



Reading an intellectual capital statement

Reading an
intellectual
capital statement

Describing and prescribing knowledge management strategies

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Abstract *This paper introduces a framework for analysing intellectual capital statements. It is suggested that the three-way model of intellectual capital (human, organisations and structural) can be developed in its descriptive and its prescriptive qualities. Another model is offered which relate intellectual capital indicators to the firm's knowledge strategy. This IC accounting system describes the transactions that allow the firm's knowledge strategy to be implemented and it prescribes an agenda from which it is possible to monitor the effects around intellectual resources, to qualify and upgrade them and to survey the portfolio of intellectual resources. An example of Systematic Software Engineering's two intellectual capital statements from 1999 and 2000 is used to illustrate how intellectual capital statements may be read from this perspective.*

Introduction

Published intellectual capital statements are rare documents. Even if Skandia and Dow Chemicals published intellectual capital statements in the 1990s, there has been more talk about the possible benefits of such documents than of their actual content. Several authors (e.g. Bontis *et al.*, 1999; Erhvervs Udviklingsrådet, 1997; Guthrie and Petty, 2000; Harvey and Lusch, 1999; Johanson *et al.*, 1998, 1999; Larsen *et al.*, 1999, Mouritsen, 1998, 2000; Petty and Guthrie, 2000; Sánchez *et al.*, 2000) discuss new forms of reporting systems, which include "non-financial" indicators. Rarely, however, were these reporting systems specifically developed as intellectual capital statements. Typically, they were "new" forms of reporting systems generally. There is still a lack of research about firms that set out to develop intellectual capital statements. Therefore, there is little analysis of situations where intellectual capital statements are seen as answers, just as there is little evidence about the question that makes an intellectual capital statement an interesting answer.

In Guthrie and Petty's (2000) study of Australian practices, the three-way breakdown of intellectual capital into human capital, organisational capital and customer capital (Edvinsson, 1997; Edvinsson and Malone, 1997; Roos *et al.*, 1997; Stewart, 1997; Sullivan, 1998) is used to "measure" the content of new forms of reporting. Using this classification, Guthrie and Petty (2000) suggest that the indicators used in the statements spread across the three forms of intellectual capital as 30 per cent human capital, 30 per cent organisational

capital (internal structure) and 40 per cent customer capital (external structure). It is possible to count the number of indicators, and this creates insight into the structure of intellectual capital indicators, but it has limited indication of the structure of intellectual capital.

It is also possible to aggregate them. Roos *et al.* (1997, p. 83ff) develop an IC-index that creates an indicator for each of the three forms of intellectual capital and an aggregate one, which then can be monitored across time. Weights have to be assigned to the actual value of each indicator and then the weighed IC index can be produced. This procedure has merit as it integrates indicators, but it is an open question how weights are to be found.

It is even possible to simulate and present the indicators in complex graphs. Edvinsson *et al.* (2000) show how an IC-landscape can describe the intellectual capital components in 3-D representations, illustrate the effects of simulations and use them as forecast information. This procedure allows communication of the structure of the intellectual capital but it may be near to impossible to find the model that allows predictions to be made about the states of the indicators.

Whether the indicators are weighed or not, and whether they are simulated and visualised or not, however, the three-way model neither *describes* nor *prescribes* the development of intellectual resources well since it tends to draw the indicators away from the context they represent. There is more to an intellectual capital statement than the indicators. Reading an intellectual capital is different from reading a financial statement, because the intellectual capital statement does not have the institutions that make certain readings conventional, as in the case of the financial statement. The financial statement is an institutionalised reading of, for example, profitability, liquidity and solidity. Through history, capital markets have increasingly refined this reading taking into regard industry-specific influence, firm-specific variance and the effect of the general economic climate. This is located in strong institutional contexts.

The intellectual capital statement does not have such institutions. This is why the indicators in the intellectual capital statement typically cannot be read as directly and “easily” as the ones in financial statements. The logic of reading the indicators can therefore not be “outside” the document but it has to be made part of it. Roos *et al.* (1997) say that the measurement of the intellectual capital and the management of knowledge and information go hand in hand: “Intellectual capital is concerned with how better to manage and measure knowledge and other intangibles in the company” (Roos *et al.*, 1997, pp. 6-7). If measurement does not make management – or intervention – possible there is no need for it. Therefore, the measurement system needed to probe into intellectual capital has to be part of an idea of intervention around managing knowledge (Allee, 1997; Baxter and Chua, 1999; Bukh *et al.*, 2001; Birkitt, 1995; Guthrie, 2001; Larsen *et al.*, 1999; Roos and Roos, 1997; Ross, 1998; Sveiby, 1997; Sullivan, 1998). In effect, an intellectual capital statement has to be about a firm’s knowledge management activities. How is this possible? How can this be read from an intellectual capital statement?

To answer these questions, this paper uses Systematic Software Engineering Ltd's two intellectual capital statements to illustrate how intellectual capital statements may be analysed[1]. It analyses their composition, textual content and indicators and thereby it illustrates that and how an intellectual capital statement is a report on the firm's knowledge management activities. The textual parts of the statement present the firm's knowledge management strategy – often as a story about the effects on users that derive from the firm's knowledge resources – and the associated set of management challenges needed to implement the knowledge management strategy. The indicators of an intellectual capital statement are there to monitor the implementation of the management challenges. The indicators do not measure and explain the difference between market and book value and they do not compute a financial value of the firm[2]. Rather, the indicators are there to check on the degree to which the firm's knowledge management strategy has been made real. An IC accounting system may help monitoring the effects of knowledge resources, the qualification and development of available knowledge resources, and the development of the portfolio knowledge resources.

The paper explains and illustrates these points, and it is organised as follows. The next section discusses models of intellectual capital. Briefly, it attempts to show why and how it may be possible to criticise the three-way split in human, organisational and customer capital. This section goes on to argue how it is possible to develop stronger analytical dimension which allows some form of prescription. Then a section presents Systematic's intellectual capital statements. This section discusses how knowledge management can be put on such a form that it may be related to indicators. The last section provides conclusions.

The three-way intellectual capital model

The idea of intellectual capital is explained by Edvinsson and Malone (1998, p. 21, translation added) as follows:

Perhaps, the role of intellectual capital is easiest explained by using a metaphor. If we imagine a firm as a living organism; for example, a tree, one can say that organisational plans, annual and quarterly reports, firm brochures, and other documents are the trunk, branches and leaves. The wise investor will examine the tree whether he can harvest ripe fruit. But to assume that we have now seen the whole tree because we have seen the visible is a grave mistake. At least half the tree is below surface in the roots. And while the taste of the fruits and the colour of the leaves make a good presentation of the present health of the tree, it is much more effective to look at what goes on in the roots if one wants to form an opinion about the health of the tree for the coming years. There may be rot below the surface, which as time goes may kill the tree that looks healthy presently. This is what makes intellectual capital – investigation of roots of a firm's value, measurement of the dynamic factors, which are found below the visible surface of a firm's buildings and products – so important.

This elegant presentation shows intellectual capital in action. It tells a story about the relationship between the past and the future, and it dramatises the need to look after the roots. Intellectual capital is thus partly a story of

interlinked activities that happen all over the tree at any moment in time. To understand a firm's intellectual resources one has to look beyond the present fruits and towards the ability to produce fruits in the future.

The three-way split into human capital, organisational (structural) capital and customer capital is thought to be able to report beyond the present. Stewart's (1997, p. 86) proposition is mainstream and he defines human capital as that which thinks: "[m]oney talks, but it does not think; machines perform, often better than any human being can, but do not invent ... [The] primary purpose of human capital is innovation – whether of new products and services, or of improving in business processes". Structural capital is "knowledge that doesn't go home at night ... [I]t belongs to the organization as a whole. It can be reproduced and shared ... technologies, inventions, data, publications, ... [and] strategy and culture, structures and systems, organisational routines and procedures" (Stewart, 1997, pp. 108-9). Like human capital, the firm cannot own customer capital. Yet, it is crucial because it is "the value of its franchise, its ongoing relationships with the people or organisations to which it sells ... [like] market share, customer retention and defection rates, and per customer profitability" (Stewart, 1997, p. 143). Edvinsson's and Sveiby's models are presented in Figure 1. There are significant overlaps.

Stewart's definition is adopted by most authors on intellectual capital even if there are small variations (see Figure 1). However, it has two problems: one of *description* and one of *prescription*!

Problem 1: description – the three-way model is functional

The three-way model separates the three kinds of knowledge resources. It purifies the distinction between them and claims that the three categories exist as autonomous functional entities. Humans think; and they go home. Organisational/structural capital does not go home and is probably more reliable. It does not have agency and does not resist – not even being sold. Organisational capital is therefore a key element in understanding the firm as a predictable entity. It is routinised and procedurised. Customer capital is – like human capital – not reliable as the customer base can flee away. It is valuable, however, and therefore customers have to be stabilised by providing valuable relationships. Customers have to be bought and then they will be loyal.

The three elements of intellectual capital fundamentally exist in separation because they have different relations to property rights. People cannot be owned; machines can. Customers cannot be owned, technology and routines can. However, the three categories are not only related, they are also integral to each other. People work through technology; customers get services from people, information technology circulates both customers and employees (Bukh *et al.*, 2001). Therefore the three kinds of resources are complements. They are part of a network of things and people that co-produce the effects of the whole network. Even when interaction between the three factors is argued to be important as Roos *et al.* (1997) do, in their IC index they are presented individually. The *descriptive* properties of the three-way model miss

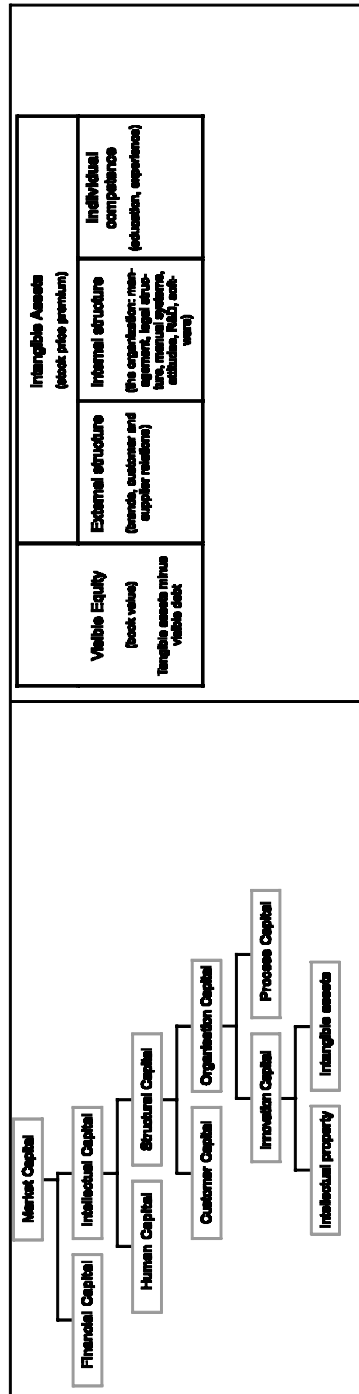


Figure 1. Edvinsson's and Sveiby's models of intellectual capital

complementary between the elements that cohere not because they help mobilise the knowledge strategy of the firm and they are interesting only to the degree that they can monitor its implementation. The intellectual capital statement translates a set of knowledge management challenges into a bundle of interrelated indicators that traverse the three elements of intellectual capital.

Where does this leave indicators? It leaves them at a level with the indicators in a financial statement. Financial statements do not principally “measure” the economy; they are literally expressions of an organisation of receipts. Analogously, indicators in an intellectual capital statement may be about transactions made visible through the “receipt” that defines an indicator, which are often statements about employees, about customer-relations, about processes, or about technology (e.g. Bukh *et al.*, 2001, Mouritsen *et al.*, forthcoming). This is not the three-way model because the “receipt perspective” is not functional – statements on employees may not (only) say something about employees but (also) about technology if it is about training in IT. Statements on employee-satisfaction may not (only) be indicative of the firm’s human resource program but (also) of interesting customer-relations. To turn from an idea of functional classification to one of classifying transactions changes the interpretation of an indicator. The *descriptive* qualities of the intellectual capital elements change from the three-way model’s emphasis on functional qualities towards an alternative that “merely” identifies the “receipts” that make up a number. This “merely” classifies indicators, which then can be attached to the implementation of management challenges relevant to the firm’s strategy rather than fill out the gap between a market value and a book value.

Problem 2: prescription – the three-way model has no management agenda

The three-way model does not *prescribe* any effect of the indicators. Comparing the three-way model with a conventional financial statement, it has objects akin to revenues, costs, assets and liabilities but it does not have anything similar to the analytical potentiality found in profitability, liquidity and solidity, which are three evaluative and potentially *prescriptive* readings of a financial statement. The three-way model omits issues and problems that face a reader of an intellectual capital statement.

Prescriptions are associated with possible courses of action. Comparing again to Edvinsson and Malone’s tree, actions seem endless, but a few types appear generic. One is the portfolio of resources: how many branches, how tall to be, how large a root system? These are portfolio issues, which in a firm would be analogous to putting together a group of employees, of customers and of technologies to answer the question: “how do we look?”. Another set of issues qualify – or develop – the tree: how to develop the branch, how to make the leaves big, how to make the tree colourful? Such questions would in a business context concern how to develop human resources, customer relations, process quality and productivity to answer the question: “what do we do to our resources?”. And a third set of issues pertains to the size of the tree’s fruits, to its taste and to its volume. For a firm this would be the monitoring of results in

a variety of dimensions that pertain to employees, customers, processes and technologies answering the question: “what good effects are associated to our resources?”.

These *prescriptions* are “managerial”. They are concerned to mobilise indicators *vis-à-vis* certain activities that have a place in and around an intellectual capital statement.

A revised model: an IC accounting system

On the basis of the previous discussion, a revised model may be formulated and presented as in Figure 2. Compared with the three-way model, it provides new possibilities of *description* and enhanced possibilities of *prescription*.

This IC accounting system[3] has a vertical dimension for knowledge resources and competencies, and a horizontal dimension for three possible types of management activities that can be performed on knowledge resources and competencies. As illustrated in Figure 2, the vertical part consists of four objects for intervention, employees, customers, processes and technology, while the horizontal part consists of three types of prescriptions.

The indicators in the “resources” column addresses the question: “what is the (right) portfolio of resources?”. Resource indicators are about the firm’s “stock” of relatively stable objects such as “a customer”, “an employee”, “a computer”, and “a process”. Such indicators show how large, how diversified, how complex and how related resources are. The indicators in the “qualifying activities” column is the answer to the question: “do managers undertake qualifying activities?”. Activity indicators describe activities undertaken to “upgrade”, “develop” or “improve” the resources. They show what is done in the firm, for

	Management arena	Monitoring of effects	Qualification Management	Portfolio Management
	Modality	Competencies	Qualifying activities	Portfolio
Area Domain	Effects	Activities	Resources	
Employees	• • • •	• • • •	• • • •	• • • •
Customers Publics	• • • •	• • • •	• • • •	• • • •
Process	• • • •	• • • •	• • • •	• • • •
Technology	• • • •	• • • •	• • • •	• • • •

Figure 2. An IC accounting system

example, to change the resource through objects such as training, investments in process improvement, and activities undertaken to attract customers. Finally, the “effects” column addresses the question: “does what we do work?”. Effect indicators illustrate overall consequences of the combination of the decisions about resources and about qualification activities. Such effects can be put together by any combination of the elements of the model illustrated in Figure 2. It is not a simple input-output model. Effects are network effects and can be explained by multiple constellations of indicators. Effects are related to the combinations involving resources and activities. It is a strategy to point this relation out and act on it.

On the other dimension, statements on employees may be indicated by formal qualifications (“resources”), investments in on-the-job training and education (“qualifying activities”) and employee satisfaction (“effects”). Likewise, statements on customers may be indicated, for example, as number of large customers (“resources”), marketing efforts per customer (“qualifying activities”), and customer satisfaction (“effects”). Statements on processes may be indicated by resources per process (“resources”), quality activities (“qualifying activities”) and throughput and waiting time (“effects”). Finally, statements on technology may be indicated by PCs per employee (“resources”), IT investments (“qualifying activities”) and IT certificates (“effects”).

This IC accounting system can classify all indicators we have seen[4]. It is noteworthy that indicators sometimes advocated in the literature and among practitioners are not visible here. Innovation, flexibility, learning, and customer-orientation are not here. This is because they convey strategy rather than transactions. For example, “innovation” may be indicated in some firms by the number of new patents (effects, processes), other firms present revenues from new products (effects, customers), and yet others from aggregate number of patents (resources, processes) or number of PhDs (resources, employees). Innovation is not an indicator but a strategy that can be laid out in different ways and through various combinations of indicators. As suggested by the examples shown, innovation can be made relevant to the firm in various ways. It does not exist *per se* and it is therefore not a category in an accounting system of intellectual capital[5].

As an accounting system, this IC accounting system has certain common traits with conventional financial accounting systems (see Table I).

	Financial accounting system	IC accounting system
<i>Description:</i> resource object	Transactions are classified in cost, revenues, assets or liabilities	Transactions are classified in employees, customers, processes, or technologies
<i>Prescription:</i> mode of intervention	Analysis can be made of profitability, liquidity, solvency and risk	Analysis can be made of management actions concerning portfolio decisions, qualifying activities, monitoring and evaluation of effects

Table I.
Similarities between the financial accounting system and the IC accounting system

Using the IC accounting system presented, it is possible to “test” the firm’s intellectual capital statement. It can be used to analyse whether the espoused strategy pursued by the firm is in accordance with its strategy of managing knowledge resources. This can be illustrated with an example using Systematic Software Engineering Ltd’s two intellectual capital statements from May 1999 and May 2000.

Systematic Software Engineering Ltd’s intellectual capital statements

Systematic Software Engineering Ltd is a Danish software house that develops and sells technical system solutions, products and support primarily to ministries of defence but also increasingly to industry, as well as transport and service companies (see and download the intellectual capital statements from www.systematic.dk)

Systematic was chosen for the analysis of this paper because managers say that it experiences several benefits from its intellectual capital statement both internal and external ones, and the firm is genuinely interested in improving its management of intellectual resources. Indeed, it could not separate between its intellectual capital project and its knowledge management project. These claims will be illustrated later in the paper.

Method

We studied Systematic’s work to develop its intellectual capital statement over three years. The object of the research was the future intellectual capital statement, which was in the making at the start of the research. We studied the statement as it was unfolding, and we were able to follow some of the prescriptions offered by network theory, which suggests that it is interesting to study things while they are being made (Latour, 1987). According to such a view, “things” are always constituted in networks of relations, and therefore they cannot possess an essence. “Things” – such as prospective or actual intellectual capital statements – are “in the hands of people; each of these people may act in many different ways, letting the token drop, or modifying it, or deflecting it, or betraying it, or adding to it, or appropriating it” (Latour, 1986, p. 267). “Things” do not have an immutable essence, which “just” has to be drawn out. In contrast, according to the network view, “it is in principle impossible to define the list of properties that would be typical of life in society although in practice it is possible to do so” (Latour, 1986, p. 272). To study Systematic’s intellectual capital statement is to look at how it was made interesting, how it was developed, how it was used, and how it was re-used and re-formed. In this sense, the intellectual capital statement was a fragile resource, which was made strong during the course of the analysis. This story is obviously a complex one, but – as will be clearer – for the indicators in the intellectual capital statement to be “stable” and “interesting” they had to be attached to an issue. This issue was knowledge management in Systematic, and therefore the management of knowledge and the intellectual capital could

not be separated. They were part of the same network of arguments, artefacts, decisions and effects.

The following five questions guided our analyses throughout the three years:

- (1) Why do the firms want to measure intellectual capital?
- (2) Who are involved in the project?
- (3) How does the firm work with intellectual capital?
- (4) What is intellectual capital made to be in the specific firm?
- (5) What potential effects is the reporting of intellectual capital expected to have?

To summarise Systematic's situation in this respect the following answers can be made (Table II).

In 1999, 33 per cent was human capital, 25 per cent customer capital and 42 per cent organisational/structural capital, and in 2000, 40 per cent was human capital, 24 per cent customer capital and 33 per cent organisational/structural

The firm	Systematic Software Engineering Ltd is a Danish software house that develops and sells technical system solutions, products and support primarily to ministries of defence but also increasingly to industry, as well as transport and service companies		
The motivation to develop an intellectual capital statement	<i>Internal reason:</i> the firm wanted to make the firm's knowledge resources and key competency areas visible and to monitor management's efforts to develop these. Also, management wanted to establish a new basis for deciding about the firm's future <i>External reason:</i> management firm wanted to present the firm to customer and employees, and to co-operating firms and other interests in an "interesting" way		
Organisation of the intellectual capital project	The project was managed by the COO and one person. The CEO and the CFO were sparring-partners		
Effects of the intellectual capital statement/project	<i>Internal:</i> it has created initiatives to share knowledge including a mapping of competencies and a heightened attention to the development of competencies, mapping of processes and introducing knowledge agents and mentors. Partly, a system of project management has been established that introduces a series of "balanced" points of measurement in project-reporting systems <i>External:</i> systematic has become a "name" among research communities, the press and local authorities. The intellectual capital statement has made it possible to attract new specialised IT employees and get network relations to a series of firms interested in competency development		
Distribution of indicators	Domain	Year 1999	Year 2000
	Employees	16	18
	Customers	12	11
	Processes	12	10
	Technology	8	5

Table II.
Summary of the systematic software engineering case

capital. This presents a story of Systematic in a form of transition between human and organisational capital. Another interpretation is possible, however. When the IC accounting system developed previously is applied, a whole new interpretation is possible. But first, what is the context of the intellectual capital statement?

Systematic software engineering

Systematic was founded in 1985, with its first contract being a support and maintenance job for the Danish Navy, but soon it obtained other defence contracts and in the beginning of 1990, the first non-defence contract was won. At the time of publication of Systematic's first intellectual capital statement in the spring of 1999, it had 130 employees and annual sales of DKK 80 million. It has subsidiaries in the UK and USA, but the intellectual capital statement only concerns the Danish part of Systematic. It is the stated aim of Systematic to change its core business areas from primarily being a supplier of defence systems to increasingly becoming a supplier also to civilian markets. In recent years there has in fact been a steady increase in the proportion of civil contracts with Electronic Data Interchange, electronic trade and security systems being the core business areas.

The layout of the intellectual capital statement. Systematic's intellectual capital statements are 16 and 19 pages long, of which the first five to seven pages are an introduction to and a description of the company including its mission, vision and values, and the last couple of pages are an excerpt from its financial statement. The intellectual capital statement is largely structured according to the model shown in Figure 3, which is inspired by the business excellence model.

The vision, values, objectives and strategies of Systematic are presented first. Then the report goes on with efforts, and it ends with results. It is

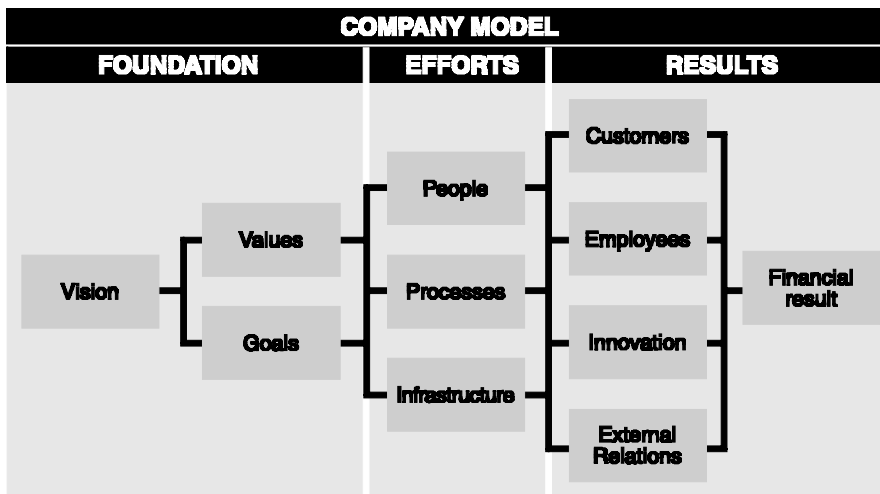


Figure 3. Systematic's model to structure the intellectual capital statement

structured as “an economic engine” where the inputs are the visions, missions and strategies, the transformation are statements on people, processes and customers, and results are financial. There is thus, even if the statement stands out as a report on the complexities of organisational life, a relatively simple model of the virtues of this complexity as it appears to translate relatively unambiguously into financial results.

The intellectual capital statements as documents. The first steps towards developing an intellectual capital statement were taken in mid-1997. It was seen as an alternative to the traditional annual report, and very symbolically the annual financial statement is presented as a supplement to the intellectual capital statement. The intellectual capital statement is a colourful and an expressive form of communication. Systematic’s second intellectual capital statement pictures employees showing how they work and what they like in life cut across the text. It has several *bonmots* such as “People learn as long as they live; firms live as long as they learn”; “Knowledge is the only asset that is increased by sharing”; “If only Systematic knew what it knows”; and “Knowledge is power, but the power must be shared”. The statement illuminates through numbers as well as corresponding text and illustrations some aspects of customer-relations, employee development and customer- and employee-satisfaction, the effectiveness of processes, and certain forms of innovation in areas of product development and process improvement. It also has a set of quite extraordinary indicators – the Coca-Cola index, the carrot index, the cycle index, and index for the number of customers visiting Solveig’s lunch buffet (these have been much talked about in the press). These show humour and suggest not only an ironic distance to the traditional accounting rigour, but they also demonstrate commitment to playfulness. The text is full of statements on preferred working methods, procedures and objectives, whose implementation is documented by an array of indicators. It also illustrates Systematic’s competency development methods and knowledge management activities.

In this way, the statement is a collage of stories about the life of Systematic; a set of numbers showing some aspects of the development of this life; and a whole array of pictures and humorous indicators. Together these make the presentation informal and ironic compared with the financial accounting framework, even if the whole publication ends with the formal financial statement.

Using the intellectual capital statement. The purpose of the intellectual capital statement “is to disclose the knowledge resources of the company and to explain management’s efforts to develop them” (Systematic, 2000, p. 6). Initially, Systematic’s intellectual capital statement project was “very internally focussed, and knowledge management was the big issue”, as it was suggested in an interview. The aim was to prepare an internal intellectual capital statement as a direct support for the knowledge management initiatives taken by Systematic. During the course of the project, however, its focus shifted more towards the external intellectual capital statement, as it was seen to be of

interest to customers, potential employees and other companies. It was an active form of communication directed towards recruiting employees, building stronger relationships to existing employees and customers and strengthening attention towards the firm's main strategic challenges. After all, it was suggested, if this were the effect of communication, then it was not "mere communication", but a system for developing the resource base of the firm, and thus allow it to prosper for the future.

After the publication of the first intellectual capital statement in May 1999, Systematic's management actively used it in their presentations of the company. It was frequently discussed with customers and business partners, and Systematic's management was surprised by the ability of the intellectual capital statement to present the firm in professional and coherent terms. It was said to help develop new contacts to both potential employees and to organisations and companies with whom they did not historically have any relations.

Suddenly, the externally published intellectual capital statement was an important part of the firm's "internal" knowledge management activities. As the intellectual capital statement reported on the implementation of knowledge management activities it allowed insight into the aspirations and practices of developing the firm's resources. This insight was deemed by internal and external parties to be interesting in their understanding of the firm and indeed in decisions about their relations to the firm.

This relation between knowledge management and the intellectual capital statement is singled out in both of Systematic's intellectual capital statements and given special emphasis in the second one where knowledge management is treated as a separate theme. Increasingly, employees found it hard "to distinguish between what has been called knowledge management and knowledge measurement", as it was expressed in Systematic. It was increasingly seen as an influence on the firm's understanding of itself, as it – even if it was an "external document" – started to occupy a place in the firm's internal communication. It was suggested in an interview that the usefulness of the statement changed over time:

... you get used to preparing an intellectual capital statement, it will also to some extent become a management model. It can be said to "set the agenda", and it thus has the potential for becoming a management model.

Over time, if mobilised, the intellectual capital statement constructs and refines organisational agendas. When mobilised they influence the domains it was supposed merely to describe. A pointed distinction between managing and describing things does not exist.

Analysing Systematic's intellectual capital statement

Table III presents the indicators used in Systematic's intellectual capital statement. As for any accounting statement, it is possible to discuss how the indicators should be placed in the IC accounting system.

Category/ form	Effects	Qualifying activities	Resources
Employees	Absence due to sickness (days/employee) Total employee satisfaction Per cent of employees perceiving Systematic as a satisfactory/very satisfactory workplace	Training days (employee/year) Training investment (employee/year) Size of project teams Team member participation in different project phases	Number of staff Average number of full-time staff Staff distribution on different tasks Average age of staff including per cent under 40 Number of software engineers vs number of staff employed in administrative functions Intake vs reduction of software engineers Professional software experience – total number of years Professional software experience – average per software engineer Per cent of employees holding PhD or Masters degrees Cola-index (per employee)
Customers	Total customer satisfaction Duration of existing customer relationships New strategic customers during the year Per cent of customers who would recommend Systematic	Customers visiting Solvejg's lunch buffet Participation in research projects	Distribution of turnover between projects and self-developed products Five largest project customers in per cent of project turnover Five largest licence sales in per cent of product turnover Export's share of turnover Number of licences sold during the year Active project customers during the year Active project customers during the year (defence vs non-defence)

Table III.
Systematic's indicators
organised by the IC
accounting system

(continued)

Category/ form	Effects	Qualifying activities	Resources
Processes	BOOTSTRAP process assessment Software development performance (five items) Score in European benchmark survey of software companies Own products share of turnover Average response time for calls to switchboard Total telephone service index (share of calls completed in first call) Number of platforms IRIS is compatible with Employee satisfaction with "quality and efficiency of processes" Customer satisfaction with "quality of services and products" Pizza-index (per employee) Quality certificates (ISO 9001, AQAP)	Consumption of internal hours on software process improvement Investment in product development Investment in process improvement Total investments in innovation activities (including percentage of group turnover)	
Technology	Employee satisfaction with "office premises" Number of hits on Web site per day Bicycle index (per cent of employees using a bicycle as their primary means of transportation to work)	Investment in computer equipment Investment in premises and office equipment	PCs/workstations per employee Number of servers in network m ² office space

Table III.

Systematic's intellectual capital statement appears to emphasise indicators on employees and processes. For employees, resource and effect indicators are used, while processes are indicated primarily via effects and partly by qualifying activities. The selected indicators appear to focus on effects of processes and on attracting employees, particularly software engineers. Recruitment and the development of procedures that enable knowledge sharing

are interrelated. Systematic's intellectual capital focuses on developing stable relationships between employees, technology and customers.

Systematic's knowledge management challenges. Systematic's challenge is to create a "knowledgeable" and "capable" organisation that integrates highly systematised processes and highly qualified employees in order to provide quality products. Commenting on the first intellectual capital statement, Systematic's management explained as follows in an interview:

We solve a problem for the customer and deliver a piece of software. In principle, we are a consulting firm that offers knowledge and expertise more than a product-house that delivers a standard solution. My picture of Systematic is that we deliver unique solutions based on the people and processes we have . . . Our TQM project is closely related to our intellectual capital project. It is about processes and we want to include more measures about our projects' on time delivery in the statement.

Here, it is suggested that organisational processes be central to knowledge management activities. These activities are far from esoteric concerns for epistemology and abstract knowledge often seen in parts of the philosophical debate on knowledge. They are particular and specific "problems" that arise out of issues concerning people and project management techniques. A closer look at Systematic's indicators, using the IC accounting system presented earlier, makes it possible to understand this a bit more clearly. Table IV illustrates the development of a selected number of indicators over three years.

Table IV shows that Systematic has expanded its human resources in software development, just as it invests increasingly in activities, which develop them. Also, employee satisfaction increases. Thus, in terms of measures in the employee category, a certain attention to expanding the resource bases is in place; and concerns to enhance their value is in place via qualifying activities. The customer category illustrates a slowly changing revenue base giving more space to civil – rather than defence-related – revenues even if the number of continuing projects only increases by small steps. As a resource, customers are found in new areas of business segments.

From the process category it appears that attention is on qualifying activities via heavy investments in product development and a slightly smaller investment in process technology, and the hours invested in development work increase steadily. It also appears that improvement in the quality of the processes is emerging, as witnessed by the BOOTSTRAP measurements.

So, Systematic is a firm that has developed its resource base in the employee category, it is partly transforming its revenues bases making it less dependent on one industry, and it invests heavily in the development of processes and employees. These indicators suggest that the development of project management systems, quality, and on-time delivery are parameters of the attempt to improve processes and incorporate employees. For Systematic, knowledge resources are enhanced by actions that make the firm attractive to prospective employees, and that allows the whole system of developing, producing and maintaining complex software solutions for certain users to be achievable. To be able to do this, however, managers also have to develop the

	Effects		Improvement activities				Resources	
Employees	Satisfaction: culture	97 98 99	Education:	97 98 99	Number of software people	97 98 99		
		3.9 3.8 4.0	days/person	3.6 5.2 7.8		69 90 103		
	Manager	3.3 3.4 3.6	Cost/person (000 Kr)	11 10 20	Employment	98 124 137		
	Tasks	3.6 3.7 3.6			Masters and PhD (%)	66 69		
	Top management	3.4 3.5 3.6						
Customers	Satisfaction ^a	97 98 99		97 98 99	Projects	97 98 99		
	% customers to recommend SSE ^a	- 4.1 -			% civil revenues (projects)	23 26 28		
	Value for money ^a	88			No. of licences sold (000)	23 39 52		
		3.9			Customer durability:	2.4 12.0 1.6		
					0-3 years	13 15 16		
Processes	BOOTSTRAP evaluation	97 98 99	Hours process improvement (000)	97 98 99				
	Customer satisfaction on quality ^a	2 2.3 2.5	Product development (mill. Kr)	1.2 3.2 4.3				
	Telephone service index (%)	3.9	Process development (mill. Kr)	3.3 6.7 7.5				
		92	Development costs as % of revenues	0.5 1.3 1.7				
				6 10 10				
Technology	Employee satisfaction with physical work environment	97 98 99		97 98 99	PC/employee	97 98 99		
		4.1 3.7 3.1				1.3 1.4 1.8		
					No. of servers	13 19 32		

Note: ^aCustomer satisfaction is only measured biannually

Table IV.
A selection of Systematic's indicators

insights that make user requirements visible. This includes training employees in the ways of customers' work and allows industry-specific knowledge to be more apparent in software development.

In effect, the knowledge management challenge thus mobilised, involves four different kinds of actions to be performed. One is to recruit and retain employees, particularly as the firm is growing rapidly along with the need for people to develop software solutions. Systematic's second intellectual capital statement is clear about this:

We ... put strong emphasis on attracting, developing and retaining the best software engineers in the market. We must provide a stimulating and challenging workplace with active investment in the professional and personal development of our employees (Systematic, 2000, p. 12).

An integrated part of the firm's knowledge management practice is thus to look for the best and brightest and develop their professional and personal competencies. This is confirmed by the intellectual capital statement (see Table II) showing that development of human resources is taking place, and that employees are attracted to the firm.

Another element of the knowledge management challenge is to make these people part of an integrated system that delivers quality software within time and budget limits. Quality is important here because the software solutions are used in critical areas such as defence communication, where errors can have tremendous consequences even to the point of human lives, and in communication within financial service institutions where security, confidentiality and precision are critical issues. The intellectual capital statement is clear about the importance of bringing the various resources of the firm together in order to gain a collective strength *vis-à-vis* the customer:

All software is developed in project groups that work according to structured methods ... The customer is involved throughout the development process. Quality is assured through consistent use of our development model, which focuses on project management, management of requirements, configuration management and close dialogue with our customer (Systematic, 2000, pp. 6-7).

Such attention to improving the delivery of software as an integrated project from inception to final use is indicated in the intellectual capital statement from investments in qualifying activities for processes. Also, at the same time, the effects – the BOOTSTRAP measure – tend to improve, this is likely, not futile.

For processes to work, individual human motivation has to be aligned with the requirements of integrated production methods. A third related knowledge management challenge is the development of the employees' precise knowledge of the users' situation. Part of this is investments in training/employee development and part of it is on-the-job training that help software engineers understand more of the users' business. The second intellectual capital statement says:

Experience shows that delays are typically due to failure to clarify specific user requirements and to acknowledge that the customer himself is a significant sub-supplier in the

development process ... It is our ambition that the success of projects should not only be measured by our ability to delivery on time and to the price and quality agreed. Ideally, both parties will also have gained knowledge, not only to the benefit of the development and operational use of the system, but also with respect to future projects (Systematic, 2000, p. 11A).

This part of the knowledge management challenge looks at the development of customer-relations. Their durability may be part of the development of insights that help Systematic to anticipate user needs and perhaps even suggest to the customers when new software and perhaps whole systems are appropriate. From the intellectual capital statement it appears that the durability of customer relations is stable over time (see Table II). There is a relatively limited set of customers but more than half has been "active" for more than four years. This durability is said to be part of the linkages between customers and employees:

Systematic is a "house of knowledge" with young employees. This provides a creative and informal environment, which is appealing to many customers. Customer meetings are often held in the house thus creating relations between the customer and our project people. Last year we had 776 guests participating in Solveig's lunch buffet (Systematic, 2000, p. 11).

The number of participants in Solveig's lunch buffet is one of Systematic's surprising indicators. It helps to show customers' willingness to visit the firm.

This set of four knowledge management challenges can be read out of Systematic's intellectual capital statements. This reading is a proposition about how the firm can and should develop its knowledge resources. Readers may disagree that this is a relevant strategy for managing knowledge resources – this is an evaluation of the relevance of the sets of management challenges mobilised in the firm. Relevance of the knowledge management activities depends on the reader.

The knowledge management strategy. How could the relevance of Systematic's knowledge management activities be evaluated? Reading the intellectual capital statements, a story of the relevance of knowledge resources gradually emerges. This story is about critical, reliable, errorless and large software solutions. Considering the users – e.g. defence departments, pilots and soldiers – lives are at stake if the technology does not work. The knowledge management strategy attends to the ability of the firm to supply reliable solutions in time through organising the firm around the user's situation. Here, knowledge is an organisational effect; it is a routine that allows the bits of software insights, project planning skills, insights into the customers' situation and ability to integrate new employees to be part of one organisational system. The first intellectual capital statement makes the point in the following way:

It is our objective to reach a certified maturity level by year 2000 ... High process maturity entails precision in delivery, predictability in quality, etc. At the same time we reduce our dependence on individuals, as knowledge and experience gathered are embedded in the organisation through recognised methodologies and techniques, guidelines, templates, best practices, etc. (Systematic, 1999, p. 10).

Figure 4 helps illustrate what Systematic's intellectual capital statement is about. It shows the knowledge management strategy – or the story that makes knowledge management relevant. It also shows the specific challenges developed to realise this knowledge management strategy, and it shows the indicators used to survey whether the set of management challenges is actually put in place.

The four knowledge management challenges are interdependent. If there were no new employees, the attention to strengthening the structuring effects of project management skills would not be as important. If users and customers were stable there would be no need to develop customer relationships, and there would – in turn – be no need to develop organisational skills in quality and project management. Likewise, development of organisational skills and collective procedures in the form of, for example, new kinds of project management systems also requires employee development. Therefore, the four management challenges are all part of a connected movement towards new organisational skills oriented towards facilitating the production and implementation of large, integrated, customer-oriented software solutions.

It may be that a reader would disagree that Systematic's strategy is sensible. The intellectual capital statement provides the reader with a story of the firm's knowledge strategy, a set of management challenges and a set of indicators. It does not prove that these are correct but the analysis of these three elements may allow a reader to form an opinion; not always in accordance with the aspirations sought by the firm. However, when Systematic suggest that attraction of employees is a priority and may document this by numbers in the form of portfolio indicators; that it attempts to improve project management and suggests that an increasing number of managers have been training to this effect documented by activity indicators; that it attempts to train employees, which has been documented by activity indicators; and that it attempts to create better customer relationships documented by the number of people having done training to understand the industry, then it is possible that the knowledge strategy is not merely "words"; it may also be "fact" in some form.

Intellectual capital statements in action

The analysis of Systematic's two intellectual capital statements suggests how it may be possible to account for a knowledge management strategy. Roos *et al.* (1997) did point out that knowledge management strategies are integrally part of intellectual capital and, in the case of Systematic, illustrates intellectual capital statements report on the efforts made to define and execute the firm's knowledge management strategy. For the purpose of the intellectual capital statement, a firm's knowledge management strategy is about its value proposition to a user. It is a strategy about the effects of the firm's efforts to make products and services useful. Concentrating on usefulness – or value-to-the-user – intellectual capital statements show the activities that the firm "has" to put in place to enhance its knowledge resources to improve "value" for a user or a customer.

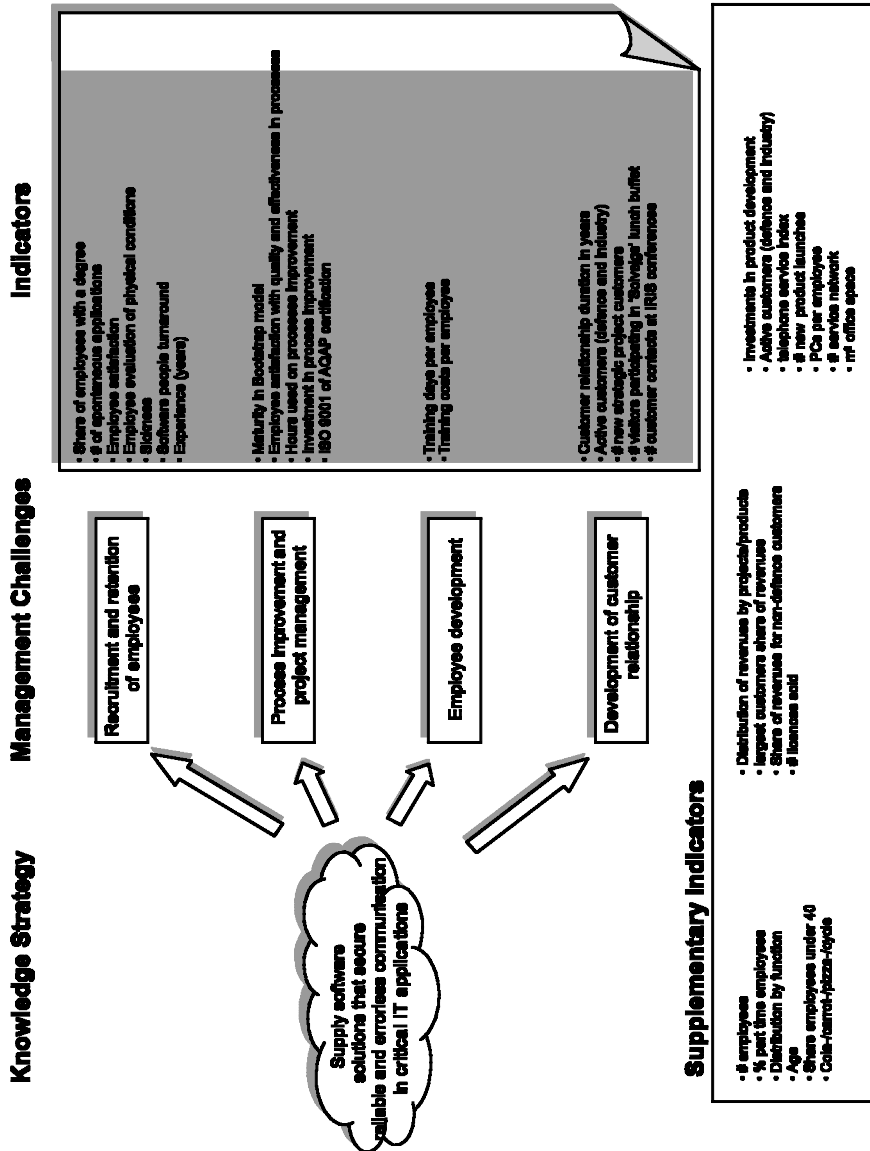


Figure 4. Interpreting Systematic's intellectual capital statement

Related to the knowledge strategy, the knowledge management challenges are the set of actions to be performed by management to implement it. The steps to make the strategy real are pointed out and monitored via indicators. The steps are defined across “employee capital”, “customer capital” and “organisation capital” categories. Systematic does not only emphasise one of the categories; it takes them all on and explains how they are not only interrelated but more part of a totality that cannot be broken down. It is a total network where each of the elements perform only together with the other elements. This linkage is a strategy that shows how the knowledge resources work in concert, what they are supposed to achieve and how they create value to users.

The intellectual capital statement is thus a mix of strategy, management and reporting. These cannot be separated because the intellectual capital statement needs a justification for the indicators, and the indicators have to report on something. The indicators are there to make evaluation of the implementation of the firm’s knowledge strategy possible, and the knowledge strategy is there to show how the intellectual capital statement is intended to be read. This does not mean that the intellectual capital statement is necessarily correct. However, it may allow readers to form their own opinions about the value of the firm. Both negative and positive readings may come out of an intellectual capital statement.

Conclusion

This paper develops an IC accounting system for *describing* and *prescribing* intellectual capital. It extends the three-way model of human, organisational and customer capital in two ways. First, it considers the complex complementarities that exist between statements on employees, customers, processes and technologies. Second, it provides an analytical ability to monitor effects, survey qualifying activities and to describe portfolios of resources. The indicators help to *describe* the transactions that take place in firms in order to enhance and mobilise their knowledge management strategies. They also help to *prescribe* types of intervention and allow the analysis of the intellectual capital statements to be oriented towards actions that can be executed.

Through a reading of Systematic’s intellectual capital statements, the application of this IC accounting system has been illustrated. Its intellectual capital statement is a heterogeneous collage of words, pictures, bonmots, numbers, and visions. Systematic’s work to develop and use an intellectual capital statement shows linkages between the “external” intellectual capital statement and the “internal” knowledge management activities. Not only is the substance of the intellectual capital statement activities of knowledge management, but the intellectual capital statement is also an active part of knowledge management, because it creates new networks and “catches” the interest of valued resources such as prospective employees and customers. The “external” is thus directly “internal”.

The indicators of Systematic’s intellectual capital statement support a story of a firm committed to creating an organisational system of coherent

knowledge resources. It shows that Systematic's efforts are primarily in the area of recruitment of software engineers (portfolios of employees) and development of organisational procedures (qualification of processes), which integrates employees, customers and products. Reading the intellectual capital statement from a three-way model, we would learn that most of Systematic's indicators are organisational capital in 1999 and human capital in 2000. Extending this story, using the IC accounting system, the complementarities between humans and organisational procedures are made clearer. The analytical categories of the proposed IC accounting system help a more complex story to be told compared with the one that can be told via the three-way classification alone.

Notes

1. Systematic Software Engineering Ltd. is one of 17 firms that participated in a large project over three years to develop a Guideline for Intellectual Capital Statements organised by the Danish Agency for Trade and Industry. Each of the 17 firms agreed to publish at least two intellectual capital statements and in collaboration with each other, they set out to create "relevant" intellectual capital statements. The authors of this paper followed and analysed the process (Bukh *et al.*, 2001; Mouritsen *et al.*, forthcoming). See also www.efs.dk/icaccounts for more information about the project's results.
2. Edvinsson (1997), Roos *et al.* (1997), Stewart (1997) and Sveiby (1997) all suggest that the value of intellectual resources is the market-to-book value. They never show how this number can be computed, however, and if it were the case that such a number could be built, it would not be very interesting. If the value of the firm were already defined, there would be no extra value from computing it again. Intellectual capital statements are of value only if they allow new insights to be produced that would change the value of the firm. In effect, the intellectual capital statement is not there to "explain" the market-to-book ratio. It is there to change it. There may be other and more interesting uses of the market-to-book argument in relation to understanding financial markets.
3. The arguments for this model have been presented logically and analytically in the text. In addition, it also has empirical support from the larger project involving 17 firms. Through interviews the dimensions of the model came out as respondents problematised their uses of the intellectual capital statement. The management agenda arose out of the discussion of how to make implications from the information contained in intellectual capital statements.
4. These categories are the ones we see from the intellectual capital reports being published by the Danish companies, but note here, that the research is carried out primarily around service and consulting firms meaning that other categories, e.g. suppliers, might be important for other kind of companies, e.g. manufacturing ones.
5. Classifying some numbers may be more difficult than others. Therefore, there is a need for rules-of-thumb – or accounting standards. As an example, involvement by customers and employees in training programmes can be seen both as improving the qualifications of the customers and the qualifications of the employees – and it could also be an activity to upgrade the firm's image. Another example could be employees that were trained in process optimisation. This could be seen as a qualifying act in relation to the employees but also in relation to the process dimension. In these cases it will be necessary to apply rules-of-thumb to classify the indicator. Should it be placed according to that domain that is mentioned first in the definition of the indicator? Or should it be classified according to the most "important" part of the indicator? And then, what will the most important part be?

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