

Knowledge



Analysing Intellectual Capital Statements



Ministry of Science
Technology and Innovation

Analysing Intellectual Capital Statements

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Foreword

Denmark is at the international forefront in intellectual capital statements. After 'A Guideline for Intellectual Capital Statements' was published in 2000, a number of companies have tested and developed the model. 'Intellectual Capital Statements – The New Guideline' published in 2003 contains additional concrete recommendations which I expect will further increase the use of intellectual capital statements in Danish businesses.

The use of intellectual capital statements has spread quickly, with quality improving significantly for each year. Content and structure is today more systematic, making comparison far easier than just a few years ago. This increase in quality can be largely attributed to the first guideline published in 2000. A number of companies now collect and process intellectual capital statement key figures with the same routine as financial information collection processes. These companies all view the management of knowledge resources as a clear strategic challenge.

One driver behind the increased popularity of external intellectual capital statements is analysts' increasing demand for information that can supplement the picture given by financial statements. A company can use intellectual capital statements to document how it builds up and manages its most important knowledge resources. This can be an important supplement to the information provided in the annual accounts on the company's position and development potential.

Intellectual capital statements are relatively new and analysts still lack a systematic method for reading and interpreting these statements (as developed for analysing financial statements). This report is the first to propose such a method.

I would like to take this opportunity to thank all companies, organisations and individuals who have contributed resources and their considerable commitment to the intellectual capital statement project.

The Minister for Science, Technology and Innovation



Helge Sander

Introduction

Can intellectual capital statements be systematically read and analysed in a way that is comparable with the reading and analysis of financial statements? This report will attempt to give a preliminary answer to this question.

The answer to this question is a *guarded yes*. The intellectual capital statement analysis method presented in this report has much in common with the principles behind financial statement analysis. The method is new and has only been tested by a few analysts. It is therefore presented here in its preliminary form to allow a wider group to test the method and contribute to its development or find suitable alternatives.

A company's intellectual capital statement is systematically read so that the following three general questions regarding the company's knowledge management can be answered.

Resources:

How is the company's knowledge resource comprised?

Activities:

What has the company done to strengthen its knowledge resources?

Effects:

What are the effects of the company's knowledge management work?

Each of the four main knowledge resource categories usually found in intellectual capital statements (employees, customers, processes and technologies) should be analysed for each of these three *evaluation criteria*. This gives a 3 x 4 analysis matrix.

Analysts who have tested the method on a number of intellectual capital statements have found this difficult to use at first, but have quickly got used to using it.

The method has two qualities in particular:

- The method allows a real insight into the company's knowledge resources to be gained. Systematic reading (partly) removes the sense that an intellectual capital statement is purely a PR tool.
- The method also allows an objective evaluation of the company's knowledge management. Analysts no longer base their work on a company's own interpretation of its figures.

Chapter 1 presents the questions that the analysis is to answer. The chapter also discusses the problems that standard intellectual capital statement structures present to analysts.

Chapter 2 presents the analysis model. The model uses the figures in intellectual capital statements to show how companies use and develop their knowledge resources.

Chapter 3 shows the application of the analysis model to three companies' intellectual capital statements.

Chapter 4 briefly contrasts the three examples and indicates how specific analysis results from different intellectual capital statements can be compared.

Chapter 1. Principal Analysis Questions

The analytical method's goal is to create sufficient distance from the intellectual capital statement figures that a company has chosen to present in text and illustrations. The starting point is to group intellectual capital statement figures in such a way that the three general questions can be answered. The table below shows that the same types of questions are found in financial statement analysis.

Financial statement	Intellectual capital statement
What are the company's assets and liabilities?	How is the company's knowledge resource comprised?
What has the company invested?	What has the company done to strengthen its knowledge resources?
What is the company's return on investment?	What are the effects of the company's knowledge work?

These two sets of questions are fully *parallel*, as they relate to the same management problems. They are, however, not identical as their answers are based on different types of data.

Financial reporting is based on the double entry system, which ensures that assets and liabilities always balance. This makes it technically possible to carry out uniform financial analyses, which has resulted in the development of strong institutions within auditing, in the financial markets and in banking. Financial statement analysis is systematic and provides solutions when interpreted by trained experts. Methods and conventions have been developed that ensure that companies and analysts both know how financial statements should be read.

Intellectual capital reporting is *not* based on the double entry system, which can ensure that assets and liabilities balance. It is based on a single entry system and 'assets' can

therefore exceed 'liabilities'. Many readers will therefore see intellectual capital statements as giving a less credible and less relevant company evaluation. This problem with the data *does exist*. Not all financial statement figures are, however, as unambiguous and informative as one would like to think. Therefore, a detailed gridwork of accounting standards has been established over time that specifies the correct use and interpretation of figures and concepts. A similar set of standards needs to be developed for intellectual capital statement transactions.

It will probably be some time before there is established a generally accepted set of figures that can give an intellectual capital statement *bottom line*. To achieve this, the first requirement is that it is possible (in principle) to read from statements a company's handling of the previously mentioned questions in an analytical way.

The intellectual capital statement model

The model below (figure 1) shows the four intellectual capital statement elements, knowledge narrative, management challenges, initiatives and indicators. The elements are explained in detail in ‘Intellectual Capital Statements – The New Guideline’.

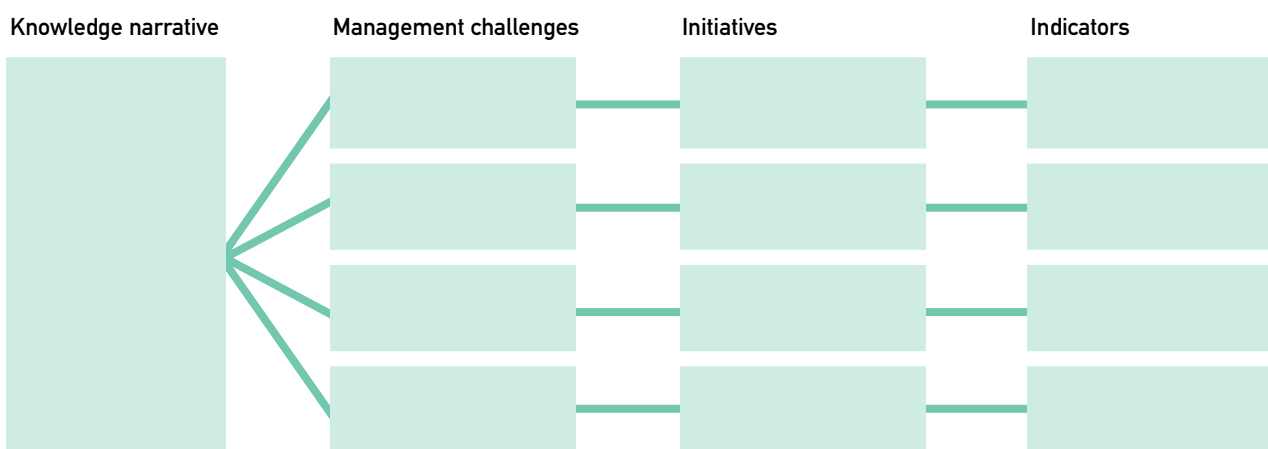
Most companies use this model to write their intellectual capital statements, adapting element content and interrelationships to the company’s particular situation. As intellectual capital statement content is therefore determined by the characteristics of the individual company, intellectual capital statements show wide variations, which also reflects the differences in how companies use their knowledge resources to create value for their users. The knowledge narrative, management challenges, initiatives and indicators are *in principle* unique to each company.

Readers interested in the analytical aspects will, however, not only be interested in the unique but want a more general insight into a company’s knowledge resources based on the three previously mentioned evaluation criteria of resources, activities and effects.

This is the point where the reader encounters the problem that intellectual capital statements are built on a company’s (knowledge) management challenges. Figures reported in intellectual capital statements inform the reader of management challenges, initiatives implemented and their success in achieving the company’s knowledge management strategy goals over time. In this way, the figures ‘illustrate’ the intellectual capital statement text. The figures act to support the management’s claims of what has been done or what should be done to utilise, acquire and strengthen key knowledge resources.

Critical evaluation is therefore dependent on the reader’s ability to *systematically* analyse the information given in intellectual capital statements, analysis being based on statement figures. The goal of such an analysis is to evaluate whether the information provided by the company is relevant and whether the development in company activities is reasonable. An analytic tool should therefore be able to provide an overview of the company’s knowledge resources, including current knowledge resource stock, development initiatives and their effects. This is the topic that the remainder of this report will address.

Figure 1: The intellectual capital statement model



Chapter 2: The Analysis Model as an Accounting System

The ability to analytically read intellectual capital statements is dependent on the ability to develop a general method for understanding their common characteristics, made possible by *an accounting system*.

Such a system has to be based on the intellectual capital statement figures, which should be classified into categories across the intellectual capital statements. The analytic model below, which can be used to interpret different companies' intellectual capital statements, has used this approach. The model can help identify where the *core* of an intellectual capital statement lies.

Separating the figures from the text, structure and internal logic of the intellectual capital statement gives a new and more *generalised* picture of the knowledge management than the company itself presents in the statement.

The analysis model

The analysis model is an accounting system where intellectual capital statement indicators are positioned with respect to two dimensions. One dimension is the four types of *knowledge resources*, the other is the three *evaluation criteria* that arise out of the principal analysis questions.

The model therefore is a 4 x 3 matrix. See figure 2.

The first dimension groups intellectual capital statement figures according to the knowledge resource they relate to. These will typically be employees, customers, processes and technologies. The knowledge resource list is, however, not fixed or final. New resources can be added, such as suppliers, management and universities. Others may lose significance over time. Experience does however show that (at this point in time) the four types encompass nearly all key knowledge resources for most companies.

The second dimension, through the three evaluation criteria, is used to show the company's knowledge resource composition, acquisition and use, which in other words are 'the resources the company has', 'what the company does with them', and 'what the company gets out of them'. Each indicator should therefore be positioned with respect to which of the three knowledge resource aspects it relates to. Evaluating whether resource composition, acquisition and use is appropriate requires examination of indicator development over time.

Figure 2: Analysis model for intellectual capital statements

Knowledge resources	Evaluation criteria		
	Effects What happens	Activities What is done	Resources What is created
Employees	• • •	• • •	• • •
Customers	• • •	• • •	• • •
Processes	• • •	• • •	• • •
Technologies	• • •	• • •	• • •

Evaluation criteria

The analysis model's evaluation criteria are based on the figures linked to the three principal questions:

Resource figures are the *portfolio of company knowledge resources*, which is the stock and composition of resources within employees, customers, processes and technologies. These figures represent the company's 'stock' of knowledge resources and define which 'resource building blocks' the company has at its disposal. The figures relate to relatively stable units such as 'a customer', 'an employee', 'a computer', 'a process' etc. They answer questions such as 'how many?' and 'what proportion' and show how large, how varied, how complex and how intertwined these knowledge resources are. Linked to this are management actions, which are portfolio decisions determining how many knowledge resources of each type the company is to own.

Activity figures describe the company's *activities for upgrading knowledge resources*, which are activities implemented to upgrade, strengthen or develop the resource portfolio. The figures also answer questions such as 'what is being done?' For example, what does the company do to develop and improve its knowledge resources, through further training, investments in processes, activities to educate or attract customers, presentations etc? The management actions linked to these are therefore upgrading activities.

Effect figures express the consequences or the *total effect of the company's development and application of knowledge resources*. Just as in an accounting system, the model only shows the effects and does not attempt to explain where they come from. Such explanations are for the analyst to find *based* on the model but not within it.

The analysis model as an accounting system *is not* a narrow input-output model.

There is not necessarily a direct relationship between initiatives and effects in the same area, for example developing employees and increased employee satisfaction. The effect of such an initiative may arise as a customer effect. Employees become more skilled and are able to provide customers with better service. The analysis is designed to define these 'many-to-many relationships' in the model. The classification itself does not explain these relationships, in the same way that increased R&D expenses do not result in increased turnover in financial accounting systems.

Classification of indicators

Ideally, intellectual capital statement indicators already contain the information required to classify them in both dimensions. The dimensions can be considered to be inherent in the figures, which always refer to a particular *aspect* of a particular type of knowledge resource. This is often the case, but in practice it is often difficult to set boundaries. Rules of thumb, as are also used in accounting standards to classify financial transactions, are used to classify in several ways.

For resource figures, classifying the indicators according to type of knowledge resource usually will not present any major problems.

Activity figures often create confusion, because some activities upgrade two (or more) different types of knowledge resources at the same time. For example, sending employees on process optimisation courses can qualify as both an employee and process activity. The rule of thumb in this case can be to position the figure on the *knowledge resource which is put most in focus*. Customer group meetings should therefore be positioned under customer resources and not under employee resources. This also applies to conference representation, because the company's image (customer resource) is in focus. The em-

employee resource is not in focus even though employees represent the company at the conference.

Special problems can arise where effect indicators are to be positioned in the model, because they may relate to more than one type of knowledge resource. For example, where ‘employee satisfaction with technologies’ and ‘customer satisfaction with employee competencies’ are to be positioned. The rule of thumb is that the figure should be classified according to the *qualities it describes*. This means that ‘employee satisfaction with technologies’ should be considered to be a technology quality and should therefore be positioned as a technology resource. Applying the same principle means that ‘customer satisfaction with employee competencies’ should be classified as an employee resource.

Many intellectual capital statements use abstract categories which are not suitable for indicator classification. For example, ‘innovation’, ‘flexibility’, ‘customer-orientation’ and ‘strong culture’ are all abstract concepts not initiatives, and are rather knowledge narrative elements. Some companies for example measure ‘innovation’ as ‘the proportion of turnover generated by new products’. Others use ‘the R&D expenses/turnover ratio’, ‘the number of patents’ and even employees’ formal educational qualifications.

‘Innovation’ is such a broad concept that it is impossible to say where ‘innovation figures’ belong in the model. They should be split with respect to the activities and knowledge resources they relate to. Turnover from new products is a customer figure, as is the proportion of customers contributing to high technology projects. The number of patents is a process figure and the number of employees with a PhD is an employee figure. The ‘innovation’ figure does not exist in its own right. ‘Innovation’ is a strategy that is illustrated using a series of diverse indicators, which should be

interpreted as a whole. The same applies to other combined concepts such as ‘flexibility’, which may range across numerous activity types and therefore be represented by many different indicators.

Goal of the analysis

An analyst’s view of the model is that it should usually be read in ‘columns’.

- The knowledge resources column provides the basis for a ‘portfolio assessment’ of the company. The analyst will determine whether the company’s knowledge resource portfolio is competitive and can meet the future.
- The activities column allows the management’s ability to develop the employees, the organisation and customer relationships to be evaluated.
- The effects column provides the basis for assessing whether the company’s knowledge management set-up and activities work, giving an assessment of company stability.

The columns can be read in random order, as they are not closely interlinked. The columns only become interlinked when the three statements given by the columns are set side by side and a reader begins to use them to develop his own version of what is going on in the company.

Analysts will probably lay particular emphasis on an overall assessment of the company and its management. The question therefore becomes whether intellectual capital statements can show to what extent a company is able to meet the challenges of the future, through developing a suitable knowledge resource, through developing it and through using it wisely.

An analyst would also be interested in what makes short supply knowledge resources want to be a part of the company’s life. The knowledge resources column can indicate what the company can offer *current and potential employees* in terms of exciting colleagues, good educational

opportunities, challenging technologies or innovative customers and projects. The activities column can form the basis for evaluating employee development opportunities. The effects column can measure current employee satisfaction with the company as a workplace and how effective the company's knowledge management is. Experience with intellectual capital statements has shown that they can be powerful tools for the expression of a company's identity and position to current and potential employees.

An analyst will also usually attempt to evaluate the company from the current and potential *customers'* perspective. The knowledge resource column will be relevant in evaluating how many and which customer relations the company has and how this changes over time. This reflects the company's (continued) ability to supply valuable services to its customers. The activities column gives the basis for assessing customer and user relationship development initiatives, and the knowledge resource portfolio shows whether there are any risks in the customer base. Finally, the effects column provides the basis for assessing whether customers are satisfied with the company's goods or services and how stable the company is.

How to use the analysis model

The analysis model can be used in three phases.

1. Firstly, visual clues are used to detect any 'blank spots on the company's intellectual capital statement map'. All fields in the model do not have to be filled in, but fields which no indicators drop into are likely to be areas not covered by the figures in the intellectual capital statement. These are the areas analysts ask the company about. Some intellectual capital statements only relate to employees, others cover a broader range of knowledge resources. This is of course dependent on knowledge management strategy. If statements only relate to employee development, a one resource intellectual capital statement can be consistent. The reader will, however, try to develop an impression of whether the strategy chosen is the most relevant.
2. The model is then used to read development over time. This is based on the model's evaluation criteria, the three columns of knowledge resources, activities and effects. The three columns can be read in random order, but conclusions can be drawn across them.
3. Finally, the analysis model can be used to classify activities that are described in the text but have not been measured. The classification can be used to compare the figures with the company's knowledge narrative.

In all three stages, the reader should continuously ask him or herself whether the company's strategy is right and whether the results of this strategy are good enough. To be able to answer questions such as these, the reader should take into consideration all other knowledge of the company and its situation. This could be future industry trend scenarios or principal market scenarios, competitor strategies and information on the company from other sources.

A final conclusion will be arrived at where the intellectual capital statement analysis is compared with a personal qualified assessment of how the company should or could look. The limited experience with the model shows that this can open up important new perspectives on the company's situation and future prospects.

Note that the conclusion is a qualitative assessment of the company and cannot be converted into a forecast of future growth and profitability. In the many surveys conducted, no *general* relationship between non-financial information and financial results has been documented. There are examples of both positive and negative relationships between (for example) employee or customer satisfaction and financial results. It is therefore possible to have satisfied employees and happy customers without earning money, at least in the short term. These interrelationships may vary from one company to another as well as over time for a specific company, dependent on its situation and strategy.

Chapter 3: Analysis of Three Intellectual Capital Statements

Using three examples, this chapter shows how the systematic analysis model can be applied to a company's intellectual capital statements. The examples are the intellectual capital statements from Systematic Software Engineering A/S, Coloplast A/S and COWI A/S.

The interpretations presented in this chapter are given to illustrate how the model works. They do not represent any form of comprehensive analysis of the three companies intellectual capital statements or their strategies.

Systematic

Systematic is a privately owned Danish software and systems company based in Aarhus,

Figure 3: The analysis model as applied to Systematic

Effects		97	98	99	00	01	Activities		97	98	99	00	01
Employees	Satisfaction with:						Development:						
	• Culture	3.9	3.8	4.0			Course days per employee	3.6	5.2	7.8	6.4	8.5	
	• Immediate superiors	3.3	3.4	3.6	3.5	3.6	Investment in education per employee in thousand DKK	11	10	20	11	13.5	
	• Assignments	3.6	3.7	3.6									
	• Top management	3.4	3.5	3.6									
	• Management values				3.8	3.9							
	• Employee conditions and development				3.7	3.9							
	Employee loyalty				4.1	4.2							
	Number of unsolicited job applications			59									
	Sickness absence	3.4	4.0	3.8	3.8	4.9							
	Total satisfaction with development opportunities	3.6	3.7	3.7	3.8	4.0							
	Proportion of employees considering SSE as a good/very good workplace	88	93	95	89	93							
	Loss of software engineers	8	11	16	21	18							
	Customers	Number of new strategic project customers	3	3	3	3	3	Number of participants in Solveig's breakfast buffet			776		1225
Overall customer satisfaction					4.2								
Number of customers who will recommend Systematic unreservedly					97								
Employee satisfaction with customer relations					3.6	3.9							
Processes	BOOTSTRAP measurement	2	2.3	2.5	2.5		Process improvement (thousand hours)	1.2	3.2	4.3	4.8	10.8	
	Customer satisfaction with quality		3.9				Product development (million DKK)	3.3	6.7	7.5	11.4	9.7	
	Telephone service index (%)		92	95			Process improvement (million DKK)	0.5	1.3	1.7			
	Employee satisfaction with:						Innovation as % of turnover	6.1	10.2	10.3		10.9	
	• processes and infrastructure						Total innovation investment (million DKK)	3.8	8	9.2		14.4	
	• quality and efficiency in work processes						Number of project progress measurements introduced					70	
	• Time allocated in the project to process improvement												
Technologies													

Denmark. The company develops and sells technical system solutions, products and support to the Danish armed forces and to the industrial, transport and service sectors. The group has around 260 employees, 230 of whom work in Denmark. Turnover is DKK 133 million. Systematic has subsidiaries in the UK and the USA which manage sales, marketing and support outside Scan-

dinavia and Germany. The company's core area is currently the development of systems for the armed forces. Systematic does, however, want to increase the number of customers outside the armed forces, for example through providing solutions in electronic data interchange (EDI), electronic data security and systems integration.

Between 1999 and 2002, Systematic published three intellectual capital statements. Some of the figures are given as five-year time series. The latest intellectual capital statement was a document of 36 pages. The table below shows the development of a number of selected indicators. The number of indicators have been reduced on the grounds of space, as some indicators require detailed explanations. The analyst has already used his skills to screen the figures, reducing the analysis model's extent and complexity.

The first visual observation is that Systematic's figures show indicators that are concentrated on employee resources and their effects, customer resources and their effects, and process activities and their effects. Upgrading activities are concentrated on employees and processes (even though the activities are carried out by the employees and the customers). There are some 'blank spots' in Systematic's intellectual capital statement. For example, the reader will be wondering why so little has been invested in acquiring new customers, particularly as the company states it wants to develop new customer groups.

Resources	97	98	99	00	01	
Recruitment:						Employees
Number of employees in Denmark	98	124	137	139	187	
Number of software engineers	69	90	103	112	154	
New software engineers	22	32	29	26	60	
Prof. software competency (total years)	362	485	534	574	775	
Prof. software competency per software engineer	4.8	5	5.2	5.5	5.6	
Bachelors, masters and PhDs (%)		66	69		61	
Number of certified employees:						
Microsoft						
• Professional				31	71	
• Solution developer				0	9	
Sun Microsyst.						
• Java Programmer				22	63	
• Java Developer				0	5	
Oracle						
• Database Adm.				2	5	
• Developer				4	8	
Number of active project customer's	23	26	28	32	36	Customers
Active armed forces customers	9	8	8	7	10	
Active industrial customers	14	18	20			
% turnover from civil projects	23	39	52			
Duration of customer relationship:						
• 0-3 years	13	15	16	18	21	
• 4-6 years	5	6	5	7	7	
• 7-13 years	5	5	7	7	8	
5 largest project customers, proportion of turnover	77	73	63	65	48	
5 largest licence sales, proportion of turnover	66	60	47	30	24	
Number of countries whose defences use IRIS			23	26	26	
Active project customers in the health care sector			0	2	3	
Number of licences sold	241	116	160			
Number of requirements in						Processes
Business Manual:					1741	
• CMM					1247	
• ISO 9001:2000					180	
• Aqap 110 & 150					314	
Number of PCs per employee	1.3	1.4	1.8			Technologies
Number of servers	13	19	32			

The next series of observations look at figure development. The most important characteristics are as follows.

1. Resources:

Systematic's staff size is growing, particularly the number of software engineers. Software competency is growing.

The company's customer relationships are very long term but projects are large and few in number. The company is becoming less and less dependent on each customer, which is reducing risk.

The company has begun to describe the extent of elements in their internal processes and procedures. However, as there are no time series, no conclusions can be drawn on their development. It can only be stated that this information is now considered to be important for understanding how the company works.

2. Activities:

Systematic focuses on developing its employees. High levels of resources have been invested in the company's process and product development.

3. Effects:

There are a wide range of effect indicators for employees. These show that employees are very satisfied with working for the company. A set of indicators has been developed for customer related effects. Their development has been described very briefly, with the exception that there has been a stable influx of strategic customers. Process effect figures are, however, very much in focus. These show that Systematic is gradually improving its project management.

Systematic's intellectual capital statement shows a company that is focused on developing its own processes, which it successfully achieves. It aims to recruit more software engineers, which it also successfully achieves, and continuously invests in employee development.

Overall, this indicates that the company's processes and procedures match the company's growth and that employee development initiatives

also partly are aimed at training the employees in the company's processes. This hypothesis can be used in more detailed analysis work. In addition to this, the company has very long-term customer relationships. The customer portfolio is not expanding, but is not contracting either. This could mean that growth is from increased business with existing customers. This can indicate that the company has succeeded in creating a strong knowledge of the needs and problems of each of its customers.

This brief analysis provides a framework, a hypothesis, which can be built on when reading the intellectual capital statement. The analysis gives the reader the ability to quality check the intellectual capital statement's text and evaluate whether a company is sound. This evaluation arises where the intellectual capital statement text and the analyst's skill and ability to understand the company meet. The analyst him or herself must provide a gauge of what development is healthy or unhealthy for the company.

For example, is it 'healthy' that Systematic writes so little about customers and markets and so much about processes? Is the most important challenge in the company to become certified? The intellectual capital statement can give the impression that Systematic is attempting to develop a *technology push* company, and that this intense focus on technology takes some of the company's attention away from its markets and customers. Whether this is a necessity for the company or whether it represents a problem is for the analyst to decide.

The analysis indicates that the company concentrates on its processes, and there may be good reasons for doing this. For example, it is probably correct that good processes are needed to establish large projects, which is Systematic's business. It is also probably wise not to leave the operation of such large projects to the whims of the individual. Allocating considerable resources to stabilising the organisation in a period of exceptional growth is also probably a wise step.

However, determining which of these explains the concentration on processes will be found by searching through the intellectual capital statement text.

The disadvantage with this prioritisation is that other segments in the private and health care sectors, that the company wants to nurture, very much remain in the shadows. The intellectual capital statement also does not show that the company is allocating resources to the development and expansion of its market base.

These ambiguities may be due to the inability to find 'good figures' for all the activities that the company implements. By taking a closer look at the intellectual capital statement text, the analysis model can be used to summarise any initiatives described in the text that are not presented in the figures. For Systematic, the initiatives are as follows.

	Effects	Activities	Resources
Employees			
Customers		<ul style="list-style-type: none"> • 'Meet the customer' project • Workshops with customers • Participation in international seminars • Customer visits to Systematic • Annual performance dialog with large customers 	
Processes		<ul style="list-style-type: none"> • User group seminars 	
Technologies			

The model can therefore also be used to structure the activities (and effects) described in the intellectual capital statement without attaching any figures. For Systematic, this supplementary analysis shows that the figures do not cover everything contained in the intellectual capital statement. The above table shows that the company probably does more to develop customer relations than it has figures for. Such information is of course less certain than other information that is

substantiated by figures. This, however, can form the basis for the analyst's dialogue with the company on its initiatives in this area.

Coloplast

Coloplast is a stock market listed group based in Humlebaek, Denmark. The company employs 5,515 people, with 2,300 of these being employed in the Danish division. The remainder are employed in subsidiaries and sales offices in 26 countries. Coloplast develops, manufactures and markets medical disposable products for the physically dis-

abled, such as products within ostomy, continence, wound care, breast and skin care and consumable items. The company's core competence is the 'non-abrasive adhesive', which is a part of very many of the company's products. Coloplast has an annual turnover of over DKK 5 billion, exports accounting for around 97 per cent.

Figure 4: The analysis model as applied to Coloplast

		Effects					Activities					
		97	98	99	00	01	97	98	99	00	01	
Employees	Commitment to job	4.26	4.31	-	4.2	4.43	Job rotation in %	11	10	13	16	16
	Correlation between responsibilities and skills	3.73	3.79	-	3.78		Training days per employee	5.3	4	4.6	4.7	4.4
	Performance review evaluations	-	-	-	3.58	3.65	Training costs per employee	4541	4741	4056	5689	6855
	Absence of production employees	6.8	5.1	5.8	5.8	6.3	Proportion of performance reviews held in %	-	-	90	-	
	Staff turnover						Proportion of employees having performance reviews with immediate superior in %	-	-	-	81	
	• salaried employees	9.6	6.3	7.8	9.9	9.0	Participation in job and education fairs	1	2	2	2	
	• production employees	17.3	15.8	16.1	16.7	15.7						
	Employee satisfaction:											
	• Denmark	3.59	3.65	-	3.6	-						
	• Other countries	-	-	3.58	3.82	3.75						
	Number of unsolicited job applications:											
	• salaried employees	450	600	820	616	677						
	• in production	2500	2600	2800	2426	2335						
Customers	Total customer satisfaction	93.5	96.1	92	99.2	97.8	Meetings with users and health professionals (index)	39	49	98	100	156
	New product proportion of turnover	33.5	26.3	22.3	27.4	31.6	Number of customer satisfaction measurements	10	8	1	4	19
	Customer loyalty	-	-	-	92		R&D costs as % of turnover	4.9	5	4.8	4.2	3.9
Processes	Number of work related accidents with working days lost						Number of products in development in accordance with Coloplast's product development model	12	17	40	52	46
	in proportion to hours (million)	23	17	16	18	15	New patent applications for the year	26	24	26	15	23
	Complaints (index)	100	132	153	160	147	Internal audits	75	75	67	-	
	Variance on audit of quality assurance system	3	3	0	2	0	Cost of clinical documentation (index)	100	103	113	-	
	Number of orders delivered on time (%)	98.5	95.5	97.8	98	97.9	IT costs in % of turnover	2.5	3	3	-	
Technologies												

A figure-based interpretation can look like this.

1. Resources:

Coloplast is not only a company in growth, but it is also a company that is active with patents. The company is also experiencing rapid change, with the development of self-managing working groups being the principle on which production organisation is based.

2. Activities:

Job rotation is important for developing and diffusing knowledge throughout the company. Investment in employee training is also increasing.

There has been an enormous increase in the co-operation with users index. This is important in the work to get to know end-users' needs. Coloplast has also an increasing interest in customer satisfaction.

Investment in company processes does not only relate to R&D's costs proportion of total. It can be more important to ensure that more product development activities are managed via a formal product development model.

3. Effects:

The employee indicators show a high level of commitment, although staff turnover is also high.

Customer satisfaction is high, and customers like the new products even though the complaints index increased during the year.

Processes are documented through focusing strongly on quality and delivery performance.

Overall, this shows that Coloplast builds up its knowledge in three fields in particular. Focus on systematic product development and patenting, focus on making production self-managing and focus on co-operation with customers and users to find out how their products work. The figures show that there is in all areas good, long-term development. The intellectual capital statement signals that these elements are clear strategic

decisions that the company keeps a close watch over.

Analysis of Coloplast's intellectual capital statement shows how knowledge can flow. Through co-operating with customers, the company creates a basis for product development. As quality is essential, emphasis has been laid on organisational methods such as self-managing groups, which are quality focused.

A critical analyst might see a lack of information in Coloplast's intellectual capital statement on the knowledge that Coloplast *should have*. It is a summary, reporting on broad and general indicators. However, it is also comprehensive, covering everything. It is a total description of the company's knowledge resources, and the time series demonstrate that there could be a management interest behind this. They could otherwise not be commented on, neither could goals be set for them year after year. There are therefore very few grounds for disputing the *seriousness* of its intellectual capital statement. An analyst will still however want a number of questions answered in-depth. Such as, what type of patents does the company hold? What does the company get out of co-operating with customers? How do the self-managing groups work with respect to quality?

The intellectual capital statement text gives more detailed information on how Coloplast works. Here the story of *product development with a view to creating quality of life for users* takes up quite a lot of space. Coloplast emphasises the importance of understanding users' needs through co-operating with healthcare professionals and user groups and of understanding market conditions through measuring customer satisfaction. This provides supports for the accounting figures, which show that Coloplast has over the last five years quadrupled the number of meetings with healthcare professionals and user groups.

Coloplast also describes, in the statement text, initiatives that do not have indicators. Using the analysis model to classify these initiatives, we get the following picture.

	Effects	Activities	Resources
Employees		<ul style="list-style-type: none"> • Participation in job fairs 	
Customers	<ul style="list-style-type: none"> • Stories about quality of life 	<ul style="list-style-type: none"> • Project on 'customer activity cycles' 	
Processes			<ul style="list-style-type: none"> • Customer centre for training employees and for CRM • Co-operation with job centres • Partnerships for delivery and for R&D activities
Technologies		<ul style="list-style-type: none"> • Codification of knowledge 	

This is a further example of how there are more resources and more activities than are described by the figures. In this case, the table shows that Coloplast has more process related resources than the analysis model indicated in the first round. A deeper insight into customer and employee relations is also achieved. These are conditions that can add new dimensions to the interpretation of the company and that can make the company's knowledge management strategy even clearer.

COWI

COWI is a Danish owned consulting company operating in the international industrial, construction, transport and environmental areas. The company was established in 1930 and has today over 2,800 employees, around 2,000 of these working in Denmark. Most of the employees have received some form of further education.

Group turnover for 2000/2001 was DKK 1,720 million. COWI's intellectual capital statement only includes the parent company, COWI A/S. The intellectual capital statement for 2000/2001 is COWI's third intellectual capital statement.

Figure 5: The analysis model as applied to COWI

		Effects				Activities			
		97	98	99	00				
Employees	Job satisfaction index		65		68				
	Sickness absence	2.1	2.5	2.2	2.6				
	Loss of employees in %		13	13	11				
	Proportion of employees with COWI shares (%)			79	70				
	Image among engineering students			Nr. 2	Nr. 2				
Customers	Media exposure			238	131				
	Percentage of new customers				24				
	Percentage loss of customers				8				
Processes	Remarks per QA audit			5.1	5.7				
Technologies									

The first observation is that COWI's figures are distributed broadly across the whole area covered by the analysis model. The figures can therefore be considered to be all inclusive.

The next observation is a direct interpretation of COWI's figures with respect to the evaluation criteria.

1. Resources:

The company's employee resource is very stable in terms of age and education. The high level of employee loss is also stable. The number of professional networks is increasing, which indicates that the company is strengthening its professional development.

The customer resource reflects a slow but stable increase, and COWI is gradually augmenting the number of processes and methods described.

2. Activities:

There is a slight increase in COWI's focus on profiling the company towards customers, and the proportion of resources used on development activities is fixed. This indicates that the company has organised its development activities systematically.

3. Effects:

COWI has a stable workforce. The number of remarks in the company's QA audit is also stable.

The number of customers have increased significantly during the year, but there is no time series that can show a stable customer base.

Even though the market is in some areas turbulent, COWI's intellectual capital statement shows a stable company and that the company has even experienced major growth in the last year. With regard to organisational development, the company looks as though it is in a long, hard haul. All figures vital to development activities are stable. Stable development, stable upgrading investment and (in general) stable effects as far as these are reported. Stability in activities should not be mistaken for stagnation. It is change at a constant rate. Whether these rates are fast enough is, however, another matter.

Resources	97	98	99	00		
Number of employees	1563	1544	1571	1667	Employees	
Average age	42	42	42	42.1		
Average years of education	5.8	5.9	6.7	6.7		
Written off value of years of education	4.3	4.2	4.6	4.6		
Proportion of employees with top education			4.4	4.7		
Work experience			16.2	16.2		
No. of years service			10.2	9.8		
Number of employees with project management experience		56	58	57		
Travel activity proportion	4.1	4.1	5.2	6.4		
Proportion of employees posted abroad long term		1.8	3.8	2.8		
Cross-disciplinary co-operation (% working hours)	29	30	30	30		
Customer's distribution, proportion of private sector customers		33	26	24		Customers
Number of individual customers			1274	1484		
Number of on-going projects			5152	5102		
Ave. turnover per project (thousand DKK)			915	1010		
International customers			15	17		
International projects (% working hours)			29	30	Processes	
Number of best practices on the intranet	612	699	773			
Number of projects per employee			17	18		
Trade within the COWI group			2.3	2.7		
Exchange of employees with the COWI group			1.1	1.1	Technologies	

The reader is left with questions around stability and development after reading COWI's intellectual capital statement. Is the company so stable that it can hinder future development? To find an answer to this question, that which is stable in the company should be looked at more closely. This shows that COWI is stable in its development and its organisational structure, as activity goals remain unchanged from year to year. However, the number of customers has fluctuated lately. The proportion of private sector customers is relatively low, meaning that a large proportion of the company's turnover is dependent on public budgets. This may be a risk.

Screening the intellectual capital statement text for initiatives without figures, the analysis model generates the following.

	Effects	Activities	Resources
Employees			
Customers	<ul style="list-style-type: none"> • Stories about how services benefit the user 		
Processes	<ul style="list-style-type: none"> • Introduction of management processes etc. 		
Technologies			

As can be seen from the table, there is little that has not been presented by the figures. This could be because the company has decided to reflect the figures directly in the text. However, it could also be due to the intellectual capital statement being written as a part of the annual report, where a number of the company's other challenges and initiatives are described.

Chapter 4: Comparing Companies Using Intellectual Capital Statements

The previous chapter's intellectual capital statement analysis shows three companies in quite different situations.

- Coloplast links collection of knowledge on customers with R&D investments and a highly decentralised production organisation.
- Systematic is moving towards increasingly systemised processes. The axis is the development of the company's project management system, which requires training and education of the rapidly increasing workforce.
- COWI has development activities across a wide front, which shows that the company is in a long, hard haul.

A reader can interpret these differences in a number of ways.

A critical analyst will notice that COWI is a mature company, whereas Systematic is still struggling to control growth so that it can become efficient.

A potential employee will interpret the signals relating to the company's development rate, to determine career opportunities or personal learning in that company. Systematic can therefore be viewed as being more active and dynamic than COWI's stable development. Coloplast's intellectual capital statement is, however, clearly formulated to appeal to the large proportion of production employees in the company.

These interpretations may well be wrong. But they are *plausible*, based on the figures that the companies have presented in their intellectual capital statements. What this shows is that figures provide associations to the reality they represent. That is why selecting figures is so important. This is particularly true when reading intellectual capital statements using an analytic method such as the one described in the previous chapters. The figures are allowed to begin to talk for themselves.

To make pointers in the figures come alive, their significance must be analysed, they should be put together in new ways and compared with the text and other knowledge of the company. This process tests the knowledge narrative, which is the objective behind analysing intellectual capital statements. After the figures from the intellectual capital statement have been extracted and analysed *in isolation*, the main trends revealed by figure analysis should be related back to that company's *particular situation*.

On this point, the analysis and comparison of intellectual capital statement figures are fully parallel to the financial statement figures. It is this which gives meaning to the total picture of the company.

This analysis shows how intellectual capital statements can be compared. The comparison is obviously a general one. However, it shows that conclusions drawn about individual companies can (with a little creativity) be brought together with conclusions about other companies. It is possible to have a discussion around whether there can be any interest in comparing these three companies which are seen to produce very different products. The analysis does, however, pinpoint what has to be done to make such a comparison work. Comparison is dependent on the ability to express each company in a statement that is more general than the figures and words in its intellectual capital statement. This is possible, although more experimenting with the method is required before it can be said to suffice.

Analysing Intellectual Capital Statements

More and more companies are preparing intellectual capital statements. They are being used internally to develop, share and anchor knowledge resources in companies and externally to communicate this to the world at large. The method for preparing intellectual capital statements is therefore well tried.

A systematic method for reading, analysing and comparing intellectual capital statements has, until now, been absent. This report has been prepared to remedy this situation. The simple analysis model presented here can help the professional reader structure his or her analysis of the many figures in intellectual capital statements. The model is also demonstrated using three companies' statements.

The analytic method has been tested by a number of business analysts, but is still at the development stage. This report is therefore also an invitation to take part in the continued work to develop common principles for the analysis and interpretation of intellectual capital statements, as have been developed over time for financial statements.

For more information on the project, please see the Danish Ministry of Science, Technology and Innovation's homepage: www.vtu.dk/icaccounts