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RECONFIGURING KNOWLEDGE MANAGEMENT

Combining Intellectual Capital,

Intangible Assets and Knowledge Creation

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ABSTRACT: Intellectual Capital, Intangible Assets and Knowledge Creation are all concepts that are strongly linked to the phenomenon of Knowledge Management. Yet they have only been parallel to each other. This controversy between different approaches has also resulted in vague definitions of Knowledge Management. This paper will critically discuss the definitions of these concepts. The analysis shows that different concepts actually focus on different angles of the topic. Based on this, a model will be built that ties all of them into a unitary entity. At the same time, this model gives a reconfigured definition of the concept of knowledge management.

Keywords: intellectual capital, intangible assets, generative intangibles, commercially exploitable intangibles, knowledge creation, knowledge management

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TIIVISTELMÄ: Osaamispääoma, aineeton varallisuus ja tiedonluominen ovat tietämyksen johtamisen elementtejä. Näiden käsitteiden välisistä kytköksistä tiedetään kuitenkin liian vähän. Käsitteiden kirjo on osaltaan vaikeuttanut tietämyksen johtamisen selkeää määrittelemistä. Käsitemäärittelyjen tarkastelu osoittaa, että yrityksen arvon luomiseen liittyvät eri käsitteet painotukset poikkeavat toisistaan. Erilaisten näkökulmien suhteuttaminen toisiinsa tuottaa uudenlaisen käsitteellisen järjestelmän, joka määrittelee myös tietämyksen johtamisen uudenlaisella tavalla.

Avainsanat: osaamispääoma, arvoa synnyttävä aineeton varallisuus, kaupallisesti hyödynnettävissä oleva aineeton varallisuus, tiedonluominen, tietämyksen johtaminen

Yhteenveto

Osaamispääoma ja tietämyksen johtaminen tukevat yrityksen kokonaiskuvan ymmärtämistä

Osaamispääoma koostuu kolmesta ulottuvuudesta: inhimillinen pääoma, sisäiset rakenteet ja ulkoiset rakenteet. Tietämyksen johtaminen voidaan nähdä voimana, joka vetää näitä ulottuvuuksia tiiviimmin toistensa päälle. Tämä eri ulottuvuuksien leikkauskohta on osaamispääoman kannalta keskeinen, sillä sen avulla muodostuu kokonaiskuva yrityksestä. Jos osaamispääoman ulottuvuuksia tarkastellaan erillään toisistaan, uudenlaisen ymmärryksen muodostuminen ei ole mahdollista. Ulkoisia rakenteita, kuten asiakkaita ja kilpailijoita, ja niihin liittyvää tietoa on aina pyritty jotenkin hallitsemaan. Liikkeenjohdollisen ajattelun perustana oleva taylorismi oli sisäisiin rakenteisiin liittyvän hallinnan ensimmäinen suuntaus. Inhimilliseen pääomaan liittyvällä seurannalla on myöskin hyvin pitkä historia. Osaamispääoman ymmärtämisessä olennaista on se, että yrityksen inhimillinen pääoma sekä sisäiset ja ulkoiset rakenteet suhteutetaan toisiinsa. Tietämyksen johtaminen voidaan nähdä käytännön kehittämishankkeita ohjaavana järjestelmänä, jonka avulla oppivan organisaation ihanteen tavoittelu on mahdollista.

Osaamispääoman määritelmissä arvonluomisen logiikka on jäänyt kuitenkin varsin epämääräiseksi. Arvonluomisen sijoittuminen kolmen ulottuvuuden leikkauskohtaan ei sellaisenaan tarjoa mahdollisuuksia selvittää sitä, miten yrityksen tuottama lisäarvo itse asiassa muodostuu.

Aineeton varallisuus erittelee arvonluomiseen liittyvää mekanismia

Aineettoman varallisuuden jaottelu arvoa synnyttävään ja kaupallisesti hyödynnettävissä olevaan osaan selittää arvonluomiseen liittyvää mekanismia osaamispääomaa yksityiskohtaisemmin. Aineettoman varallisuuden näkökulmasta olennaista on se, että arvoa synnyttävä aineeton varallisuus muuntuu kaupallisesti hyödynnettävissä olevaksi aineettomaksi varallisuudeksi. Näiden kahden välinen suhde voidaan ajatella niin, että arvoa synnyttävä aineeton varallisuus on yrityksen tulevaisuuden tuottopotentiaalia, kun taas kaupallisesti hyödynnettävissä olevan aineettoman varallisuuden kautta muodostuu yrityksen nykyhetkinen aineettomaan varallisuuteen perustuva kassavirta. Arvoa synnyttävän aineettoman varallisuuden tehokkaan johtamisen avulla luodaan siis tulevaisuuden kaupallisesti hyödynnettävissä oleva aineeton varallisuus.

Tässä keskeiseksi rajoitteeksi muodostuu se, että käsitteistö ei selitä, miten arvoa synnyttävä aineeton varallisuus muuntuu kaupallisesti hyödynnettävissä olevaan muotoon.

Tiedonluominen tietämyksen johtamisen osana

Tiedonluominen on aina ollut tietämyksen hallinnan kannalta keskeistä. Tiedon luomista ei kuitenkaan ole kyetty riittävän selkeästi liittämään osaamispääomaan ja aineettomaan varallisuuteen. Ikujiro Nonakan ja Hirotaka Takeuchin kehittämä SECI- malli tuo esiin, miten organisaatiot luovat innovaatioita käsitteellisen ja hiljaisen, ns. tacit-tiedon, välisenä vuorovaikutuksena.

Näkökulmien yhdistelmästä syntyvä teoreettinen malli antaa jäsentyneemmän määritelmän tietämyksen johtamiselle

Kun ylläkuvatut kolme näkökulmaa nivelletään toisiinsa, voidaan tietämyksen johtaminen määritellä aikaisempaa jäsentyneemmin. Osaamispääoma on kokonaisuus, joka muodostuu aineettoman varallisuuden staattisista elementeistä ja niihin liittyvistä tiedonmuodostuksen dynaamisista prosesseista. Tietämyksen johtaminen kattaa tämän kokonaisuuden, eli kuvastaa yrityksen tietämykseen pohjautuvaa lisäarvon tuottamista.

Contents

1 Introduction

The logic of business is shifting from mass-production to knowledge-intensiveness. This progression applies to both modern industries, such as information and communication technology, and more traditional ones, say the forest industry. The most important theoretical constructions to tackle this timely issue are the concepts of intellectual capital, intangible assets, knowledge creation and knowledge management.

Even though intellectual capital, intangible assets and knowledge creation are principally targeted at more or less the same topic, yet they are, at best, only parallel to each other. For example, the knowledge creation approach, especially scrutinised by Nonaka and his colleagues, has not been linked to the other two of the above stated discourses, even though Nonaka – Takeuchi (1995) has been acknowledged as the prime book in the field of knowledge management. A distinct definition of the concept of knowledge management is also lacking. This paper will explore definitions of these focal concepts in order to consolidate them into a restructured model of knowledge management.

In the next three sections, the current definitions of the concepts will be presented. These considerations lay the foundation for, in section five, deriving a model that reconfigures knowledge management by analysing, from a fresh perspective, the relationships of the concepts central to this study. Finally in the sixth section, the implications of the model presented in this paper will be discussed.

2 Intellectual Capital

Edvinsson and Malone (1997) discuss the significance of intellectual capital to a company by comparing it to a tree. When looking at the tree, it seems easy to determine how well it is doing. By this superficial judgement, however, the fact that one-half of a tree's mass is actually in its roots is missed. Furthermore, it is the condition of the roots that defines how well a tree performs in the future. Similarly, financial information given by traditional bookkeeping reports creates only a partial picture of a company's situation. The information given is only able to grasp business activities that have occurred in the past. For current bookkeeping meth-

ods, intellectual capital is invisible as the roots of a tree are to a person standing on the ground. Yet it is this hidden part that determines the future success.

Traditional accounting actually mistreats investments in intellectual capital. Viewed as costs, they are written down as short-term expenses, even though they should be seen as essential investments from the new value creation perspective, which relies heavily on knowledge-intensity. Intellectual capital is complementary, not subordinate, to financial information. Either, it can take such a long time to create financial benefits from intellectual capital, or the changes may be so rapid that traditional accounting is incapable of grasping them. Financial results should actually be seen as part of the broader IC statement, as it is just one component in a larger attempt to analyse a company's value. (Lev, 2001; Edvinsson – Malone, 1997; Sveiby, 1997.)

Intellectual capital is traditionally defined as consisting of three parts covering the human aspects, intra-organisational structures and the external environment. The debate around intellectual capital has been active for some ten years. Nevertheless, there is still no common consensus over the concept. (See, for example, Sullivan 2000; Sveiby, 1997). Intellectual capital and intangible assets are most often used to describe this phenomenon. Yet some authors prefer the term 'intangible resources' (see, for example, Johanson – Skoog 2000). According to this view, the term 'intangible assets' leads thoughts too strongly to the balance sheet and the mediated picture is too static in nature.

In this study the three dimensional definition for intellectual capital has been adopted and these dimensions are labelled human capital, internal structures and external structures. These labels are similar to Sveiby's (1997) framework with the exception that the competence of personnel is replaced by human capital, as used by, for example, Edvinsson and Malone (1997). This modification is based on the reasoning that human capital is seen to be a broader issue than individual competence. On the other hand, external structures is a broader concept than customer capital used by Edvinsson and Malone. The use of the concept 'internal structures' makes it easier to distinguish the difference between intra- and extra-organisational entities than Edvinsson's and Malone's structural capital.

No matter what definitions or concepts are used, the essence of the discussion around intellectual capital is the ability to give a holistic view on organisational development. If the three elements are seen as separate from each other, the concept 'intellectual capital' has nothing new to offer. Different development activities directed to human capital have a very long his-

tory; the scientific management as a whole can be seen as an attempt to strengthen internal structures and the evaluation of customer satisfaction etc. also has a very long history. Therefore, the true contribution of intellectual capital is to provide a framework that makes it possible to view all of these dimensions in relation to each other. As the value platform model presented in Figure 1 shows, it is the intersection of all three dimensions that forms the basis for value creation (Saint-Onge *et al*. in Edvinsson – Malone 1997). Even when two dimensions are very strong, the weak or inadequately directed dimension disrupts the value creation process. In the value platform model, knowledge management can be seen as a force that pulls different dimensions into closer interaction with each other. For example, the business reengineering school, that was highly endorsed in its time, focused solely on organisational development, that is, internal structures, and ignored human resources, in particular (Eisenberg 1997). Downsizing of the organisation was, therefore, often used as a tool for attaining increased effectiveness. However, this creates severe uncertainty and also a competitive atmosphere in the organisation. When a work community deteriorates, the vitality of the organisation also crumbles. The holistic perspective of intellectual capital makes it possible to attain sustainable economical development in organisational development activities as all three dimensions are considered in a balanced way.

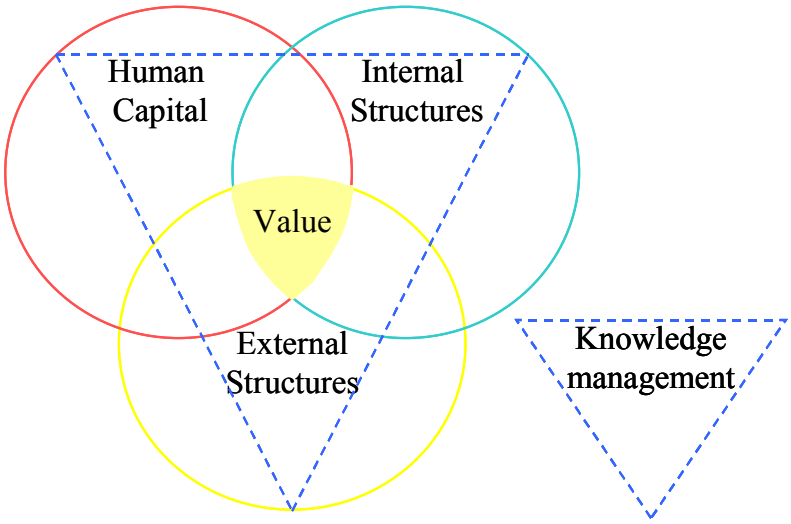

Figure 1 The value platform model [1]

[1] The sources for the model were IFAC 1998 and Edvinsson – Malone 1997. According to the latter, the model was created by Saint-Onge, Armstrong, Petrash and Edvinsson. The figure given here is modified to follow the definition of intellectual capital used in this paper.

Vision and strategy are essential for intellectual capital because it can only exist and be developed in the context of an organisation's strategy. In other words, intellectual capital does not exist without a purpose and an approach. Vision is a shared, rousing and comprehensible goal, which describes what an organisation wishes to be in the future. Possibly the state defined in a vision is never even achieved, but this image has an important role in steering the activities and directing the organisation's energy. Strategy concretises the goals set in the vision and describes the methods to be used in attaining the goals set by the vision. (Ranki 1999.) The vision sets a benchmark against which the organisation may measure the value of its intellectual capital; that is, whether an item of intellectual capital is helping a company move towards its vision or not (Sullivan 2000). Therefore, besides setting the direction for the organisations' activities, vision also sets the grounds for evaluating the successfulness of the strategy.

Furthermore, the management of intellectual capital can be analysed by strategically focussing on different dimensions of intellectual capital. The adopted strategy for managing intellectual capital varies considerably depending on the company's branch and strategic decision-making processes. A common feature, however, is that a company's strategy often relies heavily on one particular dimension of its intellectual capital, which it supplements with a second dimension, while largely overlooking the third. This setting reveals both the strengths and most essential areas of development in intellectual capital. The various potential combinations are highlighted by a matrix presented in Table 1. The matrix allows a total of six different combinations, because the dimensions cannot simultaneously have two roles[2]. (Hussi 2001; Hussi – Ahonen 2002.)

		Primary Intellectual Capital		
		Human Capital	*Internal Structures*	*External Structures*
Secondary Intellectual Capital	*Human Capital*		Learning systems	Network of excellencies
	Internal Structures	Systemised competence		Successful networking
	External Structures	Competence without boundaries	Process efficacy	

Table 1 Categorisation of Organisations according to the focus on the dimensions of intellectual capital

For "Successful networking" companies, the most valuable strategic intangible asset is the ability to manage external networks. "Learning systems" companies build their intangibles

[2] Originally this categorisation matrix was created in the study of nine case companies quoted in the Helsinki Stock Exchange (Hussi 2001). In that study, four out of six possible combinations were identified, but in this paper the matrix has been supplemented to cover all the alternatives.

strategy on competencies related to production process efficiency. The activities of "Competence without boundaries" companies are essentially based on the innovation potential of the competent personnel in an environment of loose regulation compared to foreign competitors. For companies in "The network of excellencies" group, a competent personnel and external networks are necessary for meeting the challenges of the tight regulation that dictates the activities of these companies. (Hussi 2001; Hussi – Ahonen 2002.) It is characteristic of "Systemised competence" companies that the work tasks of the highly competent personnel are well coordinated internally. Process efficacy is the category for companies that produce added value especially on already existing set-ups.

Organisational changes often become difficult due to an inadequate understanding of the complex whole, that is, dynamic system effects. It is the ability to develop an organisation in a holistic way that makes it possible to achieve really significant improvements in productivity. In pursuing the holistic approach to organisational development, it is important to also realise that companies differ in their environment, history, knowledge resources, management and competitive decisions. Interpretations of the future differ in a similar way. This implies that companies that superficially appear similar do, in fact, require highly differentiated strategies for managing their intellectual capital. (Mouritsen *et al.* 2000.)

The measurement of the intellectual capital's value may be either qualitative or quantitative. Indicators are often defined in such terms that they are not as black-and-white as normal quantitative measures. Non-financial benchmarks are crucial, because a major feature of intellectual capital is that it values such activities that may show up in financial results only after many years. Customer loyalty and long-term developments of human capital are examples of this. (Edvinsson – Malone 1997.)

2.1 Human capital

Human capital is defined as the individual's knowledge, experiences, capabilities, skills, creativity and innovativeness (Edvinsson – Malone 1997). These elements are connected to each other and collectively contribute to success in work (Ranki 1999). Sveiby (1997), who uses the concept 'employee competence', defines it as a capacity to act in different situations to create both tangible and intangible assets. While capabilities are seen as a central element in definitions of human capital, the individual's health has not been included in this debate. Yet, it is rather easy to see how fundamental health is for an individual's general capability.

Brooking (1996) has briefly mentioned health as one indicator of human capital, but no further elaboration has been made on this topic. In this study, one of the reasons for using human capital instead of Sveiby's (see, for example, 1997, 10) competence of the personnel is that an individual's health can be included in the previous one. However, this finding needs further research to analyse the relationship more thoroughly.

Creativity is a culture-bound ability to comprehend connections between things and change them in a qualitative, and even discontinuous, way in order to create ideas with added value. Ideas with added value, that is innovations, are such that they increase knowledge and create new ways of thinking. The ability to create knowledge and also exploit it is essentially characteristic to all business activities. The added value of an idea is always determined by the customer. (Salmenperä *et al.* 2000.)

The ability to perceive changes in the operational environment is also included in this category. (Edvinsson – Malone 1997.) Learning is an individual's development and adaptation to a changing environment. These changes require the ability to control immediate work tasks, as well as the ability to improve functioning and a readiness to develop even qualitative features of work. (Salmenperä *et al.* 2000.) Attitudes are related to this readiness, because they show what kind of stand a person takes in his or her tasks (Mayo – Lank 1994).

The fact that a company cannot own its human capital distinguishes this dimension of intellectual capital from the other company resources (Edvinsson – Malone 1997). Uncertainty about an employee's commitment to the organisation reduces the organisation's willingness to make these investments, especially if, as in many branches, the required skills are non-specific and transferable (Albert – Bradley 1997). Yet, a competent personnel is the key in a company's endeavour to realise and develop its business ideas (Hansson 2001; Sveiby 1990). Investments in personnel are as crucial for knowledge-intensive companies as an industrial enterprises' investments in tangible assets (Sveiby – Lloyd 1987).

2.2 Internal structure

Internal structure includes patents, concepts, models, computer and administrative systems, and organisational culture (Sveiby 1997). Edvinsson and Malone (1997) define internal structure, or structural capital as they call it, as the context, empowerment of employees, structures supporting human capital, organisational capital, innovation capital and process capital. Em-

powerment of the employees is based on distributed decision-making and collaborative leadership models. These require employees' increased commitment to the organisation and its goals. Highly committed employees are willing to take more responsibility for the planning and development of their tasks. (Sarala – Sarala 1996.) Commitment can be created by supporting the employees' feeling of responsibility for the organisation's business and providing them with sufficient information, skills, resources and authority to make decisions. (Juuti 1992.)

Structures that support human capital include, for example, recruiting capabilities, development activities, motivating strategies and organisational culture. Organisational capital consists of systems and tools, enhancement of knowledge flows and organisational competence. Innovation capital includes a company's renewal capability, results from innovativeness protected by immaterial property rights, as well as results that can be used to create new products and services and bring them quickly to the markets. Process capital is practical knowledge that includes definitions and improvements of work processes. (Edvinsson – Malone 1997).

An organisation's knowledge base cumulates in numerous daily decisions and experiences. These are stored in work processes, instructions, forms etc. resulting in organisational learning. Organisational culture can be seen as a consequence of organisational learning as it forms a shared framework for defining and solving problems. (Ranki 1999.) Schein (1992) connects organisational culture with leadership. Neither can be understood without the other, but they are different sides of the same coin. Organisational culture is the deepest level of fundamental presumptions and beliefs. It unconsciously influences the behaviour of the organisation's members. It defines the organisation's conception of itself and its environment in a fundamental way. This conception has evolved while solving problems in relation to internal and external integration. It has turned out to function well enough to be taken as justified and to be transferred to the new members as the organisation's way of thinking, perceiving and feeling the problems.

It is the nature of internal structures that they cumulate as an organisation grows and develops (Sveiby 1990). Too tight social norms, organisational values and business orthodoxies enhance a dangerous equilibrium and, thus, nullify the benefits of diversity. Too strictly standardised functioning cannot meet the unexpected changes. Such rigidity is dangerous for an organisation because it hinders the organisation's capacity to react to information obtained from different nodes. (Pascale *et al*. 2000.)

According to Edvinsson and Malone (1997) internal structures include all the substance that a company has created by its human capital or otherwise acquired for the organisation. Organisational structure, different documents and all immaterial property rights (patents, trademarks, copyrights etc.) are included in the internal structures. Unlike human capital, the company owns its internal structures and, therefore, it is also able to sell specific parts of it, such as databases etc. This definition, that includes immaterial property rights in internal structures, obscures the intellectual capital related logics of value creation. This notion will be discussed further in Figure 2.

2.3 External structure

The external structure includes relationships with customers and suppliers, brand names, trademarks and the company's reputation or image (Sveiby 1997). Edvinsson and Malone (1997) use the concept 'customer capital'. According to their definition, it consists of the strength and loyalty of the customer relationship. Such characteristics as satisfaction, durability, price-sensitiveness and good financial performance of long-term customers are related to this category. Customer capital can be created by committing the customers to the company's activities using time and resources. Trust is also a significant element in this process. What is most important is the enduring relationship between the seller and the customer. These relationships are judged based on penetration, coverage and loyalty measured as a customer's probability of continuing the partnership (Stewart 1998). This study uses the concept 'external structures' because stakeholders like subcontractors, other organisations, consultants, training institutions and the public sector can also included in this.

Interdependence is claimed to be a characteristic of technology-based firms (Yli-Renko 1999). Even though networking is seen as beneficial to a company, it has actually multifaceted effects on the company. Companies need to interact continuously in order to learn from other network members and develop their own status and position in the network. Breaking up a commitment to some relationships and building up new ones can result in significant costs. Reluctance to accept these costs reduces a company's mobility in its relationships and may hinder its innovativeness. Furthermore, through interaction a company should try to learn to understand the functioning of the network "from the perspective of others" in order to learn how it influences the network and how it is being influenced by it. Finally, companies should aim at acquiring control over the network, but it should not be total or the network will lose its dynamics. (Håkansson – Ford, 2002.)

Different kinds of networks have always existed, but they have been more or less informal. The novelty in the new networking is that companies operate in these activities in an objective-oriented way. One essential reason behind this development is the reduced costs of information technology that makes information sharing cheaper and, at the same time, more efficient. (Stewart 1998.) Due to the increasing need for networking, organisational boundaries lose significance. Collaboration leads co-operation systems, such as virtual organisations, that last at least for a while. Therefore, the competition is no longer simply between different companies, but also different value chains. Value chains consist of suppliers, middlemen, service providers and manufacturers. Information technology can be used to improve the functioning of the value chain both inside organisations and between them. (Salmenperä *et al.* 2000)

The significance of relationships is often ignored in companies' strategic planning. This is especially true for traditional approaches to strategy development, which oversimplify the networked context of business. However, stressing the importance of relationships does not mean that companies should aim at being "nice " to their partners in the same manner as, for example, in inter-personal relationships. External relationships have a historical load in both good and bad. Long lasting relationships often create trust among partners. Historical load also puts inertia in a company's willingness to create new connections with previously unknown suppliers. Membership in different networks also shapes companies as their alternatives are largely tied to changes in counterpart companies. As the networked context is so complex, companies cannot rely on the effectiveness of a straightforward strategy over the long-term. Strategy development is very much about coping with changes in the business context. (Ford *et al.* 1998.)

As a concluding remark in the discussion around intellectual capital, it can be stated that even though intellectual capital does provide a valuable insight into contemporary business, its relation to value creation is still quite blurred. The primary statement of the value platform model that value is being created in the intersection of the three dimensions raises a question of what is this value. This question is addressed in the next section as intangible assets are placed in a general view of an organisation.

3 Intangible assets

According to Ahonen (2000), intangible assets can be divided into two classes, namely generative and commercially exploitable intangibles. The rationale for this distinction is that definitions of intellectual capital tend to obscure the causal mechanism behind the intellectual capital based value creation. The commercially exploitable intangibles consist, for example, of cost efficient production, immaterial property rights, customer capital, excessive demand and reliable management. These form the basis for the expectations of capital markets. Organisations can acquire commercially exploitable intangibles either through company acquisitions or by generating them themselves. The ability to generate commercially exploitable intangibles requires processes and assets, which include human capital, internal structures and external structures. These generative intangibles describe the capacity of a firm to produce commercially exploitable intangibles.

The role and significance of Intangible Assets is displayed in Figure 2. The overall goal of business is long-term productivity of the invested capital. The company seeks this by executing its business ideas using all its resources, tangible as well as intangible, under the control of leadership. The financial markets' expectations of the company's performance are reflected in the market value of the company. In reality, the financial markets turn out to base their estimates on relatively limited information, as they tend to use mainly information on leadership, management and tangible assets and even in the best cases scant information on Intangible Assets. (Hussi 2001; Lee 2001.) This may partially be due to a lack of available information. This problem has been approached, for example, by setting up Cross-European research

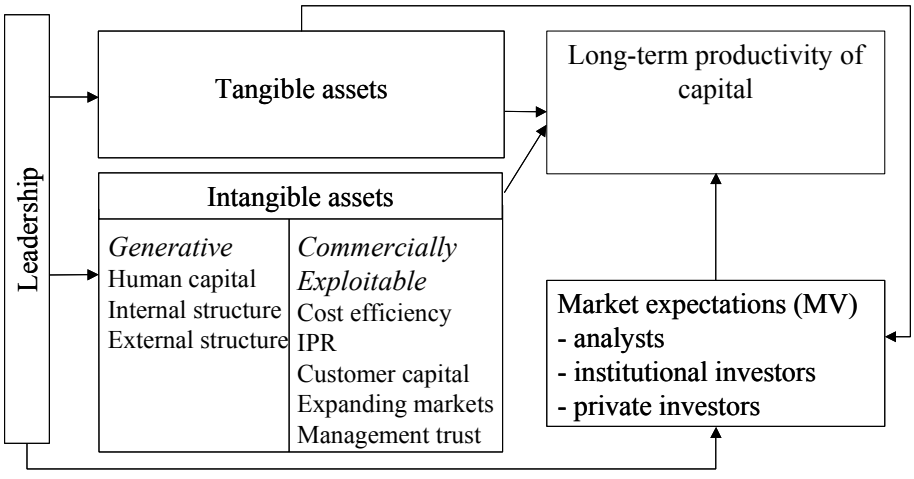

Figure 2 Intangible assets in the general view of the company

initiatives, such as the MERITUM project, to modify generalised guidelines for reporting on intangibles (see, for example, the MERITUM project 2002).

When considering the management of Intangible Assets, it is essential to understand that none of the components of Intangible Assets *per se* is sufficient for successful performance; the separate items need to be combined into the best possible balance. A company's current performance (and its market value if listed on stock markets) depends essentially on its Commercially Exploitable Intangibles. Moreover, continuous renovation in response to the company's constantly changing environment is only possible through a balanced management of its Generative Intangibles to intensify the intersection of Human Capital, Internal Structures and External Structures. (Hussi 2001; Hussi – Ahonen 2002.)

This classification of intangible assets is closely related to the value platform model presented in Figure 1, but it focuses more closely on the causality of the value creation. Whereas the value platform model only states that value is created in the intersection of the dimensions, this model reveals a realisation of future potential as a commodity and, thus, further reveals the mechanics of intangibles based revenues. Commercially exploitable intangibles are the basis for current cash flow, whereas generative intangibles are the source for renewal and the creation of future commercially exploitable intangibles. However, this model does not describe how the transformation takes place. There is a black-box feature in this setting, because the mechanics of commercialisation are taken as given. Therefore, further specification is still needed. In the next section the knowledge creation approach as the process resulting in this change will be discussed.

4 Knowledge creation

Sveiby (1997) argues that knowledge has four characteristics. Firstly, especially practical knowledge is, to a high degree, tacit by nature; that is, it is difficult to explain in words. Secondly, knowledge is action-oriented and characterised by a process-like nature. Reality is understood by categorising it in a fashion that has turned out to be applicable in the past. An entity is perceived by analysing details of it and these elements are integrated in reflection on previous experiences. Thirdly, knowledge is supported by rules. Previous experiences cumulate as mindsets that help us perform different activities effectively "without having to stop to think about what we are doing". Practice is about refining these rules. Finally, knowledge is

constantly changing. Externalisation of tacit knowledge makes it static and, thus, possible to reflect, distribute and critique it. Knowledge is increased through these actions. Thus, in short, knowledge can practically be defined as a capacity to act.

Nonaka *et al*. (2000) define knowledge as a true justified belief with the emphasis on 'justified'. Therefore, relative, dynamic and humanistic dimensions are characteristic of this definition. The dynamics of knowledge derive from its origins in social interaction. The context-specific nature distinguishes knowledge from mere information, because the meaning is embedded in the context.

> Information becomes knowledge when it is interpreted by individuals and given a context and anchored in beliefs and commitments of individuals (Nonaka *et. al* 2000).

There are two different kinds of knowledge, that is, tacit and explicit (Polanyi 1958). Tacit knowledge is personal and, therefore, difficult to formalise, communicate and share with others. Tacit knowledge consists of a technical dimension often referred to as know-how and a cognitive dimension that includes schemes, mental models and beliefs, in short a conception of reality. Explicit knowledge can be conceptualised and stored in information systems. Western thinking has concentrated on explicit knowledge. This tradition stems from the Cartesian dualism, which makes a clear distinction between mind and matter and, accordingly, body and mind. In the Japanese thinking tradition, knowledge is traditionally seen primarily as something not easily visible and expressible, that is, tacit by its nature. (Nonaka – Takeuchi 1995.)

Successful knowledge companies create sustainable value through the creation and use of knowledge and know-how. The essence of knowledge creation is the interaction between tacit and explicit knowledge rather than tacit or explicit knowledge acting separately. It is this dynamic interaction that generates innovations and, furthermore, organisational knowledge. Organisational innovativeness is not merely the processing of information prevailing in external realities, but companies also create new knowledge and information by redefining internally both problems and solutions already found. Knowledge is created through interaction both internally between the organisation's members and externally in relation to the environment. In this interaction process, all participants also get to develop themselves. (Nonaka – Takeuchi 1995.)

In Nonaka and Takeuchi (1995) the interaction between tacit and explicit knowledge has been expressed by means of the SECI model, which consists of four different modes of knowledge

conversion (Socialisation, Externalisation, Combination and Internalisation). Knowledge creation is a spiralling process in which different modes of knowledge conversion follow on each other. This process is called the epistemological level of knowledge creation. The SECI process is shown in Figure 3.

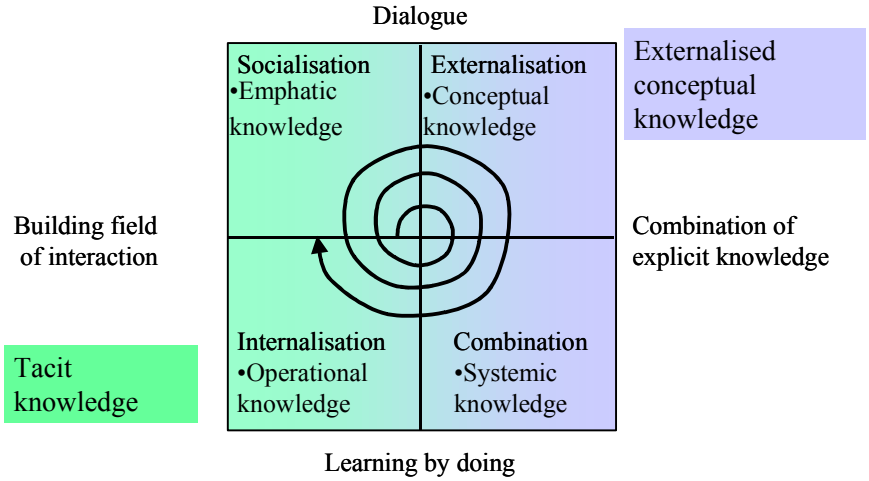

Figure 3 The spiral of knowledge in the SECI model (Nonaka – Takeuchi 1995)

In socialisation, tacit knowledge is converted into tacit "by sharing experiences". Since it is the nature of tacit knowledge that it cannot be expressed by spoken language, the conversion has to take place through observation, imitation and practise. The starting point for socialisation is building the field of interaction that facilitates the sharing of experiences and mental models. Organisational redundancy is an important mediator of socialisation, because it exhorts dialogue and communication between the organisation's members. This redundancy is created, on the one hand, by having group members with sufficiently different backgrounds and, on the other, by multiple sources of information. Managers generate creative chaos in the team's work by questioning the ambitiousness of goals. In order to turn chaos into a creative state, the organisation has to institutionalise the constant communal reflection of its functioning. Team members are also expected to have a significant level of autonomy in pursuing the commonly agreed goal. The resulting form of knowledge is emphatic. (Nonaka – Takeuchi 1995.) Socialisation is strongly supported through direct interaction with suppliers and customers (Nonaka – Konno 1998).

In externalisation, the tacit knowledge is converted into explicit concepts. It is characteristic of externalisation that it is the activity of a group. In externalisation, knowledge takes a conceptual form. During the externalisation process, when tacit knowledge is made explicit, the

shared perception is articulated into concepts in an ongoing dialogue. It is through collective reflection that words develop into phrases and further to crystallised concepts. The means of this conversion are the use of different metaphors, analogues, concepts, hypotheses and models in a sequential order. Expressing tacit knowledge via metaphors makes it possible to observe or intuitively come up with symbolic comprehension. Metaphors are intuitive by their nature. They are based on holistic imagination and are not aimed at pointing out the differences. Analogies, on the other hand, are based on rational thinking. They aim at showing structural or functional similarities as well as differences. Externalisation is an extremely important phase from a knowledge creation point of view. If the knowledge to be shared has no explicit form, it is difficult to distribute it across the organisation. (Nonaka – Takeuchi 1995.) One of the important features of the SECI process is externalisation of highly professional or highly personal tacit knowledge that is attained in the socialisation phase from external relationships or specialists, and converting it into an easily understandable form (Nonaka – Konno 1998).

Combination is about converting explicit knowledge into explicit knowledge. In this mode both the new concepts generated through the externalisation and already existing explicit knowledge are organised into larger knowledge structures, that is systemic knowledge. (Nonaka – Takeuchi 1995.) In combination, explicit knowledge is incorporated into more complex and systematic sets of explicit knowledge. The combination may also include the breakdown of concepts to operationalise them as new systemic explicit knowledge is created. The explicit knowledge needed in this phase can be gathered either from inside or outside the company. (Nonaka *et al.* 2000.) It is characteristic of the combination phase that explicit knowledge being processed can be directly disseminated by presentations or meetings (Nonaka – Konno 1998). Different computerised networks and databases can turn out to be highly facilitating in disseminating explicit knowledge resulting in combination throughout the organisation. (Nonaka *et al.* 2000.)

Internalisation is the mode in which explicit knowledge is converted into tacit. This operational knowledge takes place through learning by doing. Internalised knowledge becomes part of the individual's cognitive resources. This process is facilitated by verbalised or visualised documents, manuals or spoken stories that result from combination. When most of the organisation's members possess certain tacit knowledge it becomes part of the organisation's culture. (Nonaka – Takeuchi 1995.) Explicit knowledge shared throughout the company is converted into tacit knowledge by individuals. Reflective revision of, for example, documents can

enrich the organisation's members' tacit knowledge base. Shared mental modes or technical know-how that have been assimilated into organisation's members' tacit knowledge bases form a valuable asset for the company. (Nonaka *et al.* 2000). The process of internalisation is the link that makes explicit knowledge, as expressed in strategies, innovations and improvements, a part of the organisation's daily functioning. (Nonaka – Konno 1998.)

The spiral of the SECI process becomes larger in scale as it expands both horizontally and vertically across the organisation, that is, transforms into new ontological levels. Sectional, departmental, divisional and even organisational boundaries are transcended in this process. Knowledge created by one organisation can trigger multiple similar processes far beyond the originating organisation. (Nonaka *et al.* 2000). The ontological dimension of knowledge creation occurs when knowledge transcends to a different organisational level and begins anew. This shift can take place intra-organisationally or even between organisations. Intra-organisational transcendence of knowledge takes place, for example, when knowledge is moved from the divisional to the organisational level. Knowledge transcendence between organisations mobilises stakeholders' knowledge in a dynamic interaction. In short, the ontological dimension refers to the transformation of knowledge created by individuals into the knowledge of groups and organisations. (Nonaka – Takeuchi 1995.)

These two dimensions, the epistemological and the ontological, constitute knowledge creation (Nonaka – Takeuchi 1995). Knowledge creation is a continuous, self-transcending process through which the participants' boundaries of self are reshaped by acquiring a new context, a new view of the world and new knowledge (Nonaka *et al.* 2000). The role of the organisation in knowledge creation is to provide the context that facilitates group activities. At the same time, it provides both a setting for knowledge generation on the individual level and knowledge accumulation on the organisational level. (Nonaka – Takeuchi 1995.) An individual's knowledge is inevitably specialised and domain-specific. Collective knowledge discusses the possibilities of distributing and sharing knowledge among the organisation. It can be either a "stock" of knowledge stored as hard data or a "flow" emerging from interaction. Collective knowledge exists between people rather than within individuals. (Lam 2000.)

The context in which knowledge is embedded has been conceptualised as *ba* (see for example Nonaka 1998, Nonaka – Konno 1998, Nonaka *et al* 2000). In a *ba* changes take place at both micro and macro levels, as both the participants and the *ba* change. (Nonaka *et al.* 2000) Therefore, the *ba* provides a platform for advancing individual and collective knowledge. It is

a context that harbours meanings and is, accordingly, seen as a shared space that serves as a foundation for knowledge creation. The concept of *ba* integrates physical, virtual and mental spaces into the individual's conception of his position as part of the surrounding environment. To participate in a *ba* means facing and outreaching one's own limited perspective or boundary. (Nonaka – Konno 1998.) A *Ba* exists at many ontological levels and these may be connected to form a greater *ba.* Individuals form the *ba* of different groups, which, in turn, form the *ba* of an organisation and these again form the *ba* of a market environment and further society as a whole. (Nonaka *et al.* 2000).

There are four types of *ba* that are related to the different phases of the SECI process: originating *ba*, interacting *ba*, cyber *ba* and exercising *ba*. Originating *ba* is the "space" for sharing feelings, emotions, experiences and mental models between individuals. Originating *ba* creates a basis for the emergence of care, love, trust and commitment. Organisation issues that are closely related to originating *ba* are knowledge vision and culture. The current trend of emphasising openness in an organisation's functioning and active orientation towards stakeholders also create stronger links to harness extra-organisational tacit knowledge into the knowledge creation process. A company should, however, take care not to dominate a *ba* that is jointly created with the customers. (Nonaka – Konno 1998.) The difficulty of originating *ba* relates to the difficulty of managing it. Originating *ba* is rather ecological and autonomous by nature. It depends heavily on the organisation's culture and leadership style. (Nonaka 1998.)

The creation of interacting *ba* can be more purposeful and conscious. Getting the right mix of people with the right mix of knowledge and abilities to work on the externalisation of tacit knowledge is the key element of interacting *ba*. Through dialogue participants share the mental models of the others and reflect them as their own. This process brings forth commonly accepted explicit terms and concepts.

Cyber *ba* can take place in virtual environments because the relevant knowledge has already been captured and represented in a way that does not demand face-to-face human interaction to share. Using information technology makes combination and systemised knowledge dissemination across the organisation most efficient as limitations of time and space can be transcended.

Exercising *ba* facilitates the internalisation of explicit knowledge. Learning through on-the-job-training and other continuous cultivation of oneself means embodying explicit knowledge that is communicated, for example, through virtual media. Exercising *ba* synthesises tran-

scendence and reflection through action rather than by analysis. (Nonaka *et al*. 2000; Nonaka – Konno 1998.)

An organisation capable of innovating systematically manages its knowledge creation process. Creating a variety of *ba* moulds knowledge creation into a spiral as shared mental space expands effectively when moving further along the ontological dimension, while simultaneously helping individuals to expand their cognitive limits. (Nonaka 1998.) A top-down management approach gives only top management sufficient circumstances for creating new knowledge. On the other hand, it is typical of bottom-up management that interaction between the organisation's members is rare. This results from seeing autonomy as the main principle and it is the individuals that are essentially the creators of knowledge. The ways of working are more like those of entrepreneurs instead of co-operation. Therefore, middle management has an essential mediating role between top management and shop floor personnel. (Nonaka – Takeuchi 1995). Yet the role of the leaders is central because it is their valuation that provides a platform for the dynamics of knowledge creation. They can manage the emergence of knowledge by providing sufficiently challenging strategic goals and personal commitment. The success of knowledge creation depends on responsibility, justification, financial backing and care offered by the leaders. (Nonaka – Konno 1998.)

5 Synthesising intellectual capital, intangible assets and knowledge creation

Knowledge management has become a topical issue in business administration studies. However, excluding the attempts to create evaluation and reporting methods, there has been relatively little effort to clarify the very content of the concept of knowledge management. Ikujiro Nonaka published the pioneering book "*The knowledge creating company*" together with Hirotaka Takeuchi in 1995. This book has been taken as the corner stone of knowledge management as knowledge transfer is seen as the essence of knowledge management (Sveiby 1997). Furthermore, Nonaka *et al*. (2000) provide a comprehensive model to description of dynamic knowledge creation.

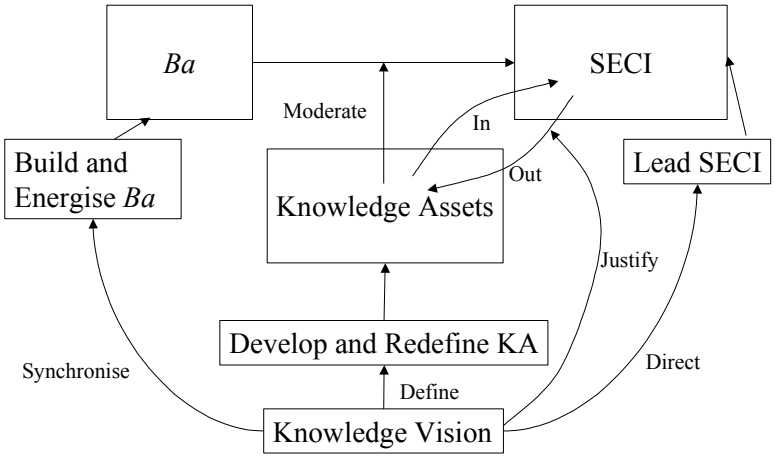

Figure 4 The unified knowledge creation model (Nonaka *et al*. 2000)

In the unified model of dynamic knowledge creation (Figure 4) the distinction between *ba* and the knowledge assets is not clearly defined. *Ba* and knowledge assets are both dynamic concepts. Questions arise from this setting concerning the relationship between the two concepts. Firstly, how can *ba* be separated from knowledge assets, as it actually is one of the knowledge assets? Secondly, the model contains some linkages (such as knowledge assets moderating the interaction between *ba* and the SECI process) that are not easy to understand.

The simultaneously determined nature of knowledge assets and the SECI process in Nonaka *et al*. (2000) construes a structure that is lacking economic impetus. In the model the knowledge assets form the "raw material" to be converted in the SECI process, which, in turn, result in new knowledge assets. This outline is not able to reveal the logic of value creation, which remains a black-box.

The Nonaka *et al*. model, however, forms a useful basis for describing the various elements knowledge management and intellectual capital. It also presents many important connections between these elements. It is, for example, one of the most illustrative presentations that set knowledge vision in a fundamental position in this discourse. It is rather often taken as given that strategic planning is the primary element in defining a company's intellectual capital, and no further clarifications have been made to make the grounds visible. Similar articulation about the importance of knowledge vision can be seen in Danish work around intellectual capital statements (see, for example, Mouritsen *et al*. 2000).

Knowledge-based resources involve both static and dynamic features. Therefore the concepts of both intangible assets and intellectual capital should be based in the same model (see Figure 5). In this way, it is possible to take advantage of the static nature of the former one and the dynamics of the latter. Even though generative intangible assets consist of three elements that are identical to those of intellectual capital, there is still something that is only present in the latter. This feature is the dynamic processes. Without them the generative the intangible assets are merely static stocks of assets. It is the dynamic processes that create interaction between these elements and, thereby, constitute intellectual capital.

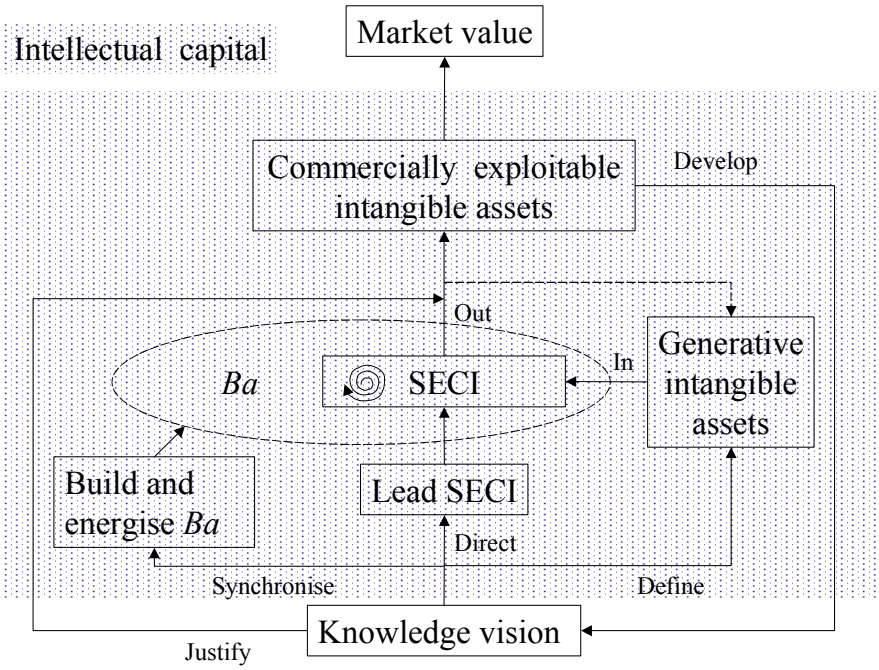

Figure 5 A reconfigured model of knowledge management

Knowledge vision is a roadmap that gives direction to the organisation's knowledge creation. It is a tool articulated and communicated by the top management for synchronising the entire

organisation. It is not tied to existing products, organisational structures or markets, but transcends them all. It also provides a frame of reference in defining the value of the knowledge created by the company. (Nonaka *et al.* 2000.) Knowledge vision is, thus, the logical starting point for all activities related to knowledge management. To put it briefly, it forms the basis for defining *what* are the company's generative intangible assets, *how* the dynamics of the SECI process should be directed and, in the sense of context, or *ba*, *where* does this take place.

Defining generative intangible assets is fundamental, because it describes the company's resources for creativity. The three-dimensional definition used in this study outlines the broad classification of these resources. This classification is applied to a specific organisation by reflecting it in the company's strategy. An example of a study that focused on identifying intangible assets was referred to above (Hussi 2001; Hussi – Ahonen 2002; see also Table 1).

Building and energising *ba* means developing the context in which knowledge creation through the SECI process takes place. According to Nonaka and Takeuchi (1995), middle management has an essential role to play in breaking down the visionary discourse of the top management and in applying it to the chaotic every-day life of the front-line personnel. In the turmoil of maintaining the SECI process, middle managers feed the process by new concepts and images that guide knowledge creation synchronically with the shared goals outspoken in knowledge vision. (Nonaka *et al.* 2000.) Therefore, it can be stated that they are the key players in maintaining the SECI process. At the same time, they also contribute by reshaping the conceptual framework that is used to interpret the experiences and results of knowledge creation. They, therefore, also provide indispensable insights for developing the knowledge vision further.

The Danish approach discusses management challenges that are about defining critical relationships that link user value with knowledge resources. The consequences of using knowledge resources are, in a certain way, assessed in relation to expected outcomes and, therefore, are strategic formulations of a company's future efforts. (Mouritsen *et al.* 2000) The management challenges approach adopted by the Danes is very closely related to the strategic alternatives of a company and, thus, represent the directing link presented as lead SECI. This is not the task of the middle management but more of the executive officers.

It is the generative intangibles that stand out as the input for the SECI process and the main output is in the form of commercially exploitable intangibles. In this way organisational inno-

vativeness, which takes place through the SECI process, is turned into a form in which value extraction is possible, that is output has commercial value. Some outcomes may also be in the form of new generative intangibles, for example, as tacit knowledge is shared between individuals through socialisation and, thus, new human capital is created.

Justification means finding the basis for agreement (Nonaka – Konno 1998). It requires evaluation of the relevance and usefulness of the knowledge produced in the SECI process. Even though the mechanisms for winnowing out the relevant results are usually created by the top management, they have to be explicitly known throughout the organisation (Nonaka – Takeuchi 1995). The resulting commercially exploitable intangible assets are linked back to knowledge vision as successfulness in some area might encourage an organisation to develop its strategic positioning by focusing on activities in which its strengths lie or then again leveraging strengths into new branches of industry.

A coherent knowledge management strategy can be seen as an attempt to verbalise the system labelled intellectual capital in Figure 5. In the Danish framework, the knowledge narrative has a central role. It can be seen as an approach to describe the intellectual capital of a company as a whole. The aim of a knowledge narrative is to explain how the company's products or services benefit the users and how they improve their situations. The knowledge narrative is used to explain the knowledge management strategy chosen by the company and the rationale for choosing this specific strategy. In short, the knowledge narrative helps to define the basic values of the company - it's *raison d'être*. For example, a plastic bag that is created for medical purposes can be shown to have a significant role in improving the quality of life of a disabled person. (Mouritsen *et al.* 2000.)

Knowledge narrative is not merely an analytical tool, but a meaningful story in which analytical elements are related to each other in a coherent entity. A slogan consisting of a couple of words is not strong enough to explain the value creation of an organisation. Describing the use value, user's situation, the particular characteristics of the product or service, fundamental conditions of production and the management challenges are the elements that are required for a coherent knowledge management strategy. The picture given by the knowledge narrative explains what the company does and also presents an idea of what it wants to be. (Mouritsen *et al*. 2000.)

The reconfigured model of knowledge management meets the challenges placed on the unified knowledge creation model (Nonaka *et al* 2000). The problems of the relationship be-

tween *ba* and knowledge assets are avoided by redefining the role of *ba.* Secondly, the whole idea of the reconfigured model is to gather different elements of the same discourse into the same model and, thus, inseparably see the knowledge creation approach in relation to intellectual capital and intangible assets. Finally, the business logic is distinctly added to the model.

6 Discussion

The Nonaka and Takeuchi (1995) book "The knowledge-creating company - how Japanese companies create the dynamics of innovation" has an established position as one of the corner stones in knowledge management literature. On the other hand, knowledge management is seen as an impartial element of intellectual capital. The model presented in this paper represents an attempt to combine the pioneering work of Nonaka *et al.* with the broader intellectual capital discussion. The conceptual categorisation of the reconfigured model of knowledge management represented in (Figure 5) describes the relation between intellectual capital and intangible assets. In this setting the critique of the concept of intangible assets is turned into a strength because the static nature of the concept is essential in the outline of the model. This classification is built to unravel the black-box phenomenon that easily takes place in discussions around intellectual capital. Generative intangible assets are an input that is modified by the dynamic processes. The definitions for these processes are outlined by Nonaka *et al.* (2000). Static resources combined into dynamic processes create the basis for the organisation's future success. The output of this modification takes the form of commercially exploitable intangible assets, which are the grounds for a company's intangibles related current cash flow. Hence, the model explains the business rationale of intellectual capital.

A question might arise whether the concept of intellectual capital has been used inconsistently. Therefore, it is important to point out the relationship between the figures describing the value platform (Figure 1), the intangible assets from a general view of the company (Figure 2) and the restructured model of knowledge management (Figure 5). There is no disharmony between the figures; they actually describe the phenomenon in an increasing level of detail. The value platform model is fundamental for understanding the importance of interrelatedness and, thus, the dynamics when discussing intellectual capital. If the compounding elements of this model are analysed, it can be seen that it does contain both generative intangible assets and the dynamic processes, that is, the definition is similar to that in Figure 5. Reducing the level of abstraction makes it possible to scrutinise the logic of value creation more

closely. The focus in Figure 2 is directed to this aspect by outlining the relationship between generative and commercially exploitable intangibles is outlined. The dynamic processes are beyond the scope of this figure. Finally, Figure 5 presents both the dynamic processes and the static intangibles and, thus, shows the logics of value creation related to intellectual capital. These three figures sum up as a continuum, through which it is possible to gain an understanding of the economical relevance of intellectual capital.

It is a matter of discussion whether the knowledge vision should be included in intellectual capital. The knowledge vision is located outside intellectual capital because it is something that defines and directs the company's use of its intellectual capital. Even though the knowledge vision is not included in the definition of intellectual capital, the relationship between intellectual capital and knowledge management is similar to Schein's (1992) definition of organisational culture and leadership. According to Schein, it is not possible to understand one without the other, but they are more like two sides of the same coin. Even though this issue is an interesting one and will supposedly give rise to discussion among the scientific community of this field, this is still a minor detail in the complexity of this paper. The principal aim of this paper has been to explore the relationship between intellectual capital, intangible assets and knowledge creation, and, thus, create a reconfigured model of knowledge management. It turned out that scrutinising the perspective of value creation was an applicable approach in building these connections.

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