MEASUREMENT OF INTANGIBLE ASSETS – AN ANALYSIS OF KEY CONCEPTS

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Abstract

The objective of this paper is to analyse and integrate the different concepts related to the measurement of intangible assets. Thus, the research method used is conceptual analysis. The definition of concepts is important in this research field for two reasons. Firstly, the use of concepts related to intangible assets is somewhat ambiguous. Several concepts are often used to describe the same phenomenon. Secondly, precise definition is required before a phenomenon can be measured. Since the measurement of intangible assets is in question, this point is emphasized. As a result of this paper, is the definitions related to the measurement of intangible assets are presented. The contribution of the paper is the integration of the concepts related to the traditional performance measurement literature and the more contemporary intangible assets literature.

Keywords

Concepts, Intangible assets, Intangible success factor, Performance, Performance measure, Performance measurement, Performance measurement system, Success factor

INTRODUCTION

There are two main research fields where the measurement of intangible assets has been studied. One is the performance measurement research field which is most closely related to the management accounting research field. The other is the intellectual capital and intangible assets research field which is related to knowledge management and intellectual capital management. The research on intangible assets measurement has been carried out at least partially separately in these two research communities and therefore the measurement solutions developed and the concepts used are somewhat different. These different approaches are shortly described below.

Nowadays a common way to carry out performance measurement is to use some kind of a balanced performance measurement framework (e.g. the Balanced Scorecard) (see e.g. Adams and Roberts 1993, Kaplan and Norton 1996, Laitinen 1998, Lynch and Cross 1991, Maisel 1992, Neely et al. 2002 or Tuomela 2000). Including non-financial measures to the measurement system in addition to the traditional financial ones creates the balance in the balanced measurement systems.

The non-financial measures include production and service related measures, e.g. quality, time and efficiency measures. In addition to these operational factors, also more intangible factors, e.g. employee and customer satisfaction can be measured. The balanced performance measurement frameworks are aimed at providing a comprehensive picture of an organization's performance. The measures are based on an organisation's business objectives and the main goal for a performance measurement system is to assist an organization in achieving those objectives. A performance measurement system is mainly an organization's internal management tool. (See e.g. Kaplan and Norton 1996 or Neely et al. 2002)

The starting point of several studies related to the measurement of intellectual capital has been the need to provide organization's managers and external stakeholders (e.g. shareholders and creditors) additional information to the traditional financial statement (see e.g. Edvinsson and Malone 1997 or Lev 2001). Especially for knowledge-intensive organizations, the financial statement shows only a small part of the total assets of an organization. It has been stated that for many organizations the intangible assets, e.g. organizational structure and employees' competencies are more important than its tangible assets. Therefore they should be managed and also reported to external stakeholders.

Many studies have aimed at constructing an intellectual capital statement or report (see e.g. Brooking 1996; Edvinsson and Malone 1997; Roos et al. 1997). These frameworks usually focus on measuring only intangible factors. This way it is possible to focus on the challenging task of measuring intangible factors. On the other hand, it may not be clear how the intangible assets are supposed to relate to the financial and other tangible factors. Many of the intangible assets measurement systems may be used both internally and externally.

Diverse use of concepts – the motivation for conceptual analysis

In the literature, there are four common concepts that are used to refer to the intangible factors related to organizations' business operations. The concepts are intellectual capital, intangible assets, intangibles and non-financial success factors. The concepts are overlapping and sometimes used as synonyms. However, there are also several differences. The concepts have different origins and they are designed for different purposes. Table 1 illustrates the different approaches and the different concepts used. The first approach examines the factors of organization's performance (the performance measurement research field). The second approach in the table examines the value of an organization's assets or capital (the intangible assets research field). It should be noted that this classification is only a rough generalization and it does not describe fairly the work of all researchers.

Table 1. Different perspectives on and concepts related to organization.

Point of view	Main components
1. Performance of organization	Financial vs. non-financial success factors
2. Value of organization	Financial vs. intellectual capital Tangible vs. intangible assets Tangibles vs. intangibles

The objective of this paper is to analyse and integrate the different concepts related to the measurement of intangible assets in order to obtain more accurate definitions. The definition

of concepts is very important in this research field for two reasons. First, the use of concepts related to intangible assets is somewhat ambiguous. Second, precise definition is required before a phenomenon can be measured. Since this paper deals with the *measurement* of intangible assets, this point is emphasized. Olkkonen (1994, 103) describes the logical chain of reasoning related to operationalizing a phenomenon as follows:

> Describing the phenomenon → Conceptualising and defining the phenomenon
> → Determining how the phenomenon can be quantified → Measuring

Key concepts are analysed and defined in the following chapters. The questions examined are, what is the meaning of each concept, what is it used to describe and what is its historical background. In addition, it is determined how the concepts relate to each other. The actual methods of conceptual analysis are described in the following chapter.

Concepts and the method of conceptual analysis

According to Olkkonen (1994, 100), a concept is an abstract, general and compact definition of a phenomenon. Näsi (1980, 10) has offered a more precise definition by stating that concepts are the counterparts of thinking-level which are presented on a linguistic-level by terms or other symbols related to an imaginary or an objective world; concepts describe compositions of mental images and meanings to contents. Precisely defined concepts are essential for scientific research. Especially, when the measurement of a phenomenon is carried out, concepts and their definitions are key factors of a successful research. (Olkkonen 1994, 97)

Various concepts are used in the everyday practice of management. These concepts can be called colloquial. For a particular phenomenon, there can be both colloquial and scientific definitions of a concept. In scientific language, the criteria of the definitions of concepts regarding their form and presentation are stricter than that of colloquial language. This is caused by the scientists' need to express phenomena as exactly as possible to other researchers. (Näsi 1980, 5-7) In the previous paragraph, two definitions of 'concept' were presented. Olkkonen's definition can be considered colloquial since it is somewhat imprecise and general whereas Näsi's definition can be considered more scientific since it is exact and its scope is carefully defined.

The colloquial and scientific definitions of concepts are used for different purposes (Olkkonen 1994, 97). Scientific definitions of concepts may be too complicated for colloquial use. However, sometimes the gap between colloquial and scientific languages is diminished. For example, in action science, the colloquial and scientific languages must coexist because there is a close interaction between the researcher (who uses scientific language) and the informants (who use colloquial language) (Näsi 1980, 34-35). Thus, the scientific definitions of concepts used in action science are more colloquial than in more positivistic studies.

Näsi (1980, 17) has stated that "contemporary science would not be possible without conceptual analysis". The analysis of concepts is an important part of any research projects. In fact, all research approaches consist of a conceptual analytic part. On the other hand, conceptual analysis can be used as an independent research approach. (Näsi 1980, 33) According to Olkkonen (1994, 65), the purpose of carrying out conceptual analytic research is

to develop systems of concepts. They are needed, e.g., in describing, understanding and classifying phenomena. The challenge is to develop concepts that will be easy for others to understand (Emory 1985, 24).

Both Näsi (1980) and Olkkonen (1994) have presented process models for carrying out conceptual analytic research. Näsi focuses his attention to the way the concepts are analysed whereas Olkkonen pays attention more extensively to the entire research process. The models can be considered as complementary to each other. Both of the models are used here to explain the analysis and definition of concepts in this study.

Conceptual analysis starts with defining the problem and the purpose of using the concepts (Näsi 1980, 14; Olkkonen 1994, 67). The problem in this study is that the use of concepts related to the measurement of intangible assets is quite ambiguous and diverse. The concepts used to describe the problem vary between and within research fields of performance measurement and intangible assets. The purpose of this conceptual analysis is to generate a consistent set of concepts that can be used by researchers of the two research fields. The concepts are intended to be used in action research projects and, thus, they should be practical, i.e. colloquial enough to usable also among managers.

The concepts are analysed and developed by performing both internal and external analysis of the concepts. Internal analysis refers to examining the contents of the concepts and considering the various views that have been presented regarding them (Näsi 1980, 13). External analysis refers to separating the concepts from similar concepts and identifying the upper-level concepts (Näsi 1980, 13). In this study, the focus is mainly on the internal analysis. This is due to the vast volume of varying views regarding the components related to the measurement of intangible assets.

As a conclusion of the analysis, the definitions of the concepts are presented. As in any research, the results (here the definitions of concepts) should somehow be verified (Olkkonen 1994, 67). Verifying the results is difficult to carry out regarding a study in which concepts are developed for a particular purpose. A practical measure of the successfulness of the new concept definitions is the extent that other researchers accept and adopt them. Unfortunately, from the point of view of verifying the results of a certain study, this occurs only after the publication of the research. In practice, the "verification" refers to careful argumentation and reasoning (see Näsi 1980, 14). In Emory's (1985, 24) words, the success of a research depends on the clarity of the conceptualisation and how well others understand the concepts used.

In the following chapters, the conceptual analysis is carried out by first discussing the concepts related to organization's performance and performance measurement. Then, the concepts related to intangible assets are analysed. Finally, making conclusions regarding how the concepts relate to each other finishes the analysis.

PERFORMANCE AND PERFORMANCE MEASUREMENT

Organization's performance is a complex phenomenon. Ultimately, the performance of an organization is about achieving its goals (Hannula and Lönnqvist 2002, Institute of Industrial

Engineers 1990, 11-14). However, performance can be examined from different perspectives and therefore the goals may differ between perspectives. In the Balanced Scorecard measurement system, organization's performance is usually examined from four perspectives: financial, customer, process and growth (Kaplan and Norton 1996). The Performance Prism framework consists of five perspectives on performance: stakeholder satisfaction, strategies, processes, capabilities and stakeholder contribution (Neely et al. 2002). Other researchers have proposed different perspectives. When an organization's performance is examined from different perspectives with various objectives, also different types of performance measures are needed.

Performance can also be examined at different organizational levels. According to Laitinen (1998, 14), performance can be defined as the measurement object's (e.g. company, team or employee) ability to generate output which has predetermined characteristics relative to predetermined goals. According to another definition by Laitinen (1998, 18-19), performance is the organization's ability to maximize the owner's benefits while also sufficiently satisfying the needs of other interest groups. Other interest groups include employees, customers, authorities and so on.

As a term, performance can be understood in several ways. First, performance refers to the actual results or outputs of certain activities. For example, a company's performance can be assessed based on its financial results. Second, performance refers to how an activity is carried out, i.e. how something is being performed. Third, performance may also refer to the ability to achieve results. In conclusion, performance may relate to actual results, activities or the potential for results. Traditionally, the actualised results have been the main focus of attention (see. e.g. Asikainen and Nissinen 1990, Humble 1976, Santalainen et al. 1987 or Stockton 1987). The main reason for this is that actual results are often considered more important than the uncertain potential for achieving results. However, the balanced view of performance focuses attention also to the operational factors (e.g. efficiency and quality in production process) and factors affecting future results (e.g. R&D activities or developing employees' competencies). This suggests that the three interpretations of the term performance correspond to the different practical views of performance.

As described above, performance is a phenomenon that is not easy to define exactly. Performance may be different depending on the perspectives it is examined from. Therefore, a practical and versatile definition of *performance is the measurement object's ability to achieve results in relation to goals*. This definition does not take a stand on which perspectives performance is examined, what the goals are or what the measurement object is. This definition of performance is measurement-oriented, but in the context of measuring performance that seems acceptable.

Now that performance is defined, the terms measurement and performance measurement should be defined. According to Vehmanen (1982, 75) "measurement is an effective assignment of numbers to a relevant quantity on the basis of empirical operations". 'Effective assignment of numbers' means that the numbers representing certain properties must have the same relationship to each other as do the properties that are represented. The word 'relevant' refers to the purposive nature of the measurement process. It means that there should be a reason for measurement. 'Quantity' refers to the fact that qualitative properties also have to be quantified. 'Empirical operations' has to be the basis for the effective assignment of numbers

to a relevant quantity. 'Empirical operations' refers to the act of measurement itself. Vehmanen (1982, 77) also emphasizes that there should first be a theory about the measurement before the empirical operations of measurement can be carried out.

The general measurement theoretical description presented above is in accordance with the more practical definitions presented about performance measurement. According to Institute of Industrial Engineers (1990, 11-14), performance measurement is a process aiming to assess achievements in relation to historical results or other target values or criteria. Neely et al. (1996, 11) define performance measurement as the process of quantifying the efficiency or effectiveness of purposeful action. Hannula and Lönnqvist (2002, 47) define performance measurement as a process used to determine the status of an attribute relevant to the performance of the measurement object. All three definitions describe performance measurement as a process in which activities are carried out in order to determine the status of some activity or result. These definitions do not say anything about the process itself. When performance measurement is considered as a management tool, the process of carrying it out is important and should be explained more precisely.

The basic process of performance measurement consists of four main phases (Neely et al. 2000, 1143). The first phase is to decide what to measure and then choose or design suitable measures. Measurement can be carried out using individual performance measures or a performance measurement system which consists of several individual measures. In the second phase, (the measures or) the measurement system is implemented into the organisation. This includes, e.g. determining how the data is collected, how the measurement results are reported and how the measures are used. After the measurement system has been designed and implemented, the third phase is simply to use the measures. The final phase, the updating of the measurement system, closes the loop. Every time when an organisation's business objectives change, the measurement system must be redesigned accordingly (see e.g. Gueldenberg 1999, 13-14). Otherwise the measures will no longer provide relevant information.

The literature suggests that, as a managerial tool, performance measurement can be used to translate an organisation's strategy into concrete objectives, communicate the objectives to employees, guide and focus employees' efforts towards achieving these objectives, control whether or not the strategic objectives are reached, use double-loop learning to challenge the validity of the strategy itself, and visualize how individual employees' efforts contribute to the overall business objectives (see e.g. Neely 1998, Lönnqvist 2002, Simons 2000 and Uusi-Rauva 1996). When performance measurement is considered as a managerial tool and a process, a following definition (amended from Okkonen et al. 2002) may be used: Performance measurement is a process in which measures are first constructed based on managerially relevant success factors, then the measures are used to help implement strategies and achieve objectives and, finally, the measurement results are analysed to provide feedback for formulating new business objectives.

Organization's performance is examined through success factors which can be chosen from different perspectives. In performance measurement, success factors are the objects that are measured. According to Hannula and Lönnqvist (2002, p. 56), success factors are key aspects where targets must be reached in order to succeed in business objectives and strategies.

Success factor is a general and versatile concept in the sense that almost any business related phenomenon could be considered as such.
There is a long tradition of measuring financial success factors, e.g. profitability and costs. During the last decades, the measurement of non-financial factors has also become common (see e.g. Kaplan ja Norton 1996, Toivanen 2001, 5-8, Neely et al. 2000 and Vaivio 2001). Non-financial success factors typically include e.g. quality, efficiency, time and volume related to operations, services or products. Many of these factors are tangible and physical, such as volume and time. In addition to these, some non-financial factors, e.g. employee satisfaction and organization's image, can be described as intangible and immaterial. Clearly most of the financial success factors are tangible in nature since many of them represent monetary values related to an organization's results. However, some financial factors can also be considered as intangible. For example, value of brand is a financial phenomenon. However, the brand itself is intangible and immaterial. Figure 1 clarifies the distinction between financial and non-financial factors and between tangible and intangible factors.

Success Factors

	Financial	*Non-financial*
Tangible	- Economic growth - Liquidity - Product / service costs - Profitability	- Delivery time - Quality of products - Production volume - Productivity - Stock turn time - Service volume
Intangible	- Brand value - Goodwill - Value of immaterial properties	- Competencies - Customer satisfaction - Customer retention - Innovation - Motivation - Personnel satisfaction

Figure 1. Classification of common success factors.

Traditionally, success factors have been classified into financial and non-financial success factors. The purpose of Figure 1 is to illustrate that it is possible to classify success factors also into tangible and intangible success factors. The division of success factors into the four boxes is based on the author's judgment. Thus, the classification is not necessarily exactly accurate. However, the main point is only to present examples of different types of success factors.

The measurement object, i.e. the success factor, and the performance measure are separate things. One success factor can be measured using various measures. Measures describe some dimensions of the factor or something else that indicates the measured factor (Emory 1985, 85). The validity of a measure is a characteristic that describes how well the measure describes the success factor (see e.g. Emory 1985 or Hannula 1999). In addition to validity, there are several other criteria for sound performance measures, e.g. reliability and practicality.

Performance measures are indicators used to quantify the efficiency and / or effectiveness of purposeful action (Neely et al. 1996, 11). In other words, a performance measure is the means for determining the status of a measurement object. Sometimes the terms indicator or metric are used as synonyms for measure. However, in their latest book, Neely et al. (2002, xiii) use the following definitions: Performance *measure* is a parameter used to quantify the efficiency and / or effectiveness of past action and performance *metric* is the definition of the scope, content and component parts of broadly-based performance measure. According to the authors, customer satisfaction is an example of a performance measure. Customer satisfaction can be divided into component parts, e.g. on-time delivery and value for money, that are called metrics.

The above definitions of the concepts measure and metric are contradictory to what is commonly used in the field of performance measurement and of measurement in general. Firstly, the measurement object is usually called a success factor. For example, Neely et al. (2002, xiii) name 'customer satisfaction' as a measure. However, customer satisfaction is commonly considered as a success factor (see e.g. Neilimo and Uusi-Rauva 1997, 287). Secondly, some kind of an instrument or procedure is used to carry out measurement which is commonly called a measure. Measures rarely describe the success factor comprehensively. They rather focus on only a certain dimension of the factor. It would seem that Neely et al. use the term metric to refer to these dimensions and to the way they are measured. However, the term performance measure is typically used for that purpose. Thus, there does not seem to be any need for another concept, metric. As a general term, metric can be used as a synonym for measure. Therefore, they can also be used as synonyms in the context of performance measurement.

In the literature, there are hundreds of different performance measures available. Measures are usually chosen specifically according to the needs of a particular organization and situation. Sometimes there are not any suitable measures available. In these situations, available measures can be modified or entirely new measures can be designed. There are also several different types of performance measures available. The list below presents some classifications used in the literature. The classifications are self-explanatory since they are primarily aimed at describing different measures.

Classifications of performance measures:

- Direct vs. indirect measures
- Leading vs. lagging measures
- Monetary vs. non-monetary measures
- Qualitative vs. quantitative measures
- Result vs. cause measures
- Subjective vs. objective measures

Performance measurement systems consist of several measures. According to (Neely et al. 1996, 11), performance measurement system is the set of indicators used to quantify the efficiency or effectiveness of purposeful actions. Quite similarly, Hannula and Lönnqvist (2002, 43) define performance measurement system as a collection of measures which are essential from the viewpoint of the measurement object's performance. The latter definition is somewhat optimistic since, in practice, measurement systems may include unnecessary measures and lack measures that would provide important information.

Performance measurement systems can be constructed based on a measurement framework or model, such as the Balanced Scorecard. The measurement frameworks consist of the principles for designing measurement systems, i.e. choosing measures. In addition to using a model in constructing a measurement system, it is also possible to design the system without any specific model. Further, performance measurement systems can be used at several organizational levels, e.g. company, business unit, team and individual. Since there are a large variety of performance measurement systems, it is difficult to provide an accurate definition. Here the following definition is used: Performance measurement system is a set of measures which are used to determine the status of attributes of the measurement objects.

INTANGIBLE ASSETS AND INTANGIBLE SUCCESS FACTORS

There are a wide variety of definitions for the concepts intellectual capital, intangible assets and intangibles. Sometimes they are treated as synonyms and sometimes not. In this chapter, the definitions of different researchers are first presented. Different definitions are then compared to each other and the analysis is supported with terminological considerations.

The starting point of several researchers' definitions for intangible assets or intellectual capital is the need to better explain the composition of the total value or the market value of a company. In the latter part of 1990's, the situation for many companies was that their book value represented only a small part of the company's market value. The difference between market value and book value was considered to be the result of the company's intellectual capital or intangible assets. (See e.g. Sveiby 1997, 3-7; Lev 2001, 9; Edvinsson and Malone 1997) Figure 2 presents an example of an organization's total assets.

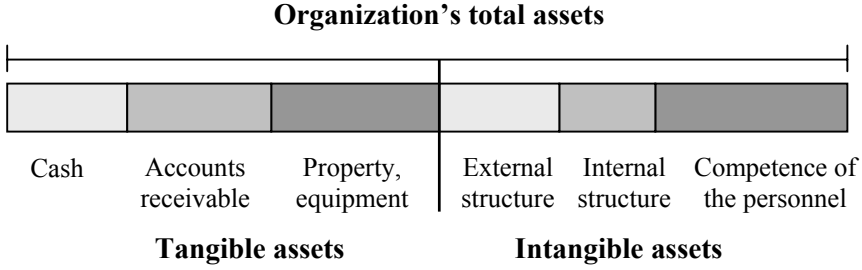

Figure 2. An example of an organization's total assets (amended from Sveiby 1997, 11).

Organization's tangible assets include fixed asset, such as property and equipment, and current assets, such as inventories, cash and current receivables. The right hand side of Figure 2 shows Sveiby's interpretation of intangible assets. According to him, organization's external structure, internal structure and the competence of its personnel are the components of intangible assets. Employee competence includes the skills and know-how the employee possesses. It results in the capacity to act in a wide variety of situations to create results. The internal structure consists of, e.g., patents, concepts, models, administrative systems and organizational culture. The external structure consists of, e.g., brands, trademarks, image and the relationships with customers and suppliers. (Sveiby 1997, 10-11)

In financial accounting, intangible assets are used to refer to certain items on the balance sheet. These include, e.g., research and development expenses, immaterial property rights and goodwill (see e.g. Ihantola and Leppänen 1998, 196). Acceptable items vary in different countries depending on the accounting standards used (Radebaugh and Gray 1997, 273-287). The definition of intangible assets used in financial accounting is a narrower than, e.g., Sveiby's definition above. Thus, it can be stated that organizations' have many kinds of intangible assets; some of them can be included on the balance sheet and some of them cannot.

According to a definition by OECD (see Petty and Guthrie 2000, 158), intellectual capital is the economic value of two categories of intangible assets of a company: organizational ("structural") capital and human capital. Structural capital refers to e.g. software systems, distribution networks and supply chains. Human capital refers to human resources within the organization (employee's resources) and external to the organization (customers and suppliers). In addition to these two categories, there are also other forms of intangible assets, e.g., a company's reputation. Thus, intellectual capital is a subset of intangible assets.

Also Edvinsson and Malone (1997, 52) divide intellectual capital into human capital and structural capital (see Figure 3). Human capital consists of, e.g., the knowledge, skills and innovativeness of employees (Edvinsson and Malone 1997, 34). Structural capital consists of customer capital and organizational capital. Customer capital refers, e.g., to strength and loyalty of customer relationship. Organizational capital includes innovation and process capital. Process capital consists of the organization's processes and techniques used, e.g., to increase efficiency. Innovation capital includes intellectual properties, such as trademarks. In addition, it includes the "surviving residue of intangible assets, such as the theory by which the business is run" (Edvinsson and Malone 1997, 36). Thus, Edvinsson and Malone consider intellectual capital and intangible assets as consisting of the same things. On the other hand, Edvinsson and Malone (1997, 43) consider intellectual capital as a debt issue, not an asset issue. This means that for them the role of intellectual capital is like that of equity and liabilities, not that of inventories or equipment. Intellectual capital is borrowed from stakeholders. In accounting, a counterbalance for intellectual capital would be goodwill.

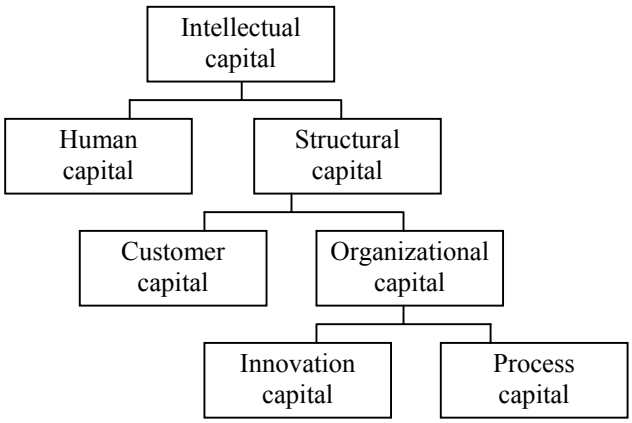

Figure 3. Components of intellectual capital (Edvinsson and Malone 1997, 52).

According to Mayo (2001, 32-37), tangible assets are the same as financial and physical capital and intangible assets are the same as intellectual capital. His book (Mayo 2001)

focuses on human capital of organizations. Human capital consists of social, emotional, relationship and knowledge capital. Ahonen (2000, 45) states that human capital can be examined from three perspectives: as the amount of employees, as employees' personal properties and as work community (organization).

Brooking (1997, 12) states that intellectual capital is the term given to the combined intangible assets which enable the company to function. According to her, the components of intellectual capital are market assets, intellectual property assets, human-centred assets and infrastructure assets. According to Roos et al. (1997, 57), intellectual capital includes human capital and structural capital. This division is the same as, e.g., Edvinsson and Malone's. The difference is that Roos et al. divide human capital into competence, attitude and intellectual agility, and structural capital into relationships, organization and renewal and development.

Ståhle and Grönroos (2000, 192-199) divide intellectual capital as potential and realised intellectual capital (see Figure 4). Intellectual capital is only potential until it is transformed into economic value added. This results in realised intellectual capital which can be seen as a productive customer base, a growing market share, consolidation of the brand and the number and productivity of new innovations. It is worth to notice that for Ståhle and Grönroos intangible assets, e.g. immaterial property rights and business applications, are only a subset of potential intellectual capital. It would seem that they consider intangible assets as the assets that can be put on the balance sheet.

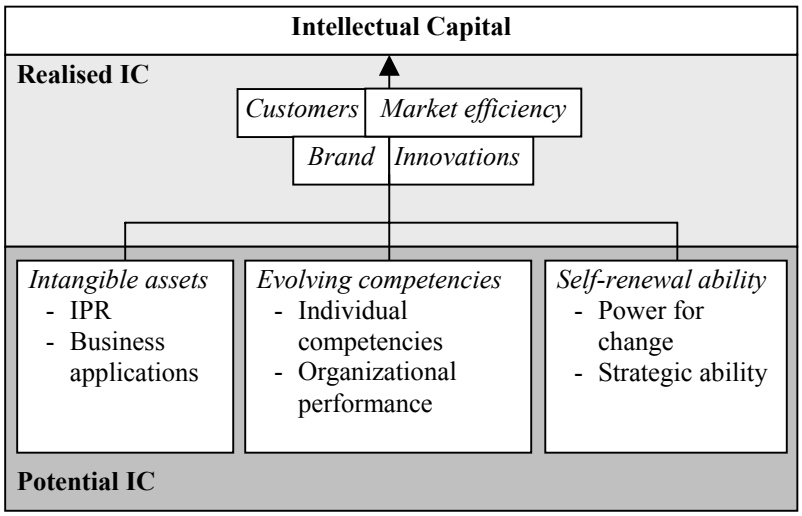

Figure 4. Realised and potential intellectual capital (Ståhle and Grönroos 2000, 195-197).

Also according to Ahonen (2000), intangible assets can be divided into two different levels: to generative and commercially exploitable intangibles. Generative assets include human capital, internal structure and external structure. Commercially exploitable assets include cost-efficiency and immaterial property rights. The generative assets can also be called intellectual capital (Bontis 2001). (Hussi and Ahonen 2002, 277)

According to Lev (2001, 7), "intangible assets are non-physical sources of value (claims to future benefits) generated by innovation (discovery), unique organizational designs, or human resource practices". Lev (2001, 18) classifies intangibles into three categories: Innovation-

related intangibles, human resource intangibles and organizational intangibles. He uses the terms intangibles, knowledge assets, and intellectual capital interchangeably. Lev (2001, 21-22) considers intangibles as assets similar to physical, human and financial assets with few exceptions. For example, tangible assets can be used in only one purpose at a time. Instead, intangibles, e.g. knowledge, can be used for multiple purposes simultaneously.

Marr et al. (2002) use the concept knowledge assets to describe intellectual capital. The components of knowledge assets, according to Marr et al., are presented in the following figure. Their definition of knowledge assets seems different from that of others presented earlier. However, they have actually only grouped the items differently than, e.g., Edvinsson and Malone.

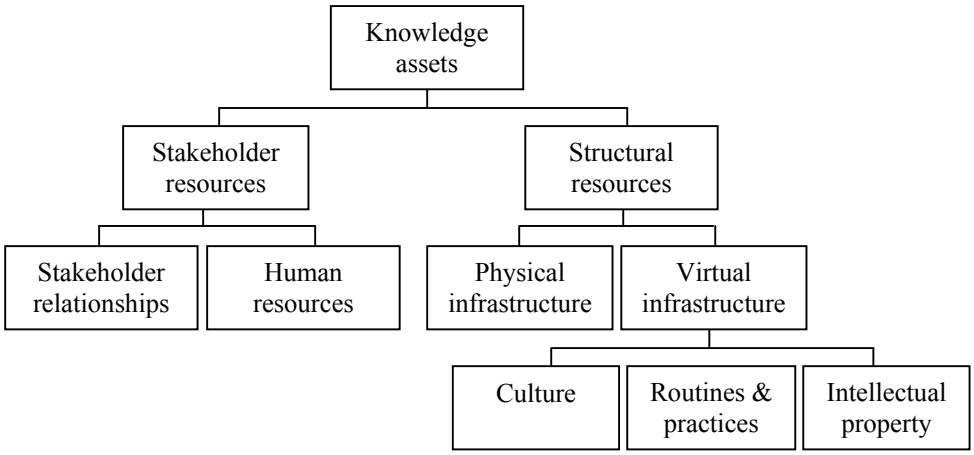

Figure 5. Organization's knowledge assets (Marr et al. 2002).

Mettänen (2002, 18) has analysed different definitions of intellectual capital and intangible assets and found three general categories in which components of intellectual capital can be assigned. These are employee-related capital, external stakeholder-related capital and internal structure-related capital (see Table 2). Mettänen has not considered which concept would be most suitable for intangibles. She has focused on the components regardless of terms used.

Table 2. Factors related to organization's intellectual capital (Mettänen 2002, 18).

Employee-related capital	External stakeholder-related capital	Internal structure-related capital
- Knowledge and competencies - Experience - Education - Creativity, innovativeness - Other properties (e.g. leadership, entrepreneurship)	- Relationships with customers and other stakeholders - Contracts and arrangements with stakeholders - Organization's image and brands	- Technologies - Information systems - Data bases - Processes - Culture and values - Management philosophy - Patents, copyrights, trade secrets, and other immaterial properties

There are several different definitions of intangible assets and intellectual capital as the definitions presented show. Table 3 summarises the various definitions by different researchers.

Table 3. Summary of the various definitions of intangible assets and intellectual capital.

View of intangible assets and / or intellectual capital	Researcher(s)
1. Intangible assets / intellectual capital can be divided into components.	- Brooking (Market, intellectual property, human-centred and infrastructure assets) - Edvinsson and Malone (Human, structural, customer, organizational, innovation and process capital) - Lev (Innovation-related, human resource and organizational intangibles) - Marr et al. (Stakeholder and structural knowledge assets) - OECD (Organizational and human capital) - Sveiby (Competence of employees, external and internal structure)
2. Intangible assets / intellectual capital can be divided into different levels.	- Ahonen (Generative and commercially exploitable intangibles) - Ståhle and Grönroos (Potential and realized intellectual capital)
3. Intangible assets and intellectual capital are seen as synonyms.	- Brooking - Lev - Marr et al. - Mayo
4. Intellectual capital is a subset of intangible assets	- Bontis - Hussi and Ahonen - OECD
5. Intangible assets are a subset of intellectual capital	- Ståhle and Grönroos
6. Intellectual capital is a debt issue, not an assets issue	- Edvinsson and Malone
7. Intellectual capital is the economic value of certain intangible assets	- OECD

It is not easy to formulate a comprehensive definition for intangible assets and intellectual capital based on the above definitions presented in the literature. Before an attempt on formulating a definition is made, some key terms are first examined.

Two of the most commonly used terms are intellectual[1] capital[2] and intangible[3] assets[4]. The terms asset and capital both refer to something valuable that is owned by an organization. They can be used a synonyms (Merriam-Webster Dictionary). The terms intellectual and intangible are more different. Intangible refers to something immaterial. Intellectual, however, can be considered as something related to the use of, e.g., employees' intellect or reasoning. For example, experience of employees is often considered as an important asset. Experience is clearly something intangible but not necessarily intellectual. The same applies, e.g., to brands or culture. Therefore, the term intangible can be seen as a wider term than intellectual. In addition, tangible[5] is clearly the antonym for intangible. It is difficult to precisely define the antonym for intellectual. The literature suggests the confrontation with intellectual and financial (capital). However, this does not seem logical from a terminological point of view. Intangibles as a noun is a general term which can be used to describe any immaterial phenomena. If the purpose is to refer to assets specifically, the term intangible assets seems more exact than just intangibles.

Based on the above considerations, the term intangible assets is preferred in this study and the following definition is proposed: *Intangible assets consist of the immaterial sources of value related to employees' capabilities, organizations' resources and way of operating and the relationships with its stakeholders.* The term intellectual capital can be used as synonym if it is considered to be more descriptive in a certain situation.

From a managerial point of view, the definitions and classifications of intangible assets offer information on which intangible assets could be important. In other words, important components of intangible assets can be identified. It is also possible to consider the intangible assets as success factors that can be improved and also measured. In addition to focusing only on the intangible assets, also the actions aimed at improving the assets can be just as interesting and important. Such activities could include, e.g., education, networking activities, organizational development activities and marketing activities. Lönnqvist and Mettänen (2002) have used the term intellectual-capital-related success factors to refer generally to all success factors that are related to intangible assets – regardless of being assets or some activities related to them.

According to the Meritum guidelines (2001, 9), intangible assets can be considered as a static concept (i.e. as resources) and as a dynamic concept (see Figure 6). The dynamic view of intangible assets refers to intangible activities which consist of three components: Developing

[1] **Intellectual** refers to "of or relating to the intellect or its use; developed or chiefly guided by the intellect rather than by emotion or experience; requiring use of the intellect; given to study, reflection, and speculation; engaged in activity requiring the creative use of the intellect".

[2] **Capital** refers to "relating to or being assets that add to the long-term net worth of a corporation; a stock of accumulated goods especially at a specified time and in contrast to income received during a specified period; the value of these accumulated goods; accumulated goods devoted to the production of other goods; accumulated possessions calculated to bring in income; net worth".

[3] **Intangible** refers to "something intangible; specifically: an asset (as goodwill) that is not corporeal".

[4] **Asset** refers to an "entire property of a person, association, corporation, or estate applicable or subject to the payment of debts; an item of value owned."

[5] **Tangible** refers to "capable of being perceived especially by the sense of touch; substantially real; capable of being precisely identified or realized by the mind; capable of being appraised at an actual or approximate value". (Merriam-Webster Dictionary)

or acquiring new intangible assets, increasing the value of current intangible assets and assessing and controlling intangible activities. Thus, the measurement of intangible assets should be focused both on intangible assets and intangible activities. Also Johanson et al. (1999, 8) suggest that, from a managerial point of view, it might be even more valuable to focus on intangible processes, activities or phenomena instead of intangible assets.

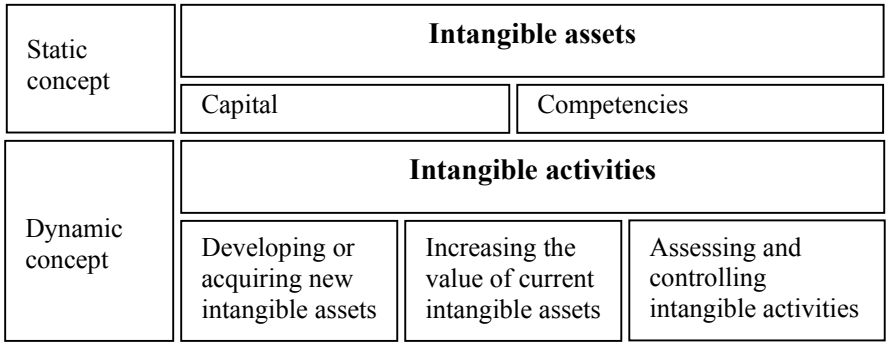

Figure 6. Intangible assets as static and dynamic concepts (Meritum 2001, 9).

Sveiby (1997, 165) suggests that intangible assets should be measured from the point of view of growth and renewal, efficiency and stability. The first and third refer to the changes in the amount and quality of intangible assets. The second refers to the ability to utilize the assets. Also Edvinsson and Malone (1997, 183) suggest that some of the measures they propose would measure the efficiency of intangible assets as other measures focus on the quantity or value of intangible assets. The Danish guidelines (2000) and the Meritum group (2001) suggest that also the activities related to, e.g., improving intangible assets should be measured. Thus, it seems that, from a managerial point of view, activities related to intangible assets are important in addition to the assets themselves.

In performance measurement literature, the measurement objects are called success factors. If an intangible asset or some activity related to it is considered to be important for a company and is therefore measured, it could be called a success factor. Many of the intangible assets, e.g. customer satisfaction, employee competencies and image, are called as such anyway in the literature regarding performance measurement (see e.g. Kaplan and Norton 1996, 67, 75 and 133). In fact, Roos et al. (1997, 63), in their book regarding intellectual capital, use the term ‘key success factors’ to refer to the intangible assets that are measured.

In this study, the term *intangible success factors* is used to refer to a) managerially relevant intangible assets and b) activities related to improving or utilising the assets. This definition is considered to be used especially in the context of performance measurement and when both intangible assets and activities should be covered. The definition is in accordance with the performance measurement related terminology presented in the previous chapter.

CONCLUSIONS

Table 4 summarises the key concepts and their definitions. The concepts are considered to have the following relationships with each other: 1) Performance is the measurement object’s ability to achieve results in relation to goals. 2) The measurement objects are called success factors. 3) Performance measures are designed to measure the success factors. 4) Performance

measurement is the process of determining performance in a certain measurement situation. 5) Performance measurement system consists of several performance measures.

Table 4. Summary of key concepts

Concept	Definition
Performance	is the measurement object's ability to achieve results in relation to goals.
Performance measurement	is a process used to determine the status of an attribute or attributes of the measurement object.
Success factors	are key aspects where targets must be reached in order to succeed in business objectives and strategies. In performance measurement, success factors are the objects that are measured.
Performance measure	is the means for determining the status of an attribute of a measurement object.
Performance measurement system	is a set of measures which are used to determine the status of attributes of the measurement objects.
Intangible assets	consist of the immaterial sources of value related to employees' capabilities, organizations' resources and way of action and the relationships with its stakeholders. The term intellectual capital can be used as a synonym if it is considered to be more descriptive in a certain situation.
Intangible success factors	consist of a) managerially relevant intangible assets and b) the activities related to improving or utilising the assets.

According to the definitions above, the basic measurement object is a success factor. Figure 7 presents a classification of and the hierarchy between different success factors. The classification suggests that there are both tangible and intangible success factors. Intangible success factors include intangible assets and intangible activities. Thus, in the context of measurement, intangible assets and activities are considered as subsets of success factors.

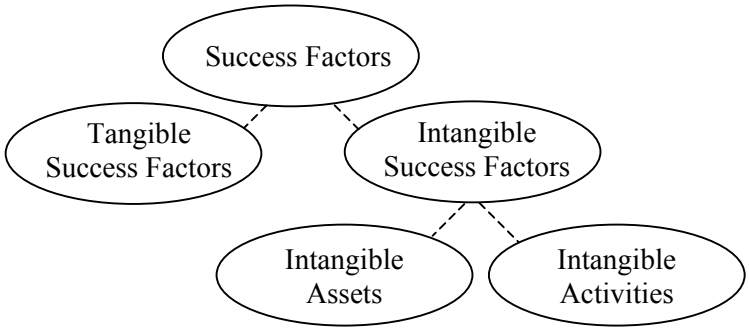

Figure 7. The suggested hierarchy between certain concepts in the context of measurement.

The result of this paper is the definitions related to the measurement of intangible assets. The contribution the paper makes is the integration of the concepts related to the traditional performance measurement literature and the more contemporary intangible assets literature. The results of the conceptual analysis reflect the views of the researcher. Another researcher could have decided that different definitions would be more suitable. Nevertheless, the

definitions of each concept are rationalized and thus their soundness can be assessed based on the reasoning.

The analysis carried out in this research and can be criticised as being somewhat superficial. However, there are a large amount of concepts related to the field of intangible assets measurement. This study aimed at achieving an extensive coverage of the topic. Therefore, each individual concept could not be analysed as thoroughly as is would have been possible if the study had focused only on one or few concepts. Ultimately, the soundness of the definitions of the concepts, as well as the quality of the paper itself, will be judged by the use of these concepts by other researchers and practitioners.

REFERENCES

Adams, C., Roberts, B. 1993. You Are What You Measure. Manufacturing Europe, Sterling Publications Ltd, 504-507.

Ahonen, G. 2000. Generative and commercially exploitable intangible assets, in Gröjer, J.E. and Stolowy, H. (Eds), Classification of intangibles, Groupe HEC, Jouy-en-Josas, 206-13.

Asikainen, R., Nissinen, J. H. (toim.) 1990. Luova tulosjohtaminen julkishallinnossa. Jyväskylä: Gummerus Kirjapaino Oy.

Bontis, N. 2001. Assessing knowledge assets: a review of the models used to measure intellectual capital. International Journal of Management Reviews, Vol. 3. No.1.

Brooking, A. 1996. Intellectual Capital. London: International Thomson Business Press.

Danish Agency for Trade and Industry. 2000. A Guideline for Intellectual Capital Statements – Key to Knowledge Management. Copenhagen.

Edvinsson, L., Malone, M. S. 1997. Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower. New York: HarperBusiness.

Emory, C. 1985. Business Research Methods. 3rd Edition. The Irwin Series in Information and Decision Sciences. Homewood, Illinois.

Gueldenberg, S. C. 1999. Measuring in the Knowledge Age: The Perspective of the Living and Learning Organization. Journal of Strategic Performance Measurement, December 1999, 6-15.

Hannula, M. 1999. Expedient Total Productivity Measurement. Espoo: The Finnish Academy of Technology.

Hannula, M., Lönnqvist, A. 2002. Concepts of performance measurement. Suorituskyvyn mittauksen käsitteet. Helsinki: Metalliteollisuuden Keskusliitto.

Humble, J. W. (suom.) 1976. Tavoitejohtaminen. Toinen painos. Tapiola: Oy Weilin+Göös Ab:n kirjapaino.

Hussi, T., Ahonen, G. 2002. Managing intangible assets – a question of integration and delicate balance. Journal of Intellectual Capital, Vol. 3, No. 3, 277-286.

Ihantola, E-M., Leppänen, P. 1998. Yrityksen kirjanpito. Perusteet ja sovellusharjoitukset. Seitsemäs uudistettu painos. Tampere: Tammer-Paino Oy.

Institute of Industrial Engineers. 1990. Industrial Engineering Terminology, revised edition. Norcross, Georgia: Industrial Engineering and Management Press.

Johanson, U., Eklöv, G., Holmgren, M., Mårtensson, M. Human Resource Costing and Accounting Versus the Balanced Scorecard: A Literature Survey of Experience with the Concepts. Abstract available on the Internet: <http://www.kunne.no/meritum/abstracts/hr_costing_a.pdf>

Kaplan, R. S., Norton, D. P. 1996. The Balanced Scorecard. Translating Strategy into Action. Boston, Massachusetts: Harvard Business School Press.

Laitinen, E. 1998. Yritystoiminnan uudet mittarit. Jyväskylä: Gummerus Kirjapaino Oy.

Lev, B. 2001. Intangibles. Management, Measurement, and Reporting. Washington, D.C.: Brookings Institution Press.

Lynch, R. L., Cross, K. F. 1991. Measure Up! The Essential Guide to Measuring Business Performance. London: Mandarin.

Lönnqvist, A. 2002. Suorituskyvyn mittauksen käyttö suomalaisissa yrityksissä, lisensiaatintutkimus. Tampere: Tampereen teknillinen korkeakoulu, tuotantotalouden osasto.

Lönnqvist, A., Mettänen, P. 2002. Criteria of Sound Intellectual Capital Measures. Proceedings of the 2nd International Workshop on Performance Measurement, Hanover, Germany, June 6 - 7, 147-157.

Maisel, L. S. 1992. Performance Measurement: The Balanced Scorecard Approach. Journal of Cost Management, No. 2, 47-52.

Marr, B., Sciuma, G., Neely, A. 2002. Measuring Knowledge Assets. [http://www.som.granfield.ac.uk/som/resources/groups/cbp/measuringcapabilities.html]

Mayo, A. 2001. The Value of the Enterprise: Valuing People as Assets – Monitoring, Measuring, Managing. London: Nicholas Brealey Publishing.

MERITUM 2001. Aineettoman varallisuuden johtamisen ja raportoinnin periaatteet. Meritum-ryhmän suositukset. A Finnish translation from "Guidelines for managing and reporting on intangibles. Final Report MERITUM Project". Helsinki

Merriam-Webster Unabridged On-line Dictionary and Thesaurus. <http://www.m-w.com/home.htm>

Mettänen, P. 2002. Tutkimusorganisaation menestystekijöiden ja mittareiden määrittäminen. Diplomityö. Tampere: Tampereen teknillinen korkeakoulu.

Neely, A., Adams, C., Kennerley, M. 2002. The Performance Prism. The Scorecard for Measuring and Managing Business Success. Prentice Hall.

Neely, A., Mills, J., Gregory, M., Richards, H., Platts, K., Bourne, M. 1996. Getting the Measure of Your Business. London: Findlay.

Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M., Kennerley, M. 2000. Performance Measurement System Design: Developing and Testing a Process-Based Approach. International Journal of Operations & Production Management, Vol. 20, No. 10. 1119-1145.

Neilimo, K., Uusi-Rauva, E. 1997. Johdon laskentatoimi. Helsinki: Edita.

Näsi, J. 1980. Ajatuksia käsiteanalyysista ja sen käytöstä yrityksen taloustieteessä. Yrityksen taloustieteen ja yksityisoikeuden laitoksen julkaisuja. Sarja A2: Tutkielmia ja raportteja 11. Tampere: Tampereen yliopisto.

Okkonen, J., Pirttimäki, V., Hannula, M., Lönnqvist, A. 2002. Triangle of Business Intelligence, Performance Measurement and Knowledge Management. IInd Annual Conference on Innovative Research in Management, May 9 - 11, Stockholm, Sweden.

Olkkonen, T. 1994. Johdatus teollisuustalouden tutkimustyöhön. Second edition. Otaniemi: Teknillinen korkeakoulu.

Organisation for Economic Co-operation and Development (OECD) 1999. Guidelines and Instructions for OECD Symposium. International Symposium on Measuring and Reporting Intellectual Capital: Experiences, Issues and Prospects.

Petty, R., Guthrie, J. 2000. Intellectual capital literature review. Measurement, reporting and management. Journal of Intellectual Capital, Vol. 1, No. 2, 155-176.

Radebaugh and Gray 1997. International Accounting and Multinational Enterprises. Fourth edition. John Wiley & Sons, Inc.

Roos, J., Roos, G., Dragonetti, N., Edvinsson, L. 1997. Intellectual Capital: Navigating the New Business Landscape. London: Macmillan Press ltd.

Santalainen, T., Voutilainen, E., Porenne, P. 1987. Tulosjohtaminen uudistuu ja uudistaa. Espoo: Oy Weilin+Göös Ab:n kirjapaino.

Simons, R. 2000. Performance Measurement & Control Systems for Implementing Strategy. New Jersey: Prentice Hall.

Stockton, R. B. (suom.) 1987. M.B.O. Tavoitejohtaminen. Alkuperäinen ja oikea ohjelma saavuttaa tuottavuus- ja suoritustavoitteet. Rastor-Julkaisut.

Ståhle, P., Grönroos, M. 1999. Knowledge Management – tietopääoma yrityksen kilpailutekijänä. Porvoo: WSOY.

Sveiby, K.-E. 1997. The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets. San Fransisco: Berrett-Koehler Publishers Inc.

Sveiby, K.-E. 2001. Methods for Measuring Intangible Assets. <http://wwwsveiby.com.au/IntangibleMethods.htm>

Toivanen, J. 2001. Balanced Scorecardin implementointi ja käytön nykytila Suomessa. Acta Universitatis Lappeenrantaensis 108, Lappeenrannan teknillinen korkeakoulu.

Tuomela, T.-S. 2000. Customer Focus and Strategic Control. A constructive case study of developing a strategic performance measurement system at FinABB. Turun kauppakorkeakoulun julkaisuja, Sarja D-2:2000.

Uusi-Rauva, E. 1996. Ohjauksen tunnusluvut ja suoritusten mittaus. Toinen korjattu painos, Opetusmonisteita 2/96, Tampere.

Vaivio, J. 2001. Non-Financial Measurement in an Organizational Context – Three Perspectives. Doctoral dissertation. Helsinki School of Economics and Business Administration.

Vehmanen, P. 1982. Is Accounting a Measurement Discipline? A Methodological Study of the Foundations of Accounting. Tampere: Yrityksen taloustieteen ja yksityisoikeuden julkaisuja.