-depth illustrations of the case in a specific context but they do not aim at generalising results (e.g. Voss et al., 2002). In general, to gain generalisable results from single cases is considered difficult, if not impossible (e.g. Eisenhardt & Graebner, 2007). However, Lukka and Kasanen (1995) argue that generalisation to a reasonable extent is possible from a properly conducted case study. The main findings may be also – at least sometimes and to some extent – applicable to other organisations in a similar context (Lukka & Kasanen, 1995). That is to say, companies that are already utilising business process management could integrate intellectual capital management with it. Furthermore, a knowledge-intensive organisation currently beginning the design of a balanced performance measurement system may integrate intellectual capital management with it. Instead, nothing can be argued based on the results about integrating intellectual capital management into other common management approaches.

Fourth, this research likewise cannot make any claims about the applicability of all intellectual capital management models. The literature covers tens of models proposed for intellectual capital management. Only four of these were taken for examination in this research. Within the limitations of this research, the findings may be useful in similar contexts (cf. Lukka & Kasanen, 1995). For example, the CIV may be appropriate in situations in which the value of many companies' intellectual capital needs to be assessed and the results need to be suitable for comparison. The results regarding the Danish Guidelines were based on four cases and therefore can be considered more generalisable (replication logic).

Fifth, the findings regarding the factors affecting the choice of whether to apply intellectual capital management model are based on three cases. The cases represent different selection situations. Despite the small number of cases, the findings (i.e. framework) can be usable in any organisation starting operationalising intellectual capital management. Moreover, the case descriptions may be valuable in organisations operating in similar environments and facing the same kind of challenges as the case organisations.

4.3 Suggestions for further research

The literature on intellectual capital continuously introduces new models for intellectual capital management. Instead, the practical use of these models does not seem to become general. This research represents a small attempt to bridge that gap between theory and practice. However, more research on the practical application of the models and intellectual capital management in general should be carried out. More evidence is needed to support the findings of this study. There are many opportunities for further research. Many issues were excluded from the scope of this research and therefore there are several options for further research. In addition, during the work several ideas of topics for further research emerged.

The first suggestion for further research emerges from the extent of the research questions formulated in relation to the phenomenon researched. This research aimed to understand why companies do not apply in practice models that are widely known in the intellectual capital literature. Because the phenomenon studied in this research was very broad as such, only four viewpoints (explanations) were researched. However, other explanations are possible and also likely. The fact that intellectual capital as a research phenomenon is fairly new may indicate that managers are not aware of the many intellectual capital management models. Moreover, they may be unaware of the benefits of applying a specific model, such as models providing a holistic perspective on intangible resources and structure intellectual capital management process. It is probable that the foregoing explains the research problem at least in part. That is to say, a model could be applicable and useful, but it is not known to the practitioners. In addition, managers may also question whether the application of a model likely to require a lot of resources will ever turn into monetary benefits (e.g. productivity improvements).

Another explanation for companies not applying the models could be that intellectual capital is already managed in companies and therefore they do not need any new models. The previous explanation is supported by the findings from the interviews: Finnish companies have a wide range of different practices in use related to intellectual capital. Finally, models may not have been applied in practice because practice is reluctant to make changes. According to Burns and Scapens (2000) changes in management models involve much more than knowledge of the formal systems; it requires an understanding of the habits of organisational members and assumptions in day-to-day activity. Granlund (2001) also shows the importance of human factors in driving change in management accounting systems. Thus these possible explanations are worth examining. In-depth case studies in real companies would be a suitable way to study them.

Next, avenues for further research related to the first research question are provided. This study evaluated the importance of Finnish companies' intellectual capital using two models presented in the literature. First, it would be interesting also to apply other models proposed for the valuation of intellectual capital to the same sample and furthermore compare the results achieved using different models. This would increase our understanding of their applicability and also provide new information on the validity of these models. Second, in this research the importance of intellectual capital as a whole was approached. One of the interesting topics for further research deals with the importance of companies' intellectual capital in terms of its individual intangible resources (e.g. competencies, image or working atmosphere). This would require more in-depth examination but allow us to use a smaller

number of companies. Third, the benefits gained from intellectual capital investments were also analysed in light of a large quantitative sample. Future studies could, therefore, focus on benefits gained by investing in intellectual capital in certain companies. Long time series would be interesting to study. Fourth, in order to better understand the linkage between intellectual capital investments and their future benefits a longer period of time (e.g. the period 2001–2006) would be relevant to study.

Possibly the most interesting topics for further research emerged from the second research question. This research concentrated on the application of intellectual capital management models. As a result of applying a model (suitable for internal development) new management systems or approaches have been developed. An important research topic would therefore be the implementation of the systems and approaches developed, i.e. putting systems in place. Qualitative research methods (e.g. action research, interviews) would be appropriate. In addition to implementation, it would be interesting to know what influence if any these management initiatives have had on those companies' activities and financial results. This in turn requires a longitudinal perspective for the research. Another important avenue for further studies is the practical application of other intellectual capital management models, such as the Knowledge Assets Value Spiral or the IC Model of the Knowledge Firm.

The findings regarding the third research question also lead to interesting ideas for research. This research demonstrated that intellectual capital management can indeed be integrated into traditional management approaches. This research included two examples of doing so (business process management and balanced performance measurement). Thus, it would be tempting to study whether intellectual capital management can be integrated, among others, into total quality management and value chain management. For example, Heng (2001) suggests that ISO-9000 could be used as a model for intellectual capital management. Action research would probably yield reliable results.

Finally, some suggestions for future research in relation to the fourth research question are presented. This research proposed a framework which includes factors that should be acknowledged when operationalising intellectual capital management. The framework needs more testing and therefore future research could be targeted at validating the framework. One important topic for further research is the improvement of existing intellectual capital management models to better suit the needs of companies. The framework could also be used when re-designing the models to better suit in different managerial situations.

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APPENDICES

Appendix 1: Summary of terms, definitions and categories

Appendix 2: The Danish Guidelines – brief description

Appendix 1: Summary of terms, definitions and categories

Author(s) (year)	Term	Definition	Categories
Brooking (1996)	Intellectual capital	Intellectual capital is the term given to combined intangible assets which enable the company function. (p. 12)	Market assets Human-centred assets Intellectual property assets Infrastructure assets
Edvinsson & Sullivan (1996)	Intellectual capital	Knowledge that can be converted to value.	Human resources Structural capital
Saint-Onge (1996) & Wallace & Saint-Onge (2002)	Intellectual capital / Knowledge capital		Human capital Customer capital Structural capital
Edvinsson & Malone (1997)	Intellectual capital	Intellectual capital is the possession of the knowledge, applied experience, organizational technology, customer relationships and professional skills that provide company with a competitive edge on the market. (p. 44)	Human capital Structural capital (customer capital and organisational capital)
Huang (1997)	Intellectual capital	Intellectual capital consists of information, knowledge, assets, experience, wisdom and/or ideas that are used to enable sharing for reuse and to deliver value to customers and shareholders.	Software assets General intellectual capital Competency intellectual capital
Roos et al. (1997, 2005)	Intellectual capital	Intellectual capital is all non-monetary and non-physical resources that are fully or partly controlled by the organisation and that contribute to the organisation's value creation. (p. 19)	Relational capital Organisational capital Human capital
Stewart (1997, 2001)	Intellectual capital	Intellectual capital is intellectual material – knowledge, information, intellectual property, experience – that can be put to use to create wealth. (p. xx)	Human capital Structural capital Customer capital
Sveiby (1997)	Intangible assets	Intangible assets derive from an organisation's personnel and can be classified into three types. (p. 8)	Employee competence Internal structure External structure
Bontis (1999)	Intellectual capital		Human capital Structural capital Customer capital
Sullivan (1999)	Intellectual capital	Intellectual capital is knowledge that can be converted into profits.	Human capital Intellectual assets
Van Buren (1999)	Intellectual capital		Human capital Innovation capital Process capital Customer capital
Harrison & Sullivan (2000)	Intellectual capital	Intellectual capital is knowledge that can be converted into profit.	Human capital Intellectual assets
O'Regan & O'Donnell (2000)	Intellectual capital		People (Human capital) Structural capital (Internal & External)

Author(s) (year)	Term	Definition	Categories
Ståhle & Grönroos (2000) & Ståhle & Hong (2002)	Intellectual capital	A competent workforce and state-of-the-art information combined with creativity, form the core of organisational intellectual capital. (p. 33)	Realised Potential / Mechanic Organic Dynamic
Andriessen & Tissen (in Andriessen, 2001)	Intangible assets		Skills and knowledge Collective values and norms Technology and explicit knowledge Primary and management processes Endowments
Blair & Wallman (2001)	Intangibles	Intangibles are non-physical factors that contribute to or are used in producing goods or providing services or, that are expected to generate future productive benefits for the individuals or firms that control the use of those factors. (p. 3)	
Hussi (2001); Hussi & Ahonen (2002)	Intangible assets		Generative (Human competence, Internal and External structures) Commercially exploitable
Lev (2001)	Intangibles / intangible assets	Intangible assets are non-physical sources of value (claims to future benefits) generated by innovation (discovery), unique organisational designs, or human resource practices. (p. 7)	
Marr & Schiuma (2001); Marr et al. (2002)	Knowledge assets		Stakeholder resources (Stakeholder relationships & Human resources) Structural resources (Physical infrastructure & Virtual infrastructure)
Meritum (2001)	Intangibles	Intangibles are composed of intangible resources and intangible activities	Human capital Structural capital Relational capital
Abernethy & Wyatt (2003)	Intangible assets	Intangible assets are non-physical sources of expected benefits.	Intellectual property Separately identifiable intangible assets Goodwill (non-separable intangible assets)
Kaplan & Norton (2004)	Intangible assets		Human capital Information capital Organisation capital
Seetharaman et al. (2004)	Intellectual capital		Human Structural Relational

Author(s) (year)	Term	Definition	Categories
Jacobsen et al. (2005)	Intellectual capital	All factors critical to an organisation's future success that are not shown in the traditional balance sheet.	Organisational structural capital Human capital Relational structural capital
Johannessen et al. (2005)	Intellectual capital		Human capital Structural capital Network capital Systemic capital
Wu (2005)	Intellectual capital		General intellectual capital Strategic intellectual capital
Diefenbach (2006)	Intangible resources	An intangible resource is everything of immaterial existence, which is used or potentially usable for whatever purpose, which is renewable after use, and which not only decreases, but can remain or increase in quantity and/or quality while being used.	Human capital Social capital Cultural capital Statutory capital Information and legal capital Embedded capital
Thorleifsdottir & Claessen (2006)	Intellectual capital		Human capital Structural capital Relational capital
Andreou (in Andreou & Bontis, 2007)	Knowledge assets	Intangible factors of production at the operational level.	Market capital Human capital Decision effectiveness Organisational capital Innovation capital
Kristandl & Bontis (2007)	Intangibles	Intangibles are strategic firm resources that enable an organisation to create sustainable value, but are not available to a large number of firms.	

Appendix 2: The Danish Guidelines – brief description³²

The Danish Guidelines (Intellectual Capital Statements – The New Guideline) serves constructing an intellectual capital statement. The intellectual capital statement both helps the company to focus on the important knowledge resources and can also be used for a company’s external communication. According to the guidelines, an intellectual capital statement is constructed via four phases: knowledge narrative, management challenges, initiatives and indicators. These four elements (see Figure 8) also formulate the structure of intellectual capital statement (also referred as the Knowledge Management Model).

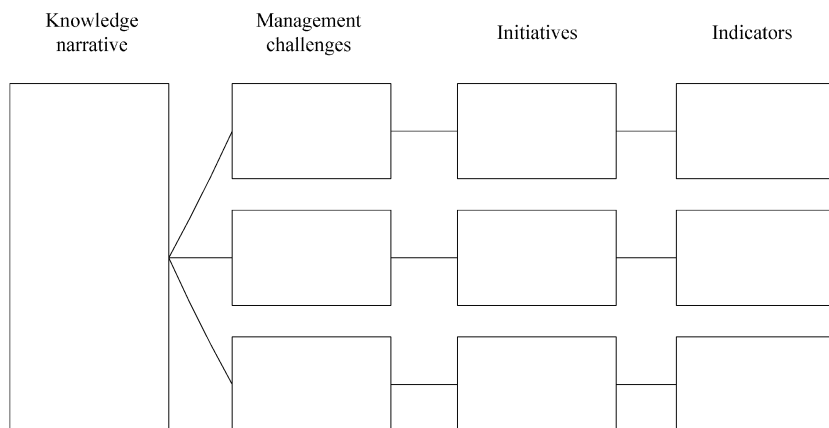


Figure 8. The Knowledge Management Model

The knowledge narrative shows which types of knowledge resources are required to create the use value the company wants to supply. The following questions are answered: What product or service does the company provide? What makes a difference for the consumer? What knowledge resources are necessary to be able to supply the product or service? What is the relationship between value and knowledge resources? The second component is a set of management challenges which emphasise the knowledge resources that need to be strengthened and that are needed. The third component is a set of initiatives that can be taken to do something about the management challenges. They concern how to compose, develop, procedure and monitor knowledge resources. Important questions are: What initiatives can be launched? What initiatives should be prioritised? The fourth component is a set of indicators (measures) which helps to follow up whether the initiatives have been launched or whether the management challenges have been achieved. Indicators can measure effect, activities or resources.

The four components represent the company’s knowledge management process. It should be pointed out that they are interrelated and the relevance of these components only becomes clear with the context. The model illustrates the interrelationships between individual factors in the company’s knowledge management.

³² The description is based on the report by the Danish Ministry of Science, Technology and Innovation (2003) and uses the terminology used in the original text.

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