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## Which Swedish industries could become pioneers in extensive Intellectual Capital disclosure?

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## **Abstract**

<b>Title</b>	Which Swedish industries could become pioneers in extensive Intellectual Capital disclosure?
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<b>Keywords</b>	Intellectual Capital, VAIC™, market value changes knowledge economy, IC measurement & disclosure
<b>Problem formulation</b>	It is difficult to assess and measure IC, and most companies lack extensive disclosure of IC. Meanwhile, theories advocate a higher level of disclosure as it is considered beneficial for companies, investors, and other stakeholders.
<b>Purpose</b>	The purpose of the thesis is to investigate in which industries IC disclosure has effect on market values. Further, we want to keep a theoretical discussion whether the same industries could become pioneers in extensive IC disclosure.
<b>Methodology</b>	The research design had an inductive, quantitative approach using multivariate regressions as main analysis tool.
<b>Empirical framework</b>	A sample of 88 companies from the Large and Mid Caps of the Stockholm Stock Exchange.
<b>Theoretical framework</b>	Our theoretical framework covers general theories about IC, VAIC™ and its components, and contemporary issues and processes. In addition, we also benchmark several similar studies as guidance.
<b>Conclusions</b>	Our main result was that the Energy, IT, and Retail industries could become pioneers in disclosing IC. The reason was that we found a statistical relationship between the VAIC™, and its components, and the market values of these industries. Thus, disclosing more information could benefit stakeholders, such as investors, of these industries.

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Any shortcomings of this thesis should only be reflected upon the authors.

With kindest regards

Alfa 1, Lund May 30th, 2010

Jens Danerhall & Johan Gyllin



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## 1. Introduction

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*In the first chapter, we will give an introduction to our thesis, what our key questions and research problems are, and the purpose of the thesis. We will also formulate delimitations, that is, what we have chosen not to include or survey. Finally, we present what our target groups are and why we chose the subject at hand.*

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As corporate finance students, we have on a number of occasions observed companies that are valued far beyond their inherent book value of net assets by the market. Pondering this phenomenon, we intuitively come to the conclusion that there are elements within a company that generate value that exceeds the traditional, quantified assets. As these factors sometimes almost represent a mystery, our academic curiosity will now take us on a journey to investigate where these values hide and if they can be directly traceable in the market values of companies.

### 1.1 Background

*”Indeed, the new source of wealth is not material, it is information, knowledge applied to work to create value”*

Walter Winston (Edvinsson & Malone, 1997 p3)

Today’s business world is becoming more service and knowledge based compared to the traditional, production based economy of the last century. Market values of companies are becoming less based on the actual physical and financial book value, which indicates that the value of a company is more than a sum of ‘traditional’ assets. Instead, the value of a company consists mainly of intangible future value; that is value originating from assets that are intangible, for example composed by an organization’s employees, culture, or the organization itself (Stegmann, 2009). Since traditional financial reporting focuses on historical quantified hard measures, such as net income or net debt, this reveals that there is something missing in this reporting. Ante Pulic (2004:b p.1) describes the situation

*“The existing accounting system cannot meet the requirements of modern companies any more because not costs but value creation is the core of modern business.”*

The gap is obviously then in the reporting of those intangible assets, or soft sides, of the company, which are believed to create most of the future value of the company. The improvement of the reporting of these intangible assets should most likely be an in common interest for both the management of the individual company as well as for the financial markets. Intellectual Capital (IC) is an academic field that tries to determine, categorize, and partially quantify, such soft sides of a company. The benefits of doing this are believed to be enormous from several perspectives, as a majority of today's company values are believed to reside in assets that are part of IC. However, it does not stop with academia, the change to a knowledge based business world has also created a need for management, as well as for financial markets, to focus on how to manage and assess these intangible, off-balance-sheet values. Authors such as Edvinsson (1997), Sveiby (1997) and Lynn (1998) all agree that IC has a great importance when discussing the main sources of creating value in the new economy.

The knowledge economy, which is defined as *“production and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence”* by Powell & Snellman (2004, p.3), is growing and has a global scope. The knowledge economy has changed the traditional paradigm of companies and organizations in a way that focus has been directed not only to exploit knowledge, but also to retain and develop it within the organization. Organizational learning is thus on every knowledge company's agenda. The strategic focus of today is not only about managing plants, factories, or machines, but is mainly shifting towards the softer sides: how to manage the intangibles of a company (Lynn, 1998). Traditionally, intangibles, or immaterial assets, have been mainly composed of patents, goodwill, and such classic, yet unique, assets (Ibid). This is the accountant's view of the 'soft' side of the company, but it has been strongly criticized as only showing the acquisition costs rather than the potential it brings (Pulic, 2004:a). We see a pattern that alliances such as WICI, EFFAS, and InCas, as well as analysts, financial markets, and academics consider today's accounting rules and standards insufficient in reflecting the value inherent in the knowledge-based companies.

If a company wants to enter a new market, it has two different strategic alternatives, which is considered to be equal from both a cost position as well as market penetration: it could either choose to create a new brand internally or it could make an acquisition. These two alternatives should be considered to have the same value from an investor's perspective, but the accounting standards treat them differently. The internal start-up is just considered to be a cost, but the acquisition will be treated as an asset on the balance sheet. We hold this is a clear example for how the current accounting standards limits the financial markets' ability to compare different companies on an equal level. This makes it more important for companies to be willing to disclose more information to the financial markets and other stakeholders. In the field of Intellectual Capital, elements such as customer relations, organizational processes, and human capital are considered to be the keys to both disclosure and to create future value to shareholders.

#### 1.1.1 A resource-based view?

IC theories are indirectly related to the resource-based view of strategy, which implies that the resources of a company are what makes the company competitive. The resource-based view of the firm focuses on the differences between the company and its competitors in order to become competitive and sustain its competitiveness, from a strategic perspective (Grant, 2008). However, in order to gain a competitive advantage, resources must to be valuable, rare, and costly to imitate (Barney, 2001). In today's knowledge economy, the resources that fulfill these requirements are not likely physical assets such as superior plants and equipment, but rather the employees and their skills and experiences, and / or the very foundations of the organization: brand image, customer relations, organizational processes, and other soft sides of an organization that can be treated as resources (Barney & Zajac, 1994; Barney, 1986:no2).

As managers of today's companies realize this, they might be, or ought to be, thinking about managing these assets at least as much as physical assets, especially as a profound part of the company's value lies in the intellectual assets. Lynn (1998 p.1) says that "*While some argue that [Intellectual Capital Management] is just another management fad, others view it as an essential strategic technique to locate, preserve and stimulate organizational value.*" This debate reveals the disunity in the



management community on how to view Intellectual Capital: should it be treated as 'corporate b.s.' or should it, as the stock markets of today obviously do, be treated as something that actually creates the majority of the value of a company?

### **1.1.2 Why is IC of importance?**

In Skandia (Edvinsson, 1997) one of the main objectives with their focus on Intellectual Capital was that the management wanted to convert the knowledge the company had among its employees into intangible assets. The Human Capital is, as we stated earlier, a form of capital that cannot be owned nor legally retained by the company. It is therefore of great importance for a knowledge company to secure that the valuable knowledge that is generated and exist inside the organization will not entirely disappear with its employees. The consensus is that the objectives of the Structural Capital are both to facilitate and leverage the usage of the knowledge and the potential of the company's employees, and at the same time the Structural Capital works to lock-in the key processes inside the company to retain them and make them less dependent on individuals.

What kind of companies should have an interest in IC? A simple answer is that all companies that have knowledge as their core competency and competitive advantage will benefit from improving and structuring their IC management. These types of companies are called knowledge firms (Edvinsson & Sullivan, 1996).

## **1.2 Problem discussion**

Proponents of IC theories assert that the main problem with traditional financial reporting is that it does not fully serve as indicators to disclose a company's actions to improve their knowledge based competitive advantage. This is of great interest to management, owners, and all other stakeholders of a company. The main problems with IC are how to measure it, manage it, and what to do with the information given. Some studies have tried to connect companies' market values to IC measures of different kinds, leading to theories such as Value Added Intellectual Coefficient™ (VAIC™), or trying to find statistical correlations between market value and IC. Some measures, such as customer loyalty or employee motivation are rather subjective. Quantifying IC is difficult and for IC to become comparable the financial accounting measurements need to be harmonized. There is a development today in

order to satisfy this need, several organizations and projects, such as WICI, InCas and EFFAS etc, are working towards helping companies develop a standardized IC disclosure and reporting framework. Meanwhile, academics have tried to come up with methods to adequately measure IC. Some of these theories will be further discussed and explained in Chapter 3.

There is a great difficulty in trying to create a universal IC indicator that fits all industries. The key indicators for a consultancy company are most likely not the same as for a manufacturing company (Edvinsson, 1997). A consultancy company might have hours of employee training as a key-ratio of Human Capital, on the other hand a more appropriate ratio of Human Capital for a manufacturing company could be average days of sick leave.

We acknowledge these limitations and therefore realize that there is no use of developing a generic ‘fits all industries’ IC Navigator (see below) for internal usage. There are several organizations that work towards such generic standards, for both internal and external use, for example, a conference was held on the 26<sup>th</sup> of May 2010 in Brussels, where EFFAS, InCas, and WICI had discussions about the similarities between the Asian and European efforts to improve the reporting of IC. We also argue that the focus should be on developing a generic disclosure standard, like EFFAS is currently developing, urging companies to disclose this information, which in theory will make companies more comparable.

### **1.3 Problem formulation**

In which industries does the current limited IC disclosure have the greatest effect on the market value of companies? What industries should have the greatest interest of becoming pioneers in disclosing IC more thoroughly? Based on this answer, which industries would be affected the most by an increased disclosure? Why do not the companies in these industries have a larger degree of transparency regarding the IC reporting? Why do some companies disclose just what is required?

These questions arise as we study the theories of IC while considering the behavior of the stock market relative to how companies are valued. Arvidsson (2003) states that

management teams in knowledge-intense companies sometimes disclose more than required on intangibles, which implies that the willingness to disclose IC actually exists, but not everywhere. Further, how managers in companies as of today do much to live up to the expectations from analysts and investors, it is somewhat of a mystery why not IC is disclosed more than it is. We believe that this might have to do with the preconception that too much disclosed information is something that might be risking the competitive position of the company. However, as we will find out in the theory chapter, this might not be entirely true.

### **1.4 Purpose**

The purpose of the thesis will be to investigate which industries' market values today's limited IC disclosure has the strongest effect on. A quantitative regression analysis will be the foundation and a clear indication to which companies that should become interested in disclosing IC measurements more elaborately. We believe that the development of a standard is imperative for a wide acceptance of IC and its disclosure. There are different initiatives and lobbying to create this kind of standard, such as the work of EFFAS and WICI, described further in the theory chapter, and we have the opinion that without the support from regulators, the most efficient way to create a standard would be for a large company to become pioneer and path maker in disclosing IC, somewhat like Skandia did in the 1990's. By performing cross-industry analyses we aim to show which companies and industries that should be the most interested in taking on this role. We believe that the most efficient way to create an interest among companies is to show that it is beneficial for their shareholders, which should serve as an adequate incentive. We also believe that market value as such is a very strong driver, and thus incentive, in public companies and hence a proof that IC statistically affects market value, which is the purpose of the thesis, would be a rather valuable point for managers in the discussion whether to disclose IC more thoroughly or not.

### **1.5 Limitations**

The limitations we have chosen for this thesis are

1. We have chosen the Large and Mid Caps of the Stockholm Stock Exchange as our sample, during a restricted period between 2002-2009

2. The type of IC we have chosen to survey is IC that is disclosed in annual reports, mainly due to that companies are legally obligated to disclose it
3. We have chosen the VAIC™ as our main indicator of IC, since it is based on information readily available in most companies' annual reports and that it is by some academics considered to be the most useful IC measurement method

These limitations will of course affect the representativity of our thesis, however we believe that these are limitations that are necessary, due to the constraints laid upon us by the timeframe of the thesis.

### **1.6 Target Group**

The target groups of this thesis are mainly academics and the corporate world. Throughout the thesis we try to explain concepts and approaches in a way that it could be understood whether the reader is a management researcher or a management practitioner. In order to stir up the interest of the corporate world to the concept of IC we try to make the text as colorful and dynamic as possible.

### **1.7 Motives behind the thesis**

In the spring of 2010, we attended BUSM37 Strategic Management, an elective course of our Master program Corporate and Financial Management. Two lectures touched upon the field of Intellectual Capital, a completely new concept for us, and we immediately found it interesting, as well as challenging. Consulting our advisor, Professor Leif Edvinsson, we came up with the idea of investigating how different IC elements and indicators affected the market value of a company. As we soon realized, the thesis subject itself would control how the research had to be designed and implemented. Initially, we were interested in the subject of VAIC™ (Value Added Intellectual Coefficient). However, we first took a detour towards more qualitative aspects of IC, something that turned out more difficult than we would imagine, more on this below.

Our conception about the problem and the problem formulation is mainly that all companies' market values in one way or the other should be affected by the VAIC™ and its components. The logic behind this pre-understanding is of course that the

VAIC™ is made up by several factors that one normally would assume affect market values. Further, we believe that some industries, that are especially dependent on Human and Structural Capital, will show particular dependence on the independent variables VAIC™ and its components. We believe that these companies should have a great interest in IC management and reporting if they were aware of this.

### **1.8 A note on the thesis**

It should be said that our intentions from the beginning were not to investigate the VAIC™'s and its elements' effects on market values of companies on the Stockholm Stock Exchange. Initially, we intended to conduct a qualitative, case-study based thesis with the purpose to investigate how an IC Navigator would look like in the Swedish food processing industry and to create a foundation to a generic IC Navigator for companies to start their own internal process of creating a tool to manage their IC work. However, due to lack of interest from the intended case companies, we were forced to change subject in order to be able to finalize a product within the given timeframe of the thesis period. The lack of interest of, or perhaps even ignorance about, IC proves that it is still seen as something that is vague, academic, or even non-existent. Therefore, we thought that we would prove to these companies that IC matters, by investigating the impact that IC reporting has on the market value of a company.

### **1.9 Thesis disposition**

As can be seen in Exhibit 1.1 on the next page, we have chosen a rather conventional disposition of our thesis. The reader will be guided through our thesis according to these steps, however we will try to repeat certain key points when needed, such as the purpose, important methodological and theoretical key points, and results from the regression analyses and our analysis.

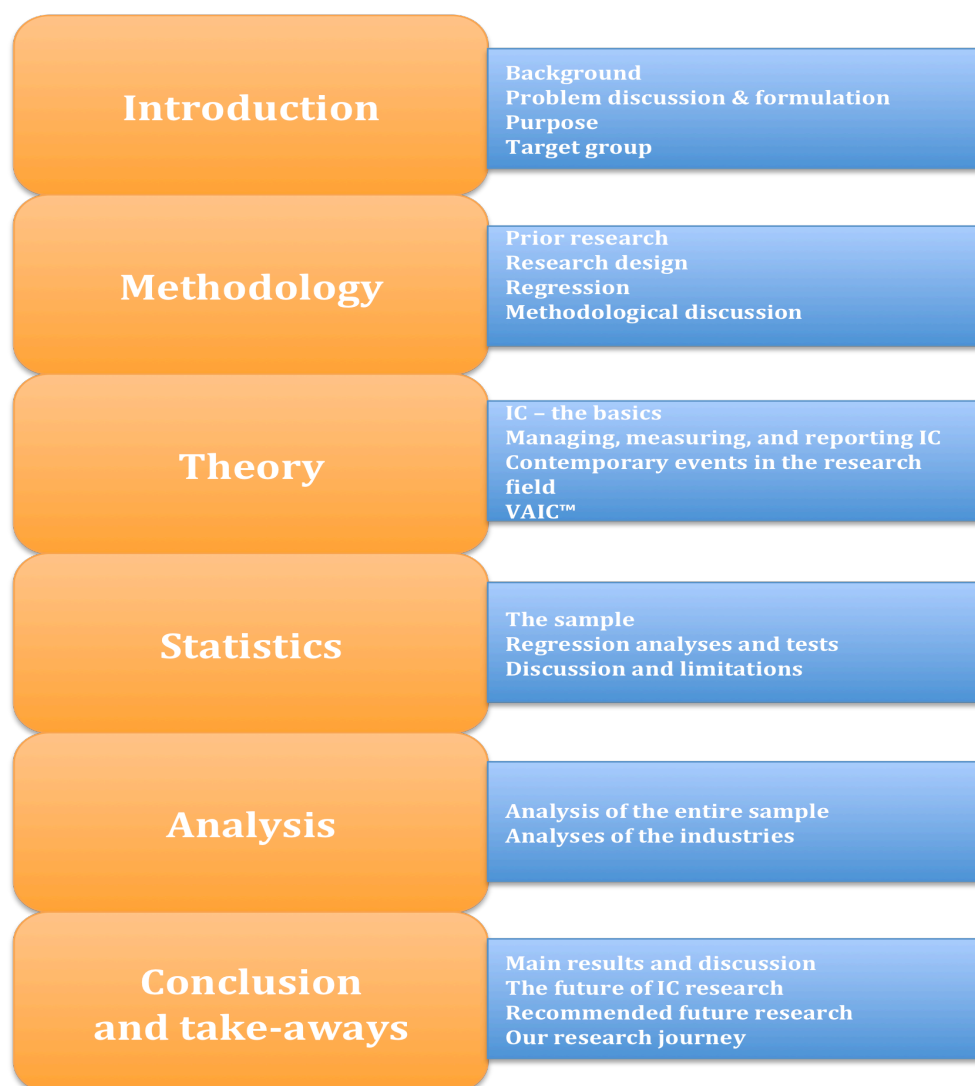


Exhibit 1.1 – Thesis disposition

## 2. Methodology

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*In the second chapter, we will go through what research methods we have chosen, as well as how we have chosen to conduct our data gathering to produce empirics for our thesis. We have chosen to view our method as practically oriented, employed to validate our chosen approach as well as refining it.*

---

### 2.1 Background

#### 2.1.1 Method matrix and choice of subject

As the matrix below in Exhibit 2.1 displays, as explained by Professor Lars Oxelheim March 15<sup>th</sup> 2010, that there are two variables when writing a thesis: the field of the thesis, which could be a new or an old industry, geographic location, company, etc; and the method used, new or old. Oxelheim explained that it would require too much time relative to what we have available for this thesis in order to construct a new method in a new field. Conversely, adapting an old method into an old field would be rather meaningless, as it has already been done. Thus, we needed to use an old method on a new field or vice versa, meaning that we either have to benchmark a method or figure out a new one. Our approach is to investigate an old field with a new method.

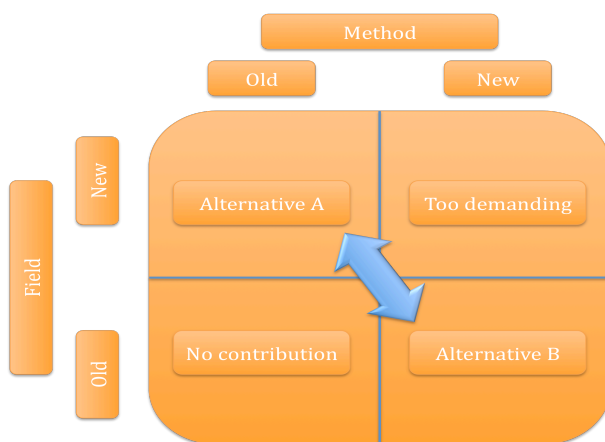


Exhibit 2.1 - Methodological approach, Oxelheim 2010

### 2.1.2 Prior research – benchmarks

Table 2.1 displays different theses and articles that deal with the VAIC™ and its influence on different measures for corporate performance. When choosing a subject for the thesis we found the recently written material in Table 2.1 the most interesting and thus wanted our thesis to relate to something similar.

Year	Authors	Title	Field of research	Main findings
2010	Zéghal, Maaloul (Academic article)	Analysing value added as an indicator of intellectual capital and its consequences on company performance	Relationship between VAIC™ and corporate economic, financial, and stock market performance in the UK in 2005 (300 companies)	IC, as measured by VAIC™ has a positive impact on stock market performance in high-tech industry
2009	Ek, Klang, & Nilsson (Master thesis)	Intellectual capital's importance for corporate performance	Relationship between VAIC™ and corporate performance on the Stockholm Stock Exchange between 1998-2007 (100 companies)	Positive relationship between IC and profitability and market value
2007	Appuhami (Academic article)	The impact of Intellectual Capital on investors' capital gain on shares; an empirical investigation in Thai banking, finance & insurance sector	Relationship between VAIC™ and its components and investors' capital gain on shares of companies in Thailand in 2005 (33 companies)	There is a significant positive relationship between investors' capital gain on shares and corporate IC
2006	Zhang, Zhu, & Kong (Academic article)	Study on Intellectual Capital and Enterprise's performance – empirical evidence from the Chinese securities market	Relationship between VAIC™ and its components with return on assets of Chinese automobile industry in 2004 (32 companies)	Compared with physical capital, human capital has more and structural capital has less significant impact on business performance
2003	Firer & Williams (Academic article)	Intellectual capital and traditional measures of corporate performance	Relationship between VAIC™ and its components with profitability, productivity, and market valuation in South Africa in 2001 (75 companies)	Limited and mixed relationship. Physical capital most significant
2002	Berglund, Grönvall, & Johnson (Master thesis)	Intellectual Capital's Leverage on Market Value	Correlation analysis between IC and the market values of companies in Sweden. Searching for indicators for leveraging the efficiency of intellectual.	The study shows that an enhancement of the IC Multiplier will have a significant effect on the market value of a company

Table 2.1 - Prior essential research on VAIC™ and related theories

From what we found, we concluded that VAIC™ has been covered by quite a few theses and articles, but the general conclusion we could draw is that there are areas of work to be done within the field. Three of the articles above were sent to us by Professor Ante Pulic's (see chapter 3) assistant, Karmen Jelcic (2010-05-24), which



were seen as important for the VAIC™ research field. When reading the articles and theses in Table 2.1, and many more on the subject of VAIC™, we came across a thesis from 2009 by Ek, Klang, and Nilsson, where they investigated how the VAIC™ related to corporate performance for companies traded on the Stockholm Stock Exchange. One of the suggestions in the thesis for further research was to investigate all elements of the VAIC™ separately, and we thought that this was an interesting idea. Initially, the purpose was to further dig down into each company and look at separate IC indicators and how these affect the market value of each company, in each industry. This suggestion would fit well with the purpose of our thesis; to analyze which industry that should become the pioneers in disclosing IC statements, by performing a regression analysis explaining the impact of the VAIC™ and its components, industry by industry, on market value. This would hopefully help us give indicators which industry / industries that IC disclosure had the greatest effect on. However, as many companies were lacking in disclosing information vital to deduct basic indicators of IC, we were forced to abandon this idea and solely concentrate on the VAIC™ and its elements. An example of the lack of IC indicators in disclosed information in public companies is ABB, one of the largest companies on the Stockholm Stock Exchange. ABB has not published any information of number of employees in their annual reports since at least 2005.

What struck us when investigating VAIC™ related studies was that, generally, the studies were rather small in both number of companies (300 at the most, but often less than 50), and number of years covered (most commonly one year). In addition, we found that these studies had rather daring conclusions about VAIC™ and its relationships with various measurement, in relation to the small sample groups and few observations. What we wanted to do was to investigate as many companies as possible over as many years as possible on the Stockholm Stock Exchange, in order to get a result that was as statistically significant as possible.

## **2.2 Research design**

The approach of a research study can be either qualitative or quantitative, the latter also known as traditional. Which approach chosen depends largely on the purpose of

the study. Our original idea was to carry out a qualitative study, but as we altered the objective and purpose, the research method was changed to a quantitative one.

Patton (1990) separates qualitative and quantitative methods by for example distinguishing the different advantages of the two methods. Qualitative designed research has the advantage that it produces a large amount of information on a small sample of cases, whereas quantitative designed research can produce a restricted amount of information on a large sample of cases. In order to analyze and discuss the relative importance of IC between different industries we found that a quantitative method was the best fit, as qualitative data in itself would appear rather difficult to obtain, whereas quantitative data was not.

The study was conducted with an inductive approach, the purpose of this was to start with the empirics and based on the findings generate a theory on how the financial markets react on different industries' IC disclosure. Patton (1990, p.40) explains an inductive approach as *"immersion in the details and specifics of the data to discover important categories, dimensions, and interrelationships; begin by exploring genuinely open questions rather than testing theoretically derived (deductive) hypotheses"*. As we started our analysis without pre-stated assumptions about which industry's market value that was the most affected by Intellectual Capital, the study assumed an inductive approach. Instead, we used existing theories and concepts in order to explain the artifacts and findings of the empirics. Bryman & Bell (2005) assert that there are often traces of deductive elements in a study that is conducted with an inductive perspective. Bryman & Bell (2005) continue stating that it is important to clarify what kind of theories that could be derived from the empirics. Theories coming from empirics are often said to be generalizing. The inductive approach is often used together with qualitative data (Bryman & Bell, 2005). We argue that the inductive approach would be more applicable to our purpose than the deductive, despite the fact that we were using quantitative data to gather our empirics.

### 2.3 The data

There are two types of data, primary and secondary data. Halvorsen (2006) describes primary data as data that the researcher has gathered himself. Secondary data is

information that other researchers have gathered and analyzed. Our empirics mainly consisted of secondary data, in the form of the data needed for our regression analysis. The sample group chosen consisted of the companies on the Large and Mid Caps of the Stockholm Stock Exchange, see Appendix I. The reason why we chose not to include the smaller lists, such as Small Cap, was that many of the companies listed on those list simply have not existed for 7 years, the data period, and that the number of companies would double if we included those companies as well, something our timeframe would not be able to handle. The initial stage of data gathering was to manually scan the annual reports of the companies. The annual reports were downloaded from each company's webpage. The companies on the Stockholm Stock Exchange are, more or less, obligated to disclose information that we set out to gather. We were well aware that some of these statements could be fabricated by the companies but we estimated it as being unlikely due to the nature of the information and disclosure rules. Even if it would be fabricated we did not see it as a significant problem, having the objective to analyze how the financial markets respond to the information disclosed. The market values of the companies were retrieved from the economic database Datastream, which we see as a reliable source due to it is commonly used by both practitioners and academics. We gathered all data that we could and finally conducted a screening process where we eliminated the companies that were missing any data. We made the decision that this was a better alternative compared to for example estimating the missing values for the missing data or get a sample with incomplete data.

### **2.3.1 Additional data gathering after conducting the first regression**

After we had conducted the first regression we decided that we wanted to add years to our time series study. Originally, we gathered data from 2005 - 2009 and due to that we looked at the yearly relative changes our sample was reduced to only cover a time period of four years. We used Datastream to gather the data for 10 years, we then realized that there were very few companies that had any data disclosed in Datastream for the fiscal years of 2000 and 2001, and we therefore needed to disregard these years in the analysis. This made our final study period 2002 – 2009. We used our initial data to control that the numbers we received from Datastream were in line with what we were seeking, which was the case.

## **2.4 The regression analysis**

In order to conduct our survey and hopefully come up with results that would give us empirical material that will be the base of our analysis, we deployed multivariate regression analyses of the empirics we collected.

### **2.4.1 The variables**

We carried out two types of regressions. The first was what would be the main analysis where we singled out which industry / industries where the VAIC™ showed indications of being explanatory significant of the changes in market value of an industry. Thus the dependent variable in the regression was the change in market value of the industry. The independent variables were the VAIC™ for the companies. In the following regressions we focused on the independent industries, for which the VAIC™ showed significance and used its components as independent variables regressed to the dependent variable, i.e. the change of market value. We decided not to incorporate any control variable in the models, which had the effect that  $R^2$  was rather low for the regressions. We argue that the need for control variables does not exist due to our purpose, which is to show if any industry in particular has incentives to disclose IC more thoroughly. If we were to construct a model to forecast or calculate market values from an IC perspective, it would be more motivated to include control variables in order to build a more robust and sustainable model.

Our observations were on a yearly basis, that is the values that ended each year. The reason why is mainly since not all data needed in order to calculate VAIC™ is disclosed in semi-annual or quarterly reports, and thus we had to use year-end figures. We know that this might distort our results, however from the situation, this is the best that we could do.

### **2.4.2 Panel data**

Panel data is used when modeling with data that handles both time series and cross-sectional elements; information over time and space. In order to process data for financial research there are two different approaches; fixed effects models and random effects models, (Brooks, 2008). We conducted different tests in order to decide which model that was most appropriate for each regression, these tests are presented later in the chapter.

### **2.4.3 R<sup>2</sup> and Adjusted R<sup>2</sup>**

R-squared could be used as a broad indication of the goodness-of-fit between the model and the data, according to Brooks (2008). But there are a couple of drawbacks with using R<sup>2</sup> as a goodness-of-fit measure. R<sup>2</sup> cannot be compared between two regressions using different variables, and adding more variables will never reduce the R<sup>2</sup>. Instead it sets a lower limit and will therefore not be a good measure when trying to decide on how many variables to use. The Adjusted R<sup>2</sup> has the ability to work around the latter problem and is therefore a better measure when going from a large variable population to a smaller one (Brooks, 2008). We used, based on these differences in characteristics, the Adjusted R<sup>2</sup> as our measure of goodness-of-fit for our regressions. The Adjusted R<sup>2</sup> was used as an indication of how much of the change in market value, the dependent variable, that was explained by the regression model (Brooks, 2008).

### **2.4.4 Coefficients**

The coefficients of the different independent variables tell us how a one per cent change in an independent variable, *ceteris paribus*, will affect the dependent variable. If, for example, the coefficient for VAIC™ in Industry B is 0.05, a one per cent positive change of the VAIC™ in Industry B will lead to a 0.05% positive change in the market value of that industry (Brooks, 2008).

### **2.4.5 F-statistic**

The F-statistic is a test that controls if there is a linear relationship between the dependent variable and any of the independent variables. The null hypothesis states that all coefficients are equal to zero. The alternative hypothesis is that at least one of the coefficients differs from zero. If the null hypothesis is true, it means that there is no linear relationship between the independent variables and the dependent variable. Further, the variation in the dependent variable cannot be explained by the regression, only by a random divergences from the intercept. By rejecting the null hypothesis we can prove that there is a statistical relationship in the regression. With a 95% confidence interval we will reject the null hypothesis if the prob(f-statistic) is smaller than 0.05, (Brooks, 2008).

#### 2.4.6 Auto-correlation and the Durbin-Watson test

Auto-correlation in econometric statistics is a problem, and it is specifically the auto-correlation of the residuals (Brooks, 2008). The Durbin-Watson test measures the auto-correlation between the residuals in the regression. Positive auto-correlation is the most common type of auto-correlation, according to Westerlund (2005). When there is a positive auto-correlation it leads to an underestimation of the standard deviation and an overestimation of the t-statistics. The DW is always between 0 – 4. There is no auto-correlation when the DW equals 2. If it is substantially higher than 2, it is an indication that there is a negative correlation, and a lower number indicates a positive correlation among the residuals. To determine if the difference between the DW of the sample and 2 is great enough to indicate auto-correlation depends on the sample size, the number of variables and level of significance (Westerlund, 2005). This is controlled by conducting a hypothesis test. The null hypothesis is that there is no auto-correlation and thus, we do not want to reject the  $H_0$ . To test the null hypothesis we need to create a critical region, this is based on the size of the sample, the number of variables and the level of significance. The two critical values are  $d_L$  and  $d_U$ , if the  $DW < d_L$  we need to reject the null hypothesis, if  $DW > d_U$  we do not reject the null hypothesis, and finally if  $d_L < DW < d_U$  we cannot make any conclusions about the auto-correlation in the sample (Westerlund, 2005).

#### 2.4.7 Normal distribution and the Jarque-Bera test

The Jarque-Bera test is a test of the normality of the statistics. When the sample is normally distributed, the histogram will be bell-shaped, see Exhibit 2.2, and the null hypothesis, which is that the sample is normally distributed, should not be rejected.

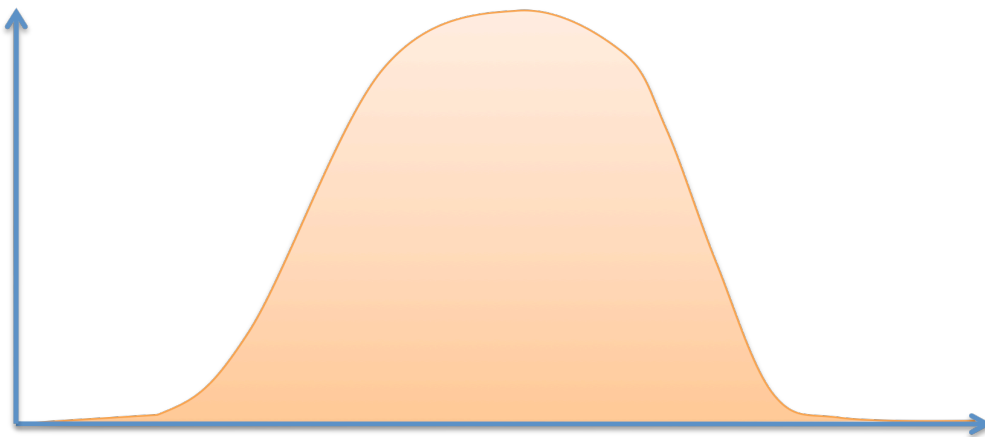


Exhibit 2.2 – Bell-shaped normal distribution

In order to decide this we look at the p-value for the Jarque-Bera, with a 95% confidence interval we will reject the null hypothesis if the p-value is lower than 0.05. The Jarque-Bera test has its starting-point in that the normal distribution is characterized by the mean and variance of the sample. Two other elements of the distribution are the skewness and kurtosis. The skewness is defined as a measurement of the extent to which a distribution is unsystematic about its mean value. The kurtosis on the other hand measures the thickness of the tails of the distribution. In order to be defined as a normal distribution the sample need to show a kurtosis of 3 and not be skewed. A common reason to why the normality of a sample's distribution is rejected is that there are a small number of outliers, which ruins the mean. This could often be resolved by increasing the size of the sample (Brooks, 2008).

## **2.5 Methodological discussion**

There are basically two major delimitations with our thesis. The first one is the lack of time, as we only have two months writing it. This is primarily affecting the number of companies we are investigating, the number of years we are covering, and the depth of each company we investigate. We have chosen to only include Large and Mid Caps companies of the Stockholm Stock Exchange, as data collection takes time, as well as limited ourselves to seven years. The second reason is the lack of information, as most companies do not disclose much information on IC, however this does not affect our purpose, as it has actually more controlled it.

### **2.5.1 Validity**

There are, according to Bryman & Bell (2005), a couple of different validity terms. Measurement validity is the issue of whether a measurement really measures the concept of interest. Halvorsen (2006) states that validity could be regarded as the relevance of the data in the research. We used the VAIC™ as a measurement of IC in the sample, and the VAIC™ is constructed in a way that it only contains data from annual reports. We believe that validity in the measurements will not be an issue in our study, due to our purpose. It is important to emphasize that we do not consider the VAIC™ to be a direct or theoretically correct method of measuring the IC in a firm, but it visualizes the IC of a company ex post in a rather simplistic way. We will further discuss this in the theory chapter.

### **2.5.2 Reliability**

The level of reliability in a study could be defined as whether the result will be the same if the study is conducted again or not (Bryman & Bell, 2005). The authors further state that the reliability is of a greater importance and relevance when conducting a qualitative study, with the dilemma of cause and effect, and therefore we believed that reliability would not create a significant problem for our thesis, due to that we were conducting a quantitative study. The data in this thesis was obtained from annual reports and Datastream, and would be easily accessible to re-do the study. In order to achieve a high reliability we will throughout the thesis explain the methods, processes, and decisions made, making it straightforward for the reader to follow and comprehend.

### **2.5.3 Representativity**

To regard and make adjustments for issues of representativity is much more important when conducting a qualitative study (Bryman & Bell, 2005). When conducting a quantitative study the representativity issues could be discussed about the sample (Bryman, 2008). We included all Large and Mid Caps companies on the Stockholm Stock Exchange, the companies that we excluded were those that were missing data, the companies that were eliminated from the sample are presented in Appendix I. We believe that results will be representative for listed Swedish companies, to be able to draw conclusions on a international level, the sample would have to be much wider. This is something that we leave for future research.



### 3. Theories and models

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*The chapter begins by presenting some basic theories about IC and related fields. This is followed by some contemporary information from the IC research frontier, and finally we present the VAIC™, which is our base in the analyses in our thesis.*

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#### 3.1 Intellectual Capital – the basics

Intellectual Capital is a broadly defined term. Stewart (1997 p.67) defines IC as “*packaged useful knowledge*”, Edvinsson & Malone (1997 p.358) give it a little more width with their definition “*knowledge that can be converted into value*”, and Pulic (2000) defines it, a bit more pragmatically, as knowledge that is used to create value. More specifically, IC could be described as the difference between the market value of a firm and the value of its financial assets, i.e. the book value of net assets (Pulic 2004:a). The logic behind this reasoning is what we mentioned in the introduction; that the financial markets value a company from what its intangible investments and resources are expected to produce together with the physical capital. Thus, there is a hidden value residing in the Intellectual Capital that the company has at its disposal. These IC-resources do not normally appear in the ‘usual way’ on balance sheets. Academics assert that the measurement of IC could assess a company's true potential quite accurately. Thus, it should be in the interest of managers, investors, and businesses, especially SMEs ([incas-europe.eu](http://incas-europe.eu); no 1).

IC is often described as being comprised of two major components; Human Capital and Structural Capital (Edvinsson & Malone, 1997). Sometimes it is attributed by Relational Capital as well (Dumay, 2009), however this is according to Edvinsson (1997) a part of the Structural Capital. The Human Capital (HC), is the total know-how, expertise, intelligence, and so forth among the employees of a company. The complexity of HC is what makes the Structural Capital (SC) so valuable, as it is what facilitates the efficiency and leverage of the HC in order to create value. It is the processes, organizational culture, customer relations, and so forth of the company. Thus, without SC, a company would only be able to extract a limited value with help from the employees which would be quite hard to increase. But with SC, a company could in theory extract value with help from employees that cannot be depleted, as

long as there is infrastructure in the form of SC that leverages the HC. Practitioners have defined SC as “the part of the firm that remains when the human resource goes home” (Edvinsson & Sullivan, 1996 p.360). Edvinsson (1997) displays, Exhibit 3.1, a schematic for how Skandia viewed how the company’s market value was built, shown below. Here, it can be seen that IC basically is market value less the book value of a company, and the definition of IC becomes more intuitive, at the same time as one understands why it is so hard to assess some of the resources in a more traditional way, for example how to quantify Process Capital, the measure of how the company’s processes are leveraging the firms HC.

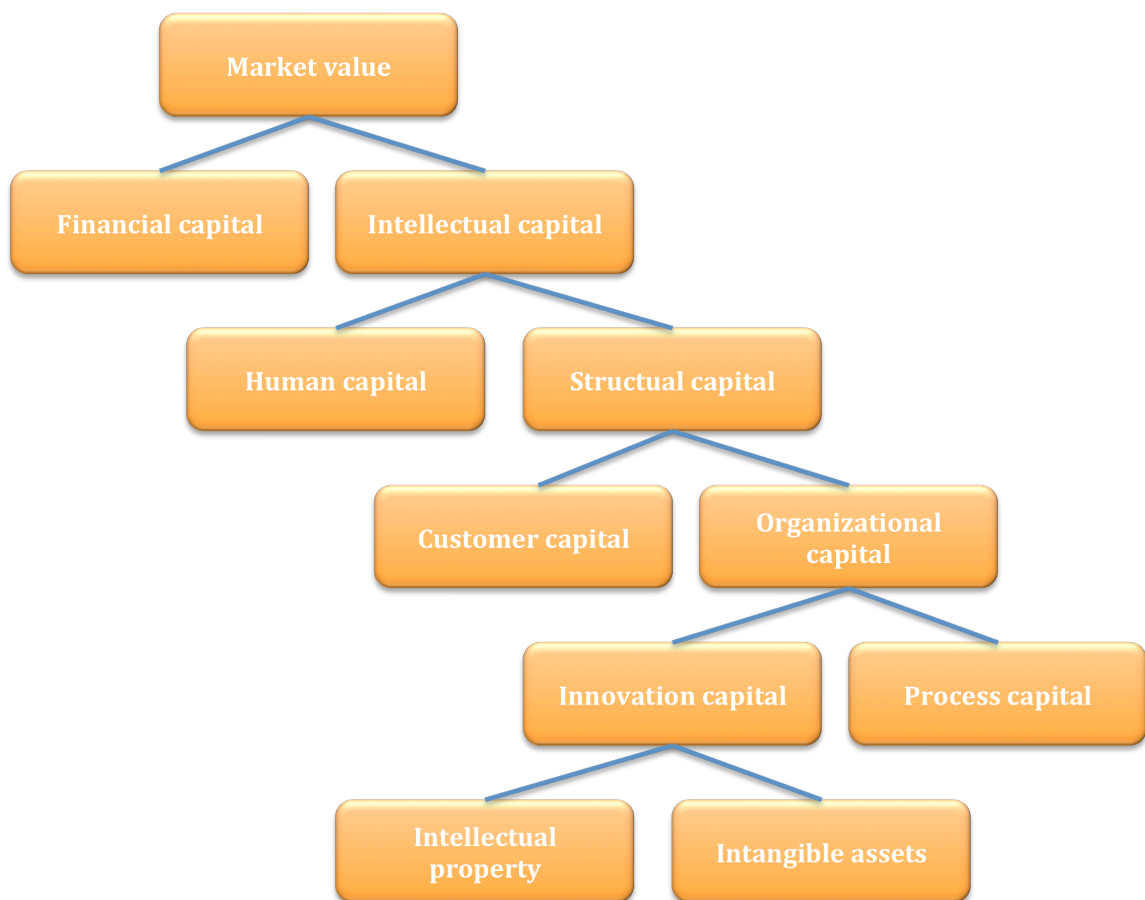


Exhibit 3.1 - Skandia’s Value Scheme, Edvinsson 1997

In this thesis, we assume that IC is constituted as Exhibit 3.1, as it is the most frequently used model in the articles and books on the subject of IC that we have come across. The model was used in Skandia to understand and display how value was structured from an IC perspective. One could however debate whether or not Relational Capital is important to the degree that it ‘deserves’ to be on it own, but

what really matters is that it is included in IC. Further, as Relational Capital is a purely qualitative measure, it is hard, not to say impossible, to quantify and measure, which would complicate IC assessments and measurements. Thus, we conclude that the definition of IC that we will use in the thesis consists of two main 'building blocks': human capital and structural capital.

IC is in many cases related to Value Added and referred to as a source of competitive advantage, as the HC is by far the most important component for a knowledge company (Edvinsson, 1997). It is a delicate and complex asset for a company, it is hard to imitate by nature, which could make it a strong competitive advantage. However, at the same time, it is an asset that cannot be owned nor fully controlled by the firm. This complication makes IC rather difficult to manage, measure, and report.

### 3.2 Managing IC

One of the most important tasks for management is to convert knowledge and value from Human Capital into Structural Capital, through processes and, for example, knowledge banks (Edvinsson, 1997). In order to protect the knowledge and expertise in the organization, a company must convert as much of it as possible into intellectual assets (Edvinsson & Sullivan, 1996). *"Many organizations have recognized that IC-management is a critical strategic factor for business growth and innovation"* (Lynn, 1998 p.1). The author further asserts that *"Only in the dynamic process of organizing information into knowledge, and transforming knowledge into IC is sustainable value added of the organization"* (p.2). Lynn (1998) expresses that the need to manage intellectual capital is imperative for all organizations.

The term organizational resilience means having the ability to adopt to the changes in the surroundings. It is not just about a firm's ability to adjust to a specific event or scandal, it is about a company's ability to continuously change and follow the movements in the business world (Hamel & Välikangas, 2003). We argue that in order to be resilient, and at the same time have a long-term perspective, a company needs to manage their IC, such adaptation could sometimes mean the need to reduce the company's work force. The risk in letting employees go is that a lot of valuable knowledge could disappear with them (Edvinsson, 1997). This does not need to be the

case however, if a company is managing its IC effectively, it could transform parts of this knowledge into intellectual assets and other forms of Structural Capital, and through this be able to use and leverage the knowledge through the remaining or new Human Capital (Lynn, 1998). By managing its IC, a company becomes less dependent of the individual employee which gives it a better opening position in negotiations, as well as reducing the risk of losing competitive advantage in case of key employees leaving. Thus, the Structural Capital not only helps leveraging the Human Capital, but it could also unburden HC from the responsibility of being key in creating value.

Edvinsson & Sullivan (1997) point out the importance of knowing what information or knowledge that is of relevance and which employee that possesses this knowledge. They refer to this as the ability to gain access to the firm's human resources. For managers this aspect is important and naturally becomes harder as an organization grows. Technological advancements have made this problem less severe, but it still remains a key issue for the modern corporation (Stegmann, 2009). This is where the Structural Capital can mitigate the problems, among the technological solutions through databases, and so on, a lot of information and experience can be stored and used over a broad front for the company. Many companies are investing a lot of money and time on documenting both contacts with customers, but also internal processes. By doing so the knowledge, or human resources, turns into intellectual assets, which could be legally protected. This is most common among intellectual assets that are used outside the firm (Edvinsson & Sullivan, 1997), due to its perceived value, both to the company and its competitors.

From this, we can conclude that companies that act in an industry that is knowledge-based have a need to transform the knowledge of their employees into Structural Capital in order to become less dependent on employees. As the Structural Capital works as a multiplier of the Human Capital, it is here value can be leveraged by letting the organization have infrastructure in form of processes, culture, and more, to use the human resources as effectively as possible. Also, the more Structural Capital a company has, the less dependent on its employees it becomes. The problems of managing IC is that at the moment there are few ways of controlling and analyzing the progress and development, both from an internal as well as from an external perspective (Pulic 2004:b). Thus, in order to spread the usage of IC, a clear method to

effectively measure it needs to be established. These measurements can of course vary for each company and industry, however some factors of IC is generic to all industries.

### 3.3 Measuring and reporting IC

As mentioned, the development of IC management, and especially IC disclosure in annual reports, has been rather slow historically. The reason why is, according to Bontis (1998), that companies keep their IC development and progress internal and keep it somewhat secret, due to the belief that it is identified as a great potential source of creating and maintaining a sustainable competitive advantage. This is analogous with Edvinsson & Malone (1997) stated above, that it is mainly intellectual assets for external usage that becomes legally protected. The authors discuss why the measurement and disclosure of IC are of importance for companies. They state that *“the lack of common practices for disclosing and visualizing [IC] hurts all stakeholders and investors”* (p.8). We also argue that the question of what to report at all is a significant reason to why IC-reporting is lacking. Since IC-components are difficult to measure or assess, clearer definitions are needed in order to quantify IC to any larger extent. We also argue that it is rather difficult to know how to report IC, which could be a source of the lack of IC reporting. What can be said with assurance is that it intuitively matters for market value and thus should be of great interest for managers, owners, and other stakeholders. The need to create stock value leads to a new definition of intellectual capital; *“It is the ability of the firm to create market power (satisfying customer needs better than the competition does) and growth, in order to control the market along with volume of sales and prices, and to manage the resources.”* (Stegmann 2009, p.82).

In order to successfully report IC externally and internally, a company needs to have methods to measure it adequately and accurately. The results of the inaccurate measurement is that many new and innovative companies are under-valued and under-capitalized, which undermine their competitiveness and in a worst-case scenario, prevent them to pursue their business due to the lack of funding (Edvinsson & Malone, 1997). The authors continue by stating that the disclosure of IC is not only in the interest of the individual companies, it is something that should be on the agenda of politicians due to the importance of an effective capital market to the national

economy. *“An economy that cannot properly measure its value cannot accurately distribute its resources nor properly reward its citizens”* (Ibid). Further, Mouristen, Buhk & Marr (2004) mention several researchers within the field of IC that claim IC reporting provides advantages for capital markets, such as benefitting smaller investors, preventing insider trading, decreasing volatility in stock prices, and decreased cost of capital (p.47). Also, measuring and disclosing IC become even more important looking back at the different scandals and frauds having occurred the last decade. The pressure on management to deliver short-term results is having a negative effect on investment decisions that will have negative cash flow in short-term but a greater positive cash flow in the long-term (Christensen, Kaufman & Smith, 2008). We are convinced that if an IC measurement system would become institutionalized, managers would be more likely to act in line with the long-term interest of the company and all its stakeholders, due to the fact that short-term actions would be more visible, at the same time as actions that are intended to raise long-term value would be more easily disclosed in annual reports and thus more easily motivated.

Roos, Fernström & Pike (2006) discuss different methods for measuring IC, and argue that most methods are various ways of explaining financial changes in a company by relating them how effectively IC resources are used. Most of them, such as EVA™, Knowledge Capital Earnings, and the Calculated Intangible Value, use the returns above what is required from the physical assets to explain the value of IC. The authors argue that it is only the VAIC™ that discerns from the accepted method, by being more detailed and connecting the firm's activities, the resources used, and the financial results (Ibid), although they state that it is not a perfect measure of IC.

### **3.3.1 The IC Navigator**

The Skandia Navigator was developed due to the need Skandia, a Swedish insurance and financial company, had to find a balance between financial and non-financial issues, which accentuated a constant on-going process of fostering the roots of the IC tree. This in order to create long-term value in the company through sustainability and competitive advantage. The balance exists in two dimensions; the one mentioned earlier, as well as a balance in time between yesterday, today, and tomorrow (Edvinsson, 1997). This can be related to the IC tree (Exhibit 3.2), in which the fruit (the financials of yesterday) is only an indicator of how the roots were yesterday.

Today's roots (the IC within the company in the Navigator; humans, processes, customers, and innovation) determine the fruits of tomorrow (Edvinsson, 1997).



Exhibit 3.2 – The IC Tree, unic.net

The house metaphor in Exhibit 3.3 (Edvinsson, 1997) is something that the author used for the Skandia IC Navigator. It could be seen as analogous to the IC tree, but with more pragmatic metaphors. Here, the Renewal and development focus represents the roots, or the platform, on which the house is built and needs in order to stand firm.

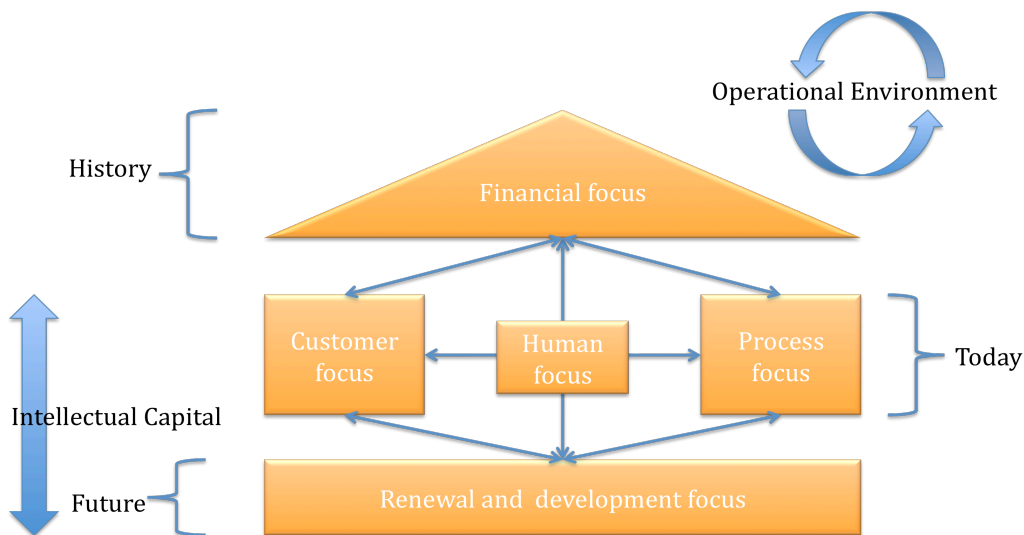


Exhibit 3.3 - The Skandia Navigator, Edvinsson 1997

As seen above, the Navigator consists of five different foci areas, which are incorporated into an operational environment to generate a strategic IC focus. Li &

Wang (2009, p.3) state that *"...the model reflects the contribution channels of financial information and non-financial information to market value[,] and intellectual capital is the source of value creation"*. Although only an example of one company's Navigator, and that Skandia was a pioneer within the field of disclosing IC, it had remarkable effects on stock price as the company was viewed as more transparent due to having a richer and more elaborated content of information. The Navigator itself was only a template for managing and reporting IC, and it is not easily transferred to another company, but the concept could easily be transferred.

Concluding the discussion, what is clear is that a generalized and standardized method of calculating IC, both for internal and external uses, is needed. Although many variations exist (Roos et al, 2006), we have chosen the VAIC™, for reasons mentioned later. The need exists not only for investors and politicians, but we believe that companies that would apply a more thorough and transparent disclosure of IC, and related measurements, could discern themselves radically from other companies. Consequences could be that it would be viewed as less volatile and more reliable in operations and strategy.

### **3.4 Contemporary processes at the research frontier of IC**

Our impression of the contemporary work in the field of Intellectual Capital is that there are many driving forces in the IC community, having governmental support will most likely be great benefit for the adoption of IC. We have the opinion that there is a need for an even greater initiative from the business world to subscribe to the 'IC thinking' and realize that there is a need for IC disclosure from an external perspective as well. Here, we will present some of the contemporary research and processes that are ongoing in the world of IC.

#### **3.4.1 Intellectual Capital Statements – Made in Germany**

The Federal Ministry of Economics and Labour and Commissioner of the Federal Government for Small- and Medium-Sized Enterprises (SME:s) in Germany is the organization behind the guidelines called 'Intellectual Capital Statements – Made in Germany'. The principles were created due to numerous reasons; to facilitate the development of Intellectual Capital and innovation in Germany, to help SME:s to improve their rating according to the Basel II by disclosing more information, support



knowledge building and increase the productivity and competitiveness by tapping into the true potential of an organization, and more (Federal Ministry of Economics and Labor, Germany, 2004).

Why a company should develop and disclose an ICS the organization states a couple reasons (Federal Ministry of Economics and Labor, Germany, 2004, p.14)

- Systematic management of the organization
- Acquisition of loan and equity capital
- Meeting legal requirements
- Employee recruitment and retention
- Developing cooperation, and
- Customer acquisition and retention

The following quote is a statement from representatives from the German bank VR Bank, which was a part of the pilot group that was the first to adopt these guidelines;

*“The results of the intellectual capital statement present us with our current situation in black and white, and therefore provide us with a sound basis for decision-making. We can now complete the discussions about our situation and start carrying out measures for targeted improvements.”*

(Federal Ministry of Economics and Labor, Germany, 2004, p.44)

According to the organization behind the guidelines, the process of constructing the IC statement will have a positive effect on the management directly, giving them a more holistic view of their organization (Federal Ministry of Economics and Labor, Germany, 2004). They are currently launching a program on extensive IC disclosure to cover 3500 German SMEs.

#### **3.4.2 A Practical example of an ICS adoption**

A company that employs Intellectual Capital reporting in their annual report is the German energy company Energie Baden-Württemberg AG (EnBW). They have since 2005 followed the principles of ‘Intellectual Capital Statements – Made in Germany’. The company has acknowledged the importance of Intellectual Capital for their future

sustainability and made the decision to adopt the disclosure of an ICS-part in their annual report. They categorize IC under unrecognized intangible assets. EnBW divide IC into Human Capital, Structural Capital, and Relational Capital. They further break down the parts into sub-categories. The Human Capital has three different sub-categories; Technical competence, Management and social competence, and Motivation. Structural Capital is measured as Corporate culture, Communication and organization, and Innovation. Finally, Relationship Capital is divided into Relations with customers, Relations with cooperation partners, and Relations with stakeholders. Exhibit 3.2 below shows EnBW’s IC development over three years.

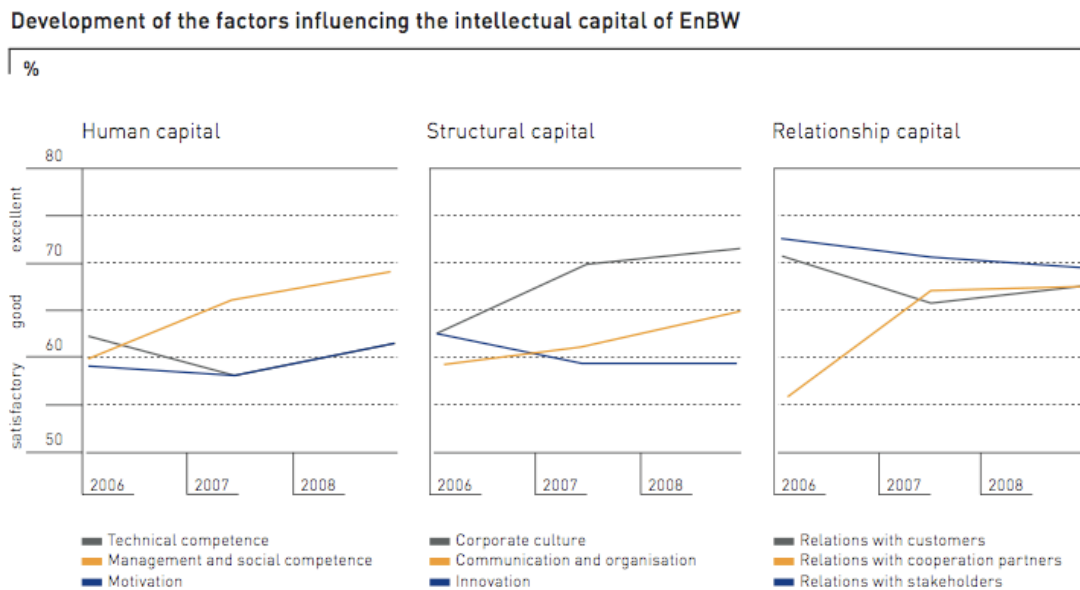


Exhibit 3.4 - Development of EnBW’s IC, Annual Report 2008, p.75

The information is gathered through ‘a systematic self-assessment process’ from a sample group of their workforce. They have an internal goal of keeping a level above of 60%, a level that the management considers being ‘strategically favorable’, (EnBW Annual Report 2008).

The measuring of Intellectual Capital is used internally within EnBW in order to see where the company is going. *“This way, we obtain a comprehensive overview of the development of our intellectual capital on an annual, rolling basis and can therefore initiate targeted optimisation measures as required”* (EnBW Annual Report 2008, p.75). The IC development is both used as a guiding tool (with the 60% level goal) and as an evaluation instrument. *“The results of the intellectual capital reporting in*

*2008 demonstrate that the action taken over the past two years has had a positive effect on the development of our intellectual capital.” (Ibid).*

From an external perspective this disclosure is of great interest, since it increases the ability for external stakeholders to value the intangible parts of the company. One problem we see with EnBW’s disclosure is that they do not disclose how they specifically have measured these IC figures. This constrains the comparability between different companies but it still allows for a trend analysis, which gives the reporting great value, also from an external perspective.

### **3.4.3 InCas: Intellectual Capital Statement – Made in Europe**

InCas is a project that is a collaboration between leading academic institutes and SME organizations from five different countries in Europe. The project for SMEs has its head-quarter in Brussels and collaborates with organizations and associations in many European countries ([psych.lse.ac.uk](http://psych.lse.ac.uk)). InCas is based on the concept of the ‘Intellectual Capital Statements – Made in Germany’. It is important to mention that the international Intellectual Capital community is a very open and sharing community, something that we ourselves have experienced during the course of this thesis. This is, according to us, something that is, and will continue to be, one of the strongest factors in favor for an adoption of the IC concept in both management theory and practice. The German project was the pioneer that had a focus solely on the German development. After this initiative the European Commission decided that it would be in the interest of the European Union to start a similar project, but on a larger scale. This was one of the projects that the EU have funded in order to achieve its goal of making EU to “*the most competitive and dynamic knowledge-based market in the world*” by 2010 ([incas-europe.eu](http://incas-europe.eu); no1). InCas uses similar guidelines for how to create an Intellectual Capital Statement as their German counterpart. The two Exhibits below (3.5 & 3.6) show the construction processes for each of the guidelines; the German and the European, respectively.

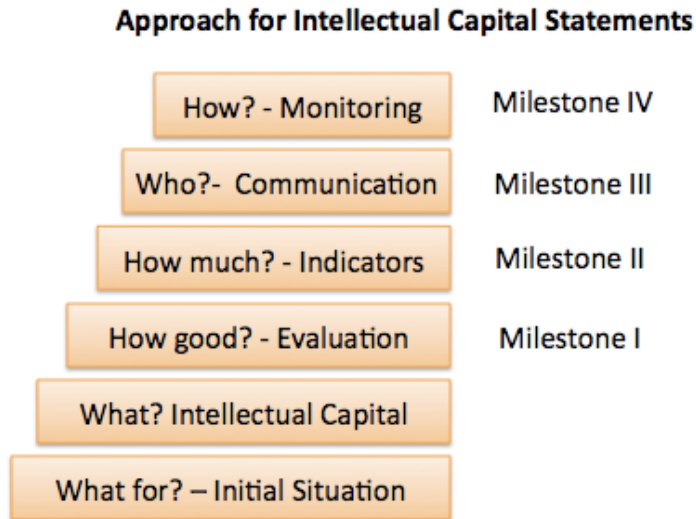


Exhibit 3.5 – Process of making the Intellectual Capital Statement – Made in Germany  
(Federal Ministry of Economics and Labor, Germany, 2004, p.16)

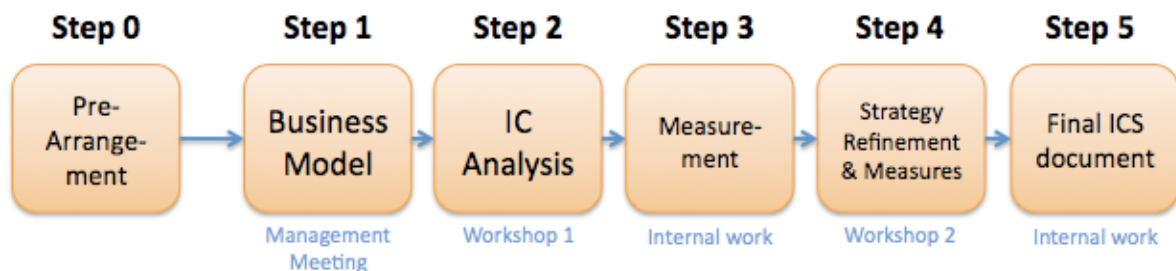


Exhibit 3.6 - InCas Intellectual Capital Statement Procedural Model, incas-europe.eu; no 2 2010, p.9

As seen, the processes are very similar, not being a surprise as they originate from the same foundation. There is a strong focus on taking the starting point from the individual company and the specific situation and characteristics it has. The guidelines provide the fundamental information about both the purpose and why there is a need for a company to create an ICS. The fact that the European Commission is co-financing the project gives a lot of credibility to the guidelines and should work as a great force to support the initiative.

#### 3.4.4 EFFAS: The European Federation of Financial Analysts Societies

EFFAS is an organization that is working for the development and implementation of disclosure standards for Intellectual Capital, (effas.net; no1). One could say that InCas takes the internal processes perspective, at the same time as EFFAS focus lies on the external presentation and communication perspective, from the financial markets' point of view.

### 3.4.5 WICI: World Intellectual Capital Initiative

WICI is a business reporting network that is a collaboration of both private as well as public sector actors that have the objective to improve the overall reporting of Intellectual Capital to external stakeholders. The network acknowledges that if a voluntary framework of IC disclosure will get a break-through, it will require a great deal of collaboration between companies, the financial markets, and other stakeholders, (effas.net; no2).

### 3.5 VAIC™

*“...a new measuring system for corporate success should be focused on value creation, value creators and value creation activities and processes.”*

Pulic (2000, p.4)

In the mid 1990s, Ante Pulic introduced the concept of Value Added Intellectual Coefficient (VAIC™), a method to internally and externally measure the usage of resources within a modern organization. Among these measurable resources is IC. The raison d'être of the VAIC™ is the fact that conventional and traditional cost and management accounting had been proven inadequate for companies conducting business in services industries, such as banking. Also that IC as a resource was, and still is, continuing to increase relative to other resources, such as physical and financial capital, and that this called for new accounting methods as old were becoming insufficient, and even obsolete, to cover all information disclosure needs of a modern company (Pulic, 2004:a). Pulic therefore realized that alternatives to the traditional forms of cost accounting had to be created, preferably focusing on value adding activities of a company rather than on cost control.

Pulic states that ABC accounting and the EVA™ shifts from cost towards value creation, although they are still lacking the information needed to fully disclose IC (2004:a). Further, he discusses how managers should be made aware of the limits of classical measures such as EBIT (Earnings before interest and taxes) or operating profits. Instead they should maintain their foci on value creation – benefits for customers, employees, stakeholders, and managers. Pulic (2004:a) also mentions how companies are becoming more focused on value creation, rather than the traditional

focus of keeping operations, such as production, cost effective. Also the fact that effectiveness has been optimized in most manufacturing companies induces incentives for companies to rationalize processes that are knowledge based. Pulic (2004:a) further asserts that today's production is much more information and knowledge based, making these resources key to the modern company. This implies that human resources should be treated as investments, not as a cost item as it traditionally has been treated. Pulic (2004:b) clarifies here that since employees invest their human capital, that is skills, experience, etc, into the companies activities, and that the market puts a value on these 'employee investments', it becomes value adding.

The VAIC™ was intended to be crude to calculate, contain a minimum of variables that are normally available in annual reports of listed companies, and foremost be able to measure companies of different size and industry, as well as being able to benchmark a company's performance over several years (Nazari & Herremans, 2007). In other words, a relative measure was to be preferred instead of a measure that deals in absolute terms. Pulic (2000) shows this by using a sample of companies where the difference in firm size was a ratio of 1:10, yet displaying roughly the same VAIC™.

Although we see the VAIC™ as a rather restricted measure of a company, using only factors that are included in other methods such as EVA™ (or Economic Profit method), as well as only using quantifiable indicators of a company's IC, we argue it is a sufficient measure to start with when comparing IC over time and between companies, and foremost, it is by some academics considered to be the best method for measuring IC. As mentioned in Chapter 1, the purpose of this thesis is to find the industries to which IC disclosure is have the greatest effect on the market value of the industry and therefore should become the pioneers in improving their disclosing and reporting of IC. Thus, VAIC™ could be used as a tool to investigate this.

### **3.5.1 Basic definitions**

Value added (VA) is a measure that can be defined as a company's sales less what it takes to make those sales, such as services, components, and materials. In other words, it is the value that the organization has added to the components of what is produced. Mathematically

$$VA = OP + EC + D + A \quad (1)$$

(Pulic, 2008)

where OP is the operating profit of the company, EC is the cost of salaries and other personnel related costs, and D and A are depreciation and amortization. Thus, value is created if (1) is positive, in other words if what comes out of the company possesses more value than what came in. With this measure, Pulic emphasizes that each business should have as an objective to create as much VA with a given amount of physical, financial, and intellectual capital. In the words of Ante Pulic (2000 p.6):

*“...VA, is related to the resources, capital employed, human and structural capital, in order to receive the value creation efficiency of each resource.”*

As defined in 3.1, IC consists of the two components Human Capital (HC) and Structural Capital (SC), which Edvinsson & Malone (1997) expresses as

$$IC = HC + SC \quad (2)$$

Here, according to Pulic (2004:a), HC could be expressed as all costs for personnel, such as salaries, social costs, bonuses, and more. The SC is however more difficult to arrive at since it involves organizational processes, knowledge, and more, which are difficult to quantify or assess. However, Pulic (2004:a) finds a way to bypass this by

$$SC = VA - HC \quad (3)$$

This is an approach that Pulic chooses to take, and one could debate over whether it is correct or not, however we accept it. Combining (1) and (3) would lead to

$$SC = OP + D + A$$

Finally, a definition of the physical capital has to be made, as physical capital, together with structural capital, is essential for most companies in order to create value. Pulic defines the physical capital as capital employed (CE), which is capital that is necessary for operations. CE is measured as the book value of net assets within the firm. The

value that is added by CE is represented in (1) by depreciation and amortization. Also, henceforth EC in (1) will equal HC in (2) for simplicity (Pulic, 2004:a).

### 3.5.2 Definition of the VAIC™

To make comparisons between companies, as well as comparisons of the individual company over time, Pulic (2008) created coefficients of the HC, SC, and CE. To derive the Human Capital Efficiency Coefficient (HCE), following equation holds

$$HCE = \frac{VA}{HC} \quad (4)$$

The economic interpretation of the HCE is basically how much value added each unit of currency that is invested into human capital generates. Thus, a company that is heavily dependent on the employees' knowledge and skills will have a marginal HCE > 1, and a company that could replace employees rather frequently yet losing little VA would have a marginal HCE < 1.

The Structural Capital Efficiency coefficient (SCE) is expressed as

$$SCE = \frac{SC}{VA} \quad (5)$$

The economic interpretation of SCE is the reverse as of that of the HCE. Instead, the SCE measures how much structural capital each unit of VA requires. This interpretation is questionable, as Pulic (2000, 2004:a&b, 2008) explains it rather diffusely. Combining (5) with (3) and (4) explains it better

$$SCE = \frac{VA - HC}{VA}$$

⇔

$$SCE = 1 - \frac{HC}{VA}$$

⇔

$$SCE = 1 - \frac{1}{HCE}$$

⇔



$$SCE = \frac{HCE - 1}{HCE}$$

In the case that OP and D&A in (1) combined equals 0,  $HC = VA$ . This leads to the conclusion that  $HCE = 1$ . In this case, SCE would equal 0, that is that no value added comes from Structural Capital. In a situation when the sum of OP and D&A is larger than 0,  $VA > HC$  which would lead to an HCE greater than 1, which in turn implies an SCE larger than 0. Only in the case of the sum of OP and D&A is less than 0, HCE is smaller than 1, leading to a negative SCE. The economic interpretation of this is that the company's structures, such as customer relations, culture, business models, etc, actually destroy value. This is, according to Pulic, nothing that is bad in the short-term, a contraire, a company needs to do long-term investments and / or reorganizations in order to stay competitive. However, if a company produces negative results, and hence negative SCE, for a longer period, a due diligence would be in place. Here, Pulic (2000) means that the VAIC™ is preferable due to the fact that one could easily through the coefficients see what is 'wrong' with the company.

Now, a definition of the Intellectual Capital Efficiency coefficient (ICE) can be made, based on (2), (4), and (5)

$$ICE = \frac{VA}{HC} + \frac{VA - HC}{VA} \quad (6)$$

which describes how efficiently the firm uses its IC: the higher ICE, the better. Lastly, the Capital Employed Efficiency coefficient (CEE) is defined as

$$CEE = \frac{VA}{CE} \quad (7)$$

Which, in the same manner as HCE, is defined as how much VA each unit of CE adds to the value creation of the company, that is how successfully a company uses its tangible, or fixed, assets.

Now, a formal definition of the VAIC™ can be written as

$$VAIC^{TM} = ICE + CEE \quad (8a)$$

↔

$$VAIC^{TM} = HCE + SCE + CEE \quad (8b)$$

↔

$$VAIC^{TM} = \frac{VA}{HC} + \frac{VA - HC}{VA} + \frac{VA}{CE} \quad (8c).$$

VAIC<sup>TM</sup> thus measures how efficiently the company creates value, independent from its size. The higher the VAIC<sup>TM</sup>, the better the company creates value from its physical and intangible assets. To get a graphic overview of the VAIC<sup>TM</sup>

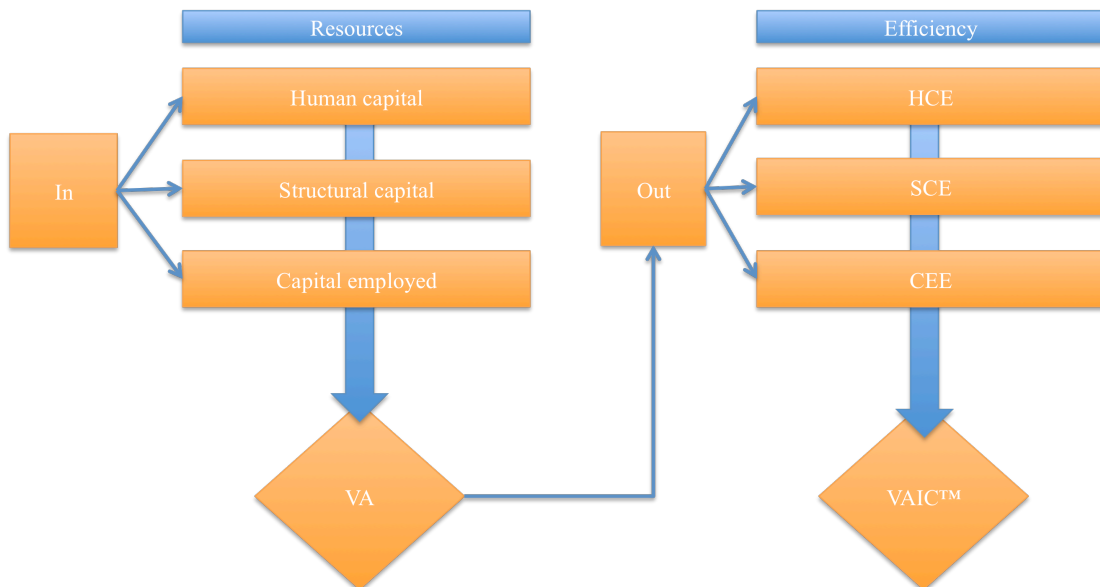


Exhibit 3.7 – Deriving the VAIC<sup>TM</sup>, Pulic 2000 (own interpretation)

Pulic asserts that an advantage with the VAIC<sup>TM</sup> is that it highlights areas of improvement for a company, both internally and externally, as it provides information on each part of the value creation process and its weaknesses, but from a IC perspective that still is quantitative and takes into account financial measures (2000). However, more elaborated models exist that also fill this function that are more established, theoretically more sound, and academically more accepted. An example of this is the EVA<sup>TM</sup> model, or Economic Profit. With the value driver model

$$\text{Value} = \frac{NOPLAT \cdot \left(1 - \frac{g}{RONIC}\right)}{WACC}$$

where value is the value of a set of activities, a division, or a company, NOPLAT is the Net Operating Profits Less Adjusted Taxes,  $g$  is growth in revenue, RONIC is the Return On New Invested Capital, and WACC is the Weighted Average Cost of Capital. With the value driver formula, one could as well find areas of problem within an organization, and probably could slim down where in the company the value destroying (if any) activities are taking place. It would be more easily traceable to investigate the source of such activities, and comparisons are fully possible, as in the VAIC™, with the difference that in an annual report, different business segments are reported separately, whereas employee costs for each division or such are not. However, as Pulic (2004:a) also points out, all VAIC™ components are readily available in annual reports, whereas in the value driver formula above, the drivers have to be calculated before deriving the formula. Also the fact that the VAIC™ is backward looking whereas the value driver formula is mainly forward, based on historical figures, looking separates the two models. However the point is that both models can be used to analyze value creation, but from different perspectives. Thus, one could very well use both models to analyze a company, get different results that would both be valuable for a corporate analysis.

Roos et al (2006) ask the valid question whether it is really possible to measure something that by nature consists of different parts, some physical whereas others are not, especially if value depends on who is measuring it. The authors then answers that, although the difficulties with measuring IC, it is worth doing it, both internally and externally. Roos et al (2006) further describes the VAIC™ as a measurement that connects activities in the company, the exploited resources, and the financial results. The authors describe the VAIC™ as the best method in measuring return on assets involving intangible assets.

As Pulic (2004:a) expresses it, because knowledge is the key to creating value, the new economy is based on goods that have a high level of quality, as opposed to the traditional market economy in which quantity drives value. Thus, it is not physical attributes such as endurance, but rather the freshness of the knowledge that decides

whether or not a product is rich in value. Pulic (2004:a) expresses this as it is the intangible – not the tangible – assets (knowledge) that becomes obsolete.

Value destruction happens in one out of two cases (Pulic 2004:a p.6)

1. If a fall in value creation efficiency occurs
2. When efficiency is below the average of the environment

### 3.5.3 Practical example of the VAIC™

In order to get an intuitive understanding of the VAIC™, we will now present a fictional example we have created, with the formulas in 3.4.1 and 3.4.2 as a base. In this case, the normal Value Added (VA) and Structural Capital (SC) formulas from above hold, so that

$$VA = OP + HC + D\&A$$

and

$$SC = VA - HC$$

which we input into a fictional scenario

Factor	Base case value	Change	New case value
HC	10	+10	20
OP	10	+/- 0	10
D&A	10	+/- 0	10
VA	30	+10	40
SC	20	+/- 0	20
CE	100	+/- 0	100

Thus, Value Added has increased only by the increase in HC (which, according to Pulic could be interpreted as personnel cost), and all other factors remain unchanged. Now, we will use additional formulas from above which are

$$HCE = \frac{VA}{HC}, \quad SCE = \frac{SC}{VA}, \quad CEE = \frac{VA}{CE}$$

and

$$VAIC^{TM} = HCE + SCE + CEE$$

The following table describes the coefficients derived from the formulas and values above

Coefficient	Base case value	New case value	Change
HCE	3	2	-1
SCE	0.67	0.5	-0.17
CEE	0.3	0.4	+0.1
VAIC <sup>TM</sup>	3.97	2.9	-1.07

Here, we see that the HCE has decreased, due to the fact the relation VA to HC has decreased, remembering that we increased both HC and VA with 10. Also SCE, which is basically the relation (VA – HC) to VA, has decreased. However, the CEE, which remains unchanged in the sample, has increased and intuitively it means that the same amount of capital employed generates more VA, which means that CE is used more efficiently. The conclusion from this is that if HC were to change by +10, and HCE were to remain unchanged, the following would apply

$$\text{if } \Delta HCE = 0 \Rightarrow \Delta \frac{VA}{HC} = 0 \Rightarrow \Delta VA > 10$$

in this case

$$\frac{VA + \Delta VA}{HC + \Delta HC} = 3$$

⇔

$$\Delta VA = 3 \cdot (HC + \Delta HC) - VA$$

⇔

$$\Delta VA = 3 \cdot (10 + 10) - 30 = 30$$

and we come up with a new VA of 60, and a new SC of 40 ( VA(60) – HC(20) = SC(40)). If we insert these values in the table above, we get

Coefficient	Base case value	New case value	Change
HCE	3	3	+/- 0
SCE	0.67	0.67	+/- 0
CEE	0.3	0.6	+0.3
VAIC™	3.97	4.1	+0.3

Here, both the VAIC™ and the CEE has increased, due to the fact that more VA 'came out' than that 'came in'. However, SCE is unchanged. This basically mean that in order to get an unchanged HCE, SCE cannot change either. In order to get an understanding of why, we look at the  $\Delta VA$  formula

$$\Delta VA = \Delta OP + \Delta HC + \Delta D\&A$$

and deduct  $\Delta HC$  from both sides, we realize that  $\Delta OP + \Delta D\&A$  must equal 20 ( $\Delta VA(30) - \Delta HC(10) = 20$ ) which is the same as  $\Delta SC$ . Thus, the SC leverages the HC of a company, which is an important feature with the IC of a company.

### 3.6 VAIC™ framework

In the analyses we will conduct, we have chosen to accept the VAIC™ as a sound and correct method to analyze how IC influences the market value of a company. The VAIC™ and its components will be used as a benchmark of how the current IC disclosure is received by the financial market. Although we are very well aware of that there are an almost infinite number of factors affecting market values of listed companies, such as the macroeconomic environment, market psychology, and other

more complex factors at the frontier of the finance research field, we believe that the VAIC™ and its components could significantly influence market value. Having said that, it will now be up to the historical figures to show if we can find any indication if our prediction has any ground. Also, we will try to establish some kind of structure in how the influence of VAIC™ and its components on market values differ in different industries, and also look into what industries that could gain (or lose) on disclosing and reporting more IC. This means that we will draw conclusions that, for example, if a company has a positive correlation between HCE and Market Value, we assume that other, non-VAIC™ related IC measures, such as employee education, and more, could also influence market value in the same direction. This might not be theoretically or academically correct, but as stated throughout what has been written so far, it is the best assumption we can make, based on the lack of proper IC disclosure and measurement methods. However, as Arvidsson (2003) argues, more extensive disclosure could increase stock liquidity, lower average cost of capital, increase forecast accuracy, and more. This is due to the reduced information asymmetry that arises when increasing transparency of IC.

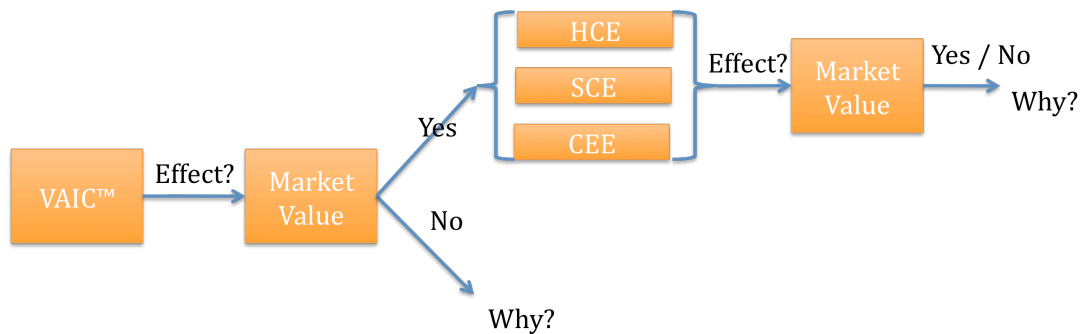


Exhibit 3.8 – VAIC™ framework

## 4. Statistics

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*This chapter covers and explains the regression analyses that we have conducted. First we present an overall picture of the regressions and their purposes. We continue by presenting the regressions and disclosing the results and the different statistical tests. The chapter will be the base for our analysis in the following chapter.*

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### 4.1 Introduction

We have chosen to use the VAIC<sup>TM</sup> as a measure for a disclosed IC. We base this conclusion on the fact that there is little disclosure of IC in reports from public companies, and VAIC<sup>TM</sup> is, despite its drawbacks and limitations one of the best methods for measuring IC from an external ex post perspective. In Appendix I an overview of all companies included in the regression can be seen.

#### 4.1.1 General discussion

Conducting a regression is a way of analyzing the relationship between a dependent and one or more independent variables (Firer & Williams, 2003). We have made the decision to use the market value of the company as the dependent variable in our regression, based on that we want to see how the financial markets react on the disclosure of intellectual capital. Our initial thought is that the market will react positively to disclosure that involves positive figures, i.e. if VAIC<sup>TM</sup> is positive, so will the reaction be. While the global economy and business climate are becoming more knowledge based, the disclosure of IC ought to at least in theory become more appreciated by the financial markets. It is important to point out the limitations of our model. The market value of a company depends on a lot of different factors, both tangible and intangible. How the market perceives news about a company depend for example also on the expectations from the market, current economic climate, industry trends, and more. We realize that the explanatory power of our model will be rather low having made the conscious decision to only use the VAIC<sup>TM</sup>, and later its different components, as explanatory variables for changes in market value. We are convinced that this model fits our purpose better than adding additional other independent variables, such as for example book value of assets, firm size, return on assets, and so on, which will increase the Adjusted R-square, but will not have any further implications for our thesis. This would be an appropriate thing to do when for



example using the regression to create a model that forecasts future performance, as Ek et al (2009) did. Our purpose is not to use the coefficients to explain the change in market value, though we will discuss it, instead we intend to analyze which industry / industries that have the greatest interest in increasing their disclosure due to financial markets' view on the information. For the regression, we have used EViews, a statistical computer program.

## 4.2 The sample

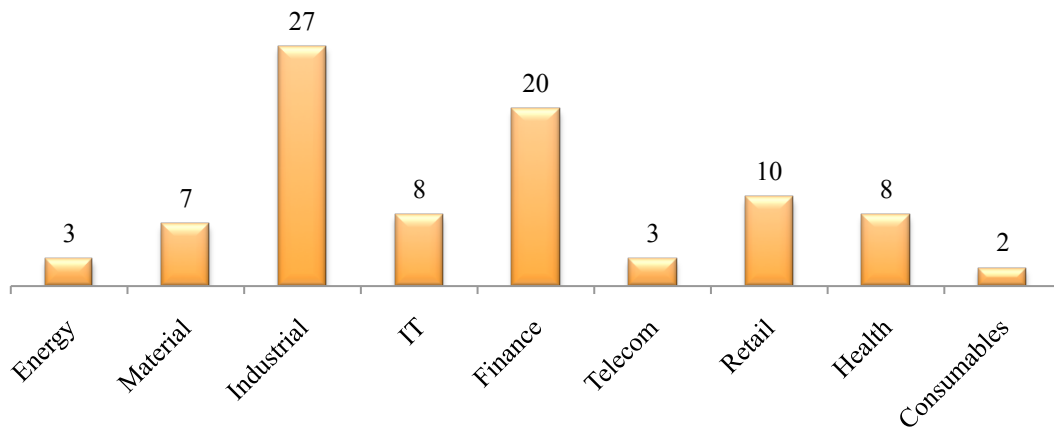


Exhibit 4.1 - Sample industry distribution, N=88

As seen in Exhibit 4.1, the individual samples for each industry are rather small, the largest being 27, while the smallest is 2. Based on our purpose, we are of the opinion that the results are valid despite the small sample sizes. When it comes to the size of the sample, the best is obviously to have as large sample as possible, from a statistical perspective. (Brooks, 2008) The risk when not using the whole sample is that the sample used does not show the same characteristics as the whole sample, this is called sampling error. The sampling error could be reduced by increasing the sample size (Brooks, 2008). In our sample we use 88 of the 128 total companies of the Large and Mid Caps companies on the Stockholm Stock Exchange. We have the opinion that this sample is large enough in order to draw conclusions for the total of the companies on those two categories of companies. Then, how further conclusions for the whole Stockholm Stock Exchange and broader will be discussed later.

### 4.3 The multivariate regression

The regression has an ambiguous function, as we use it as the base for discussion about which industry's or industries' market values that VAIC™ have the strongest influence on, and simultaneously use it as an elimination mechanism to single out which industries to further analyze by conducting additional regressions.

#### 4.3.1 Definitions

We have conducted a multivariate regression in order to determine the effect of the VIAC™ on the market value of the company. The regression formula is the following

$$\Delta MV = \beta * VAIC\_COM + \beta * VAIC\_CON + \beta * VAIC\_E + \beta * VAIC\_F + \beta * VAIC\_H + \beta * VAIC\_I + \beta * VAIC\_IT + \beta * VAIC\_M + \beta * VAIC\_R + [CX = F, PER = F]$$

where

$$\Delta MV = \frac{\ln(MV_{Year\ t})}{\ln(MV_{Year\ t-1})}$$

VAIC\_COM =  $\Delta$  in VAIC™ for the **Telecom** industry

VAIC\_CON =  $\Delta$  in VAIC™ for the **Consumables** industry

VAIC\_E =  $\Delta$  in VAIC™ for the **Energy** industry

VAIC\_F =  $\Delta$  in VAIC™ for the **Financial** industry

VAIC\_H =  $\Delta$  in VAIC™ for the **Health Care** industry

VAIC\_I =  $\Delta$  in VAIC™ for the **Industrial** industry

VAIC\_IT =  $\Delta$  in VAIC™ for the **IT** industry

VAIC\_M =  $\Delta$  in VAIC™ for the **Material** industry

VAIC\_R =  $\Delta$  in VAIC™ for the **Retail** industry

CX = F = Variable that EViews generate to make the model cross-section fixed

PER = F = Variable that EViews generate to make the model cross-section fixed

The dependent variable is the annual percentage change in market value. This has been calculated as the natural logarithm of Year t over the natural logarithm of Year t-1. The usage of the natural logarithm is a common practice with the purpose of adjusting for normality (Brooks, 2008). In the regression the independent variables are the percentage change in VAIC™ of each industry. This is calculated as

$$\frac{VAIC_T^{TM} - VAIC_{T-1}^{TM}}{VAIC_{T-1}^{TM}}$$

The regression is constructed as a panel data regression, this is the preferable way of treating a sample which models both time series and cross-sectional elements (Brooks, 2008). We have chosen to use dummies in order to single out the different industries. We have used one dummy per industry and by doing this we single out which industry that VAIC<sup>TM</sup> have the greatest effect on a company's market value. A problem with using dummies is that it is not possible, due to mathematical constraints, to combine dummies for all different industries and still use an intercept in the equation. What happens is that the dummy variables and the intercept will have multicollinearity, resulting in that the coefficients will not be able to be estimated, a phenomenon called 'the dummy variable trap'. This could be resolved by for example either eliminating the intercept in the equation or neglecting one of the dummy variables (Brooks, 2008). We have chosen to construct the dummy variables in the base data, which is another solution to the problem.

#### 4.3.2 The regression result

Dependent Variable:		MV		
Method:	Panel Least	Squares		
Date: 05/18/10	Time: 15:34			
Sample:	2003 2009			
Periods included:	7			
Cross-sections	included: 88			
Total panel	(balanced)	observations:	616	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013582	0.002155	6.303718	0.0000
VAIC_COM	0.004768	0.003080	1.548094	0.1222
VAIC_CON	0.009709	0.017027	0.570178	0.5688
<b>VAIC_E</b>	<b>0.030420</b>	<b>0.006259</b>	<b>4.860519</b>	<b>0.0000</b>
VAIC_F	-0.000668	0.002049	-0.325933	0.7446
VAIC_H	-0.001987	0.004188	-0.474589	0.6353
VAIC_I	0.028901	0.028816	1.002938	0.3164
<b>VAIC_IT</b>	<b>0.027037</b>	<b>0.005554</b>	<b>4.867622</b>	<b>0.0000</b>
VAIC_M	-0.001176	0.034902	-0.033691	0.9731
<b>VAIC_R</b>	<b>0.061952</b>	<b>0.027817</b>	<b>2.227120</b>	<b>0.0264</b>
	Effects	Specification		
Cross-section fixed	(dummy	variables)		

Period fixed	(dummy	variables)	
R-squared	0.514522	Mean dependent var	0.013601
Adjusted R-squared	<b>0.417995</b>	S.D. dependent var	0.069676
S.E. of regression	0.053156	Akaike info criterion	-2.879739
Sum squared resid	1.449495	Schwarz criterion	-2.140138
Log likelihood	989.9596	Hannan-Quinn criter.	-2.592167
F-statistic	5.330307	Durbin-Watson stat	<b>2.495905</b>
Prob(F-statistic)	<b>0.000000</b>		

Table 4.1 - The main regression

What we can see here is that there are three industries for which the VAIC™ could have a significant effect on the dependent variable, the market value of the company. We will therefore conduct explicit regressions on these industries using the three components of the VAIC™ as the independent variables. We will conduct a deeper and more rigid analysis, as well as economic interpretation of the regression (Table 4.1.) in chapter 5.

### 4.3.3 Testing the VAIC™ regression

#### Redundant Fixed Effects

This test is used to check if it is applicable to use a pooled sample. The three different tests shows p-values lower than 1%, which indicates that the pooled sample model cannot be used (Brooks, 2008).

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section and period fixed effects			
Effects Test	Statistic	d.f.	Prob.
<b>Cross-section F</b>	<b>1.558160</b>	<b>-87,513</b>	<b>0.0020</b>
Cross-section Chi-square	144.438761	87	0.0001
<b>Period F</b>	<b>57.303388</b>	<b>-6,513</b>	<b>0.0000</b>
Period Chi-square	315.978678	6	0.0000
<b>Cross-Section/Period F</b>	<b>5.177188</b>	<b>-93,513</b>	<b>0.0000</b>
Cross-Section/Period Chi-square	407.756650	93	0.0000

Table 4.2 – Redundant Fixed Effects Tests

#### Hausman test

In order to show the validity of the random model, the usage of Hausman test is recommended (Brooks, 2008). The Hausman test shows that the p-value is less than 5%, which indicates that for our regression the random effect model is not appropriate (Brooks, 2008).

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
<b>Cross-section random</b>	<b>19.841007</b>	<b>9</b>	<b>0.0189</b>

Table 4.3 – Hausman Test

Based on these two tests we will use the fixed effect model for our regression. We use what Brooks (2008) refers to as a ‘two-way error component model’, which is fixed in cross-section and time period. This lets the value of Y vary over both time and company (Brooks, 2008).

#### The Adjusted R-squared and the goodness of fit

The Adjusted  $R^2$  is at an acceptable level of 41.8%. This tells us that 41.8% of the change in market value can be explained by the model. This is obviously a rather low explanatory rate, but the model still gives us the indication that we are looking for, i.e. which industry that the VAIC™ has significance explaining changes in market value.

#### Normal distribution and the Jarque-Bera-test

The Jarque-Bera test shows that we should reject the null hypothesis (described in the methodology chapter), which means that we cannot statistically prove that we have normality in the sample. Looking at the skewness and kurtosis we could see that the tail is thicker than what is considered to be normal for the distribution. There are ways to adjust for this absence of normality. One could use the plot function to see where the outliers are and create dummies to remove the outlying residuals. This method has received a lot of critic due to the trade-offs it induces (Brooks, 2008). By removing the outliers in the sample, the normality increases but at the same the critics argue that the procedure means that you change the model, it becomes a way of polishing the model, making it look better than it is. This will increase the R-square, making the fit better. (Brooks, 2008) We have done this by adding three dummy variables and thereby removed the three biggest outliers, as shown in Exhibit 4.2. The normality was improved, but as we see it, the trade-offs by doing this are too great, having increased the Adjusted R-square from 0.417 to 0.540. The goodness of fit, i.e. the Adjusted  $R^2$ , has increased remarkably by removing the effects of three outliers, which makes us confident that a larger sample would show normality. In this case we

choose not to use the equation with the dummies, we would rather accept to reject the null hypothesis and show the unpolished model rather than the alternative Exhibit 4.3.

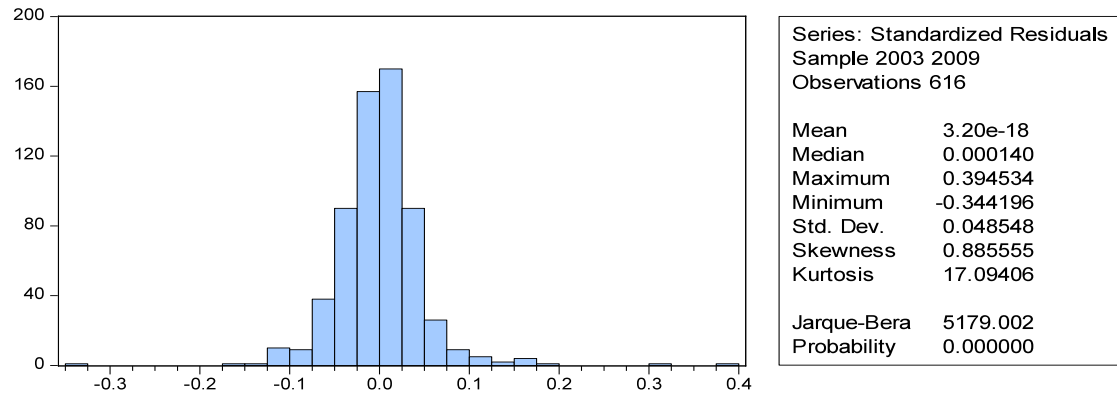


Exhibit 4.2 – Normal Distribution

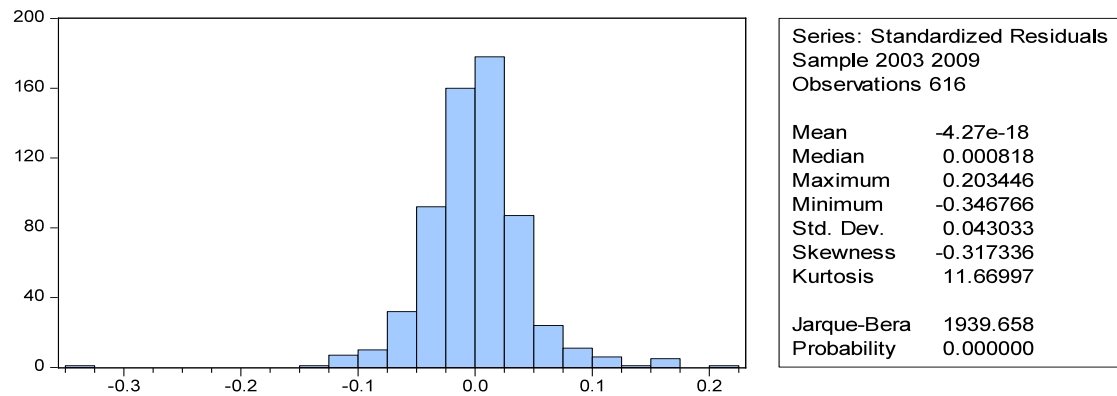


Exhibit 4.3 – Normal Distribution adjusted using three dummies (Polished version)

#### Autocorrelation and Durbin-Watson-test

As discussed in the method chapter the null hypothesis for autocorrelation is that there is no autocorrelation in the statistic. To test this we look at the Durbin-Watson-statistics, which is 2.4959, this means that we cannot reject the null hypothesis and therefore we find no indication that there is autocorrelation in the statistic.

#### F-test & Prob(F-statistics)

By controlling for the p-value of the f-statistic we can see that the null hypothesis will be rejected and that we could statistically establish that at least one of the coefficients is different from zero.

### 4.4 The industry specific VAIC™-components regressions

Based on the multivariate regression above we have been able to single out three different industries, for which the VAIC™-coefficients show indications of being significant when using it to explain the changes in market value. These industries are

Energy, IT, and Retail; this finding and its implications will be further discussed in the analysis chapter. We will continue this chapter by disclosing the statistics for the regressions that we have performed on the three industries. The regression formula used for each industry is

$$\Delta mv = \beta * SCE + \beta * HCE + \beta * CEE$$

We refer back to the method and theory chapters in order for the reader to derive the calculations for HCE, SCE, and CEE.

#### 4.4.1 The Energy industry

##### Redundant Fixed Effects Tests

The Redundant Fixed Effects Tests show p-values over 5% over the 3 different tests indicating that a pooled sample could be used (Brooks, 2008). We have therefore chosen to use a panel data model with a pooled sample.

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section and period fixed effects			
Effects Test	Statistic	d.f.	Prob.
<b>Cross-section F</b>	<b>4.026619</b>	<b>-2,9</b>	<b>0.0564</b>
Cross-section Chi-square	13.421426	2	0.0012
<b>Period F</b>	<b>0.376117</b>	<b>-6,9</b>	<b>0.8767</b>
Period Chi-square	4.698525	6	0.5830
<b>Cross-Section/Period F</b>	<b>1.588602</b>	<b>-8,9</b>	<b>0.2521</b>
Cross-Section/Period Chi-square	18.490375	8	0.0178

Table 4.4 – Redundant Fixed Effects Tests

##### Regression for the Energy industry

Dependent Variable: MV				
Method: Panel Least Squares				
Date: 05/18/10 Time: 21:10				
Sample: 2003 2009				
Periods included: 7				
Cross-sections included: 3				
Total panel (balanced) observations: 21				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.158419	0.058007	-2.731010	0.0142

<b>SCE</b>	<b>-0.071439</b>	<b>0.015531</b>	<b>-4.599733</b>	<b>0.0003</b>
HCE	0.021572	0.004900	4.402640	0.0004
CEE	-0.066708	0.060600	-1.100782	0.2863
R-squared	0.603623	Mean dependent var	-	0.149786
Adjusted R-squared	<b>0.533674</b>	S.D. dependent var		0.151303
S.E. of regression	0.103322	Akaike info criterion	-	1.532293
Sum squared resid	0.181482	Schwarz criterion	-	1.333336
Log likelihood	20.08908	Hannan-Quinn criter.	-	1.489114
F-statistic	8.629478	Durbin-Watson stat	<b>0.680013</b>	
Prob(F-statistic)	<b>0.001057</b>			

Table 4.5 – The regression for the Energy Industry

**The Adjusted R-squared and the goodness of fit**

The Adjusted R<sup>2</sup> is at a level of 53.37%. This tells us that 53.37% of the change in market value can be explained by the model.

**Normal distribution and the Jarque-Bera test**

First of all we need to emphasize that the sample is very small with only three companies and a total of 21 observations. The Jarque-Bera test indicates that we do not reject the null hypothesis and support that there is normality in the distribution.

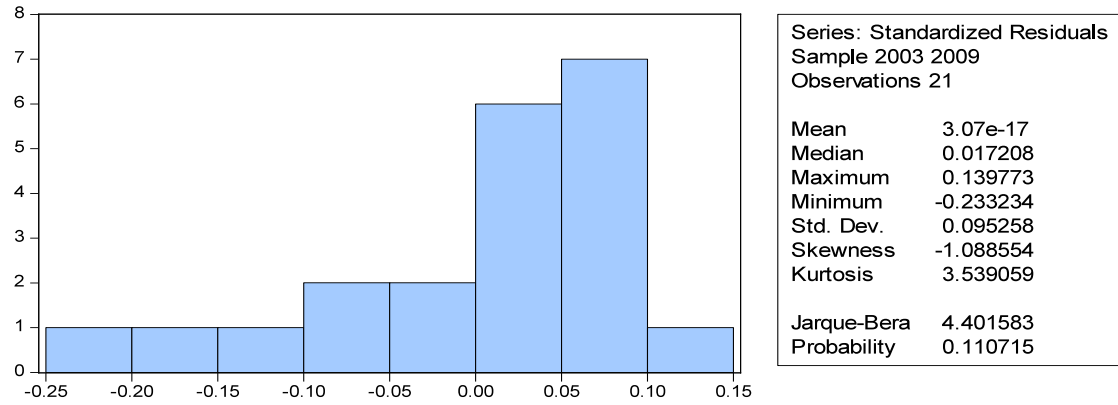


Exhibit 4.4 – Normal distribution

**Autocorrelation and the Durbin-Watson-test**

In this regression with a Durbin-Watson statistic of 0.68 ( $d_U = 1.02$ ), we need to reject the null hypothesis, indicating that there is some kind of relationship between the residuals (Brooks, 2008; Stanford.edu). Brooks (2008) states that testing and correcting for autocorrelation in cross-sectional data is far more complex than in a



pure time series study. He states that a potential solution could be to insert lags to the variables in the model, being non-econometrics experts we acknowledge our limitations and leave this as it is. There are consequences of ignoring autocorrelation, according to Brooks the coefficients are still unbiased but inefficient, which means that the standard deviation could be wrong. We have a problem of positive autocorrelation, which means that the errors will be biased downwards relative to the true standard errors (Brooks, 2008).

**F-test and Prob(F-statistics)**

By controlling for the p-value of the f-statistic we can see that the null hypothesis will be rejected and that we could statistically establish that at least one of the coefficients are different from zero.

**4.4.2 The IT Industry**

As in the previous regression we started by performing the Redundant Fixed Effects Tests (shown in Table 4.6). The p-values all indicate a 5% significance, which has the implication that we cannot use a pooled sample for the data (Brooks, 2008). We then made the Hausman test, which tests correlated random effects of the sample using a cross-section random model, see Table 4.6. The p-value is greater than 5%, which means that the random model is appropriate for the sample (Brooks, 2008).

<b>Redundant Fixed Effects Tests</b>			
Equation: Untitled			
Test cross-section and period fixed effects			
Effects Test	Statistic	d.f.	Prob.
<b>Cross-section F</b>	<b>174.380620</b>	<b>-7,38</b>	<b>0.0000</b>
Cross-section Chi-square	192.512113	7	0.0000
<b>Period F</b>	<b>2.829844</b>	<b>-6,38</b>	<b>0.0224</b>
Period Chi-square	20.315144	6	0.0024
<b>Cross-Section/Period F</b>	<b>95.830437</b>	<b>-13,38</b>	<b>0.0000</b>
Cross-Section/Period Chi-square	193.599460	13	0.0000

Table 4.6 – The Redundant Fixed Effects Test

<b>Correlated Random Effects - Hausman Test</b>			
Equation: Untitled			
Test cross-section random effects			

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
<b>Cross-section random</b>	<b>1.755946</b>	<b>3</b>	<b>0.6246</b>

Table 4.7 – The Hausman test

### The equation for the regression

$$\Delta mv = \beta * SCE + \beta * HCE + \beta * CEE + [CX = R]$$

(CX=R) is the variable that EViews automatically inserts in order to make the cross-section random.

### Regression for the IT industry

Dependent Variable: MV				
Method: Panel EGLS (Cross-section random effects)				
Date: 05/18/10 Time: 22:44				
Sample: 2003 2009				
Periods included: 7				
Cross-sections included: 8				
Total panel (unbalanced) observations: 55				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.053643	0.123706	-0.433637	0.6664
SCE	-0.000276	0.002785	-0.099174	0.9214
<b>HCE</b>	<b>0.123850</b>	<b>0.034357</b>	<b>3.604842</b>	<b>0.0007</b>
CEE	0.000777	0.001210	0.642552	0.5234
Effects Specification				
			S.D.	Rho
Cross-section random			0.348074	0.9690
Idiosyncratic random			0.062208	0.0310
Weighted Statistics				
R-squared	0.239877	Mean dependent var		-
Adjusted R-squared	<b>0.195163</b>	S.D. dependent var		0.068421
S.E. of regression	0.061379	Sum squared resid		0.192139
F-statistic	5.364789	Durbin-Watson stat		<b>1.177259</b>
Prob(F-statistic)	<b>0.002745</b>			
Unweighted Statistics				
R-squared	0.145918	Mean dependent var		-
		var		0.084875

Sum squared resid	4.968321	Durbin-Watson stat	0.045528
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Table 4.8 – The IT regression

### The Adjusted r-squared and the goodness of fit

The Adjusted  $R^2$  is at a level of 19.52%. This tells us that 19.52% of the change in market value can be explained by the model.

### Normal distribution and the Jarque-Bera test

By conducting the Jarque-Bera test we see that the sample lacks the characteristics of a normally distributed sample. The low p-value tells us that the null hypothesis should be rejected, implicating that there is a lack of normality. We can see in the distribution in Exhibit 4.5 that there is a problem in the outliers. This could, as discussed before, be adjusted for using dummy variables, but the sample has only 55 observations, and we see no point in using dummy variables to artificially enhance the model.

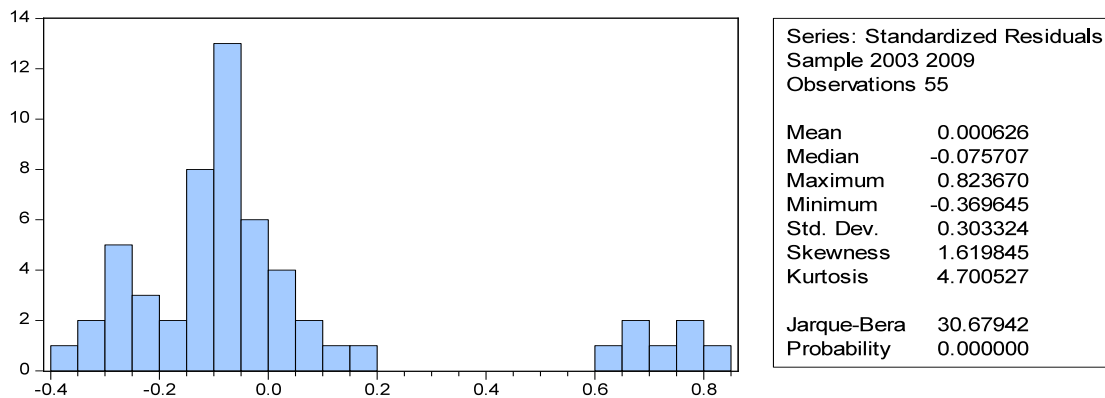


Exhibit 4.5 - Normal distribution

### Autocorrelation & the Durbin-Watson-test

The DW statistic is 1.177, which is lower than  $d_L$  1.45 (Stanford.edu), which means that we cannot exclude the possibility for autocorrelation in the regression and the implications connected with this have been addressed in the energy industry regression discussion above.

### F-test & Prob(F-statistics)

By controlling for the p-value of the f-statistic we can see that the null hypothesis will be rejected and that we could statistically establish that at least one of the coefficients are different from zero.

#### 4.4.3 The Retail Industry

Following the same pattern, we initially conduct the Redundant Fixed Effects Test, Table 4.9. Being consistent with our previous methods we proceed by checking the p-value of the Hausman test, Table 4.10. These tests help us to make the conclusion that the random model is the most appropriate model.

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section and period fixed effects			
Effects Test	Statistic	d.f.	Prob.
<b>Cross-section F</b>	<b>77.079986</b>	<b>-9,51</b>	<b>0.0000</b>
Cross-section Chi-square	187.682776	9	0.0000
<b>Period F</b>	<b>1.920227</b>	<b>-6,51</b>	<b>0.0953</b>
Period Chi-square	14.257784	6	0.0269
<b>Cross-Section/Period F</b>	<b>47.765293</b>	<b>-15,51</b>	<b>0.0000</b>
Cross-Section/Period Chi-square	189.790020	15	0.0000

Table 4.9 – The Redundant Fixed Effects Test

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.385161	3	<b>0.4964</b>

Table 4.10 – The Hausman test

#### The equation for the regression

$$\Delta mv = \beta * SCE + \beta * HCE + \beta * CEE + [CX = R]$$

(CX=R) is the variable that EViews automatically insert in order to make the cross-section random.

#### Regression for the Retail industry

Dependent Variable: MV	
Method: Panel EGLS (Cross-section random effects)	
Date: 05/18/10 Time: 23:22	
Sample: 2003 2009	
Periods included: 7	
Cross-sections included: 10	
Total panel (balanced) observations: 70	

Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.015652	0.079956	-0.195756	0.8454
SCE	-0.001206	0.002074	-0.581224	0.5631
HCE	0.021852	0.035012	0.624131	0.5347
<b>CEE</b>	<b>-0.022911</b>	<b>0.007164</b>	<b>-3.198194</b>	<b>0.0021</b>
Effects Specification				
			S.D.	Rho
Cross-section random			0.251095	0.9227
Idiosyncratic random			0.072655	0.0773
Weighted Statistics				
R-squared	0.167577	Mean dependent var		-
Adjusted R-squared	<b>0.129740</b>	S.D. dependent var		0.077519
S.E. of regression	0.072316	Sum squared resid		0.345152
F-statistic	4.428869	Durbin-Watson stat		<b>0.841371</b>
Prob(F-statistic)	<b>0.006744</b>			
Unweighted Statistics				
R-squared	0.036205	Mean dependent var		-
Sum squared resid	4.031683	Durbin-Watson stat		0.072030

Table 4.11 – The Retail regression

### The Adjusted R-squared and the goodness of fit

The Adjusted  $R^2$  is at a level of 12.97%. This tells us that 12.97% of the change in market value can be explained by the model.

### Normal distribution and the Jarque-Bera test

This sample has the problem of showing indications of lack of normality, however we argue that like the prior model this is mainly due to the small sample size.

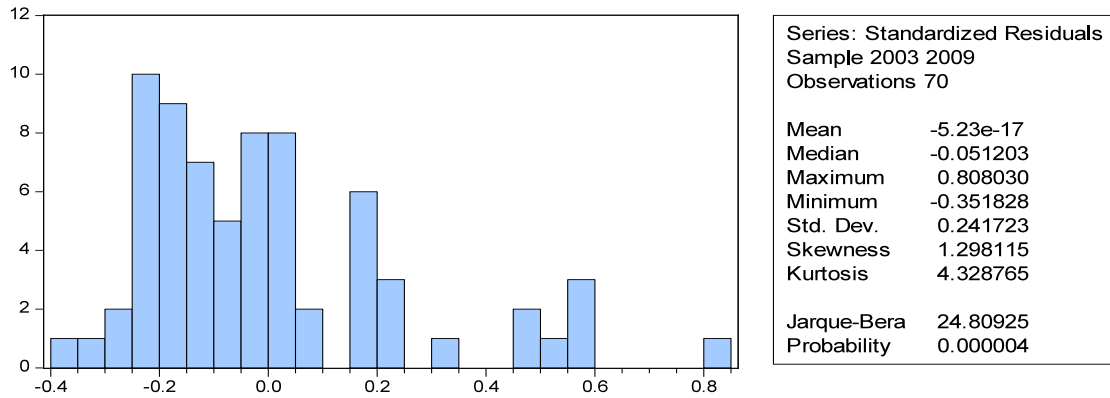


Exhibit 4.6 – Normal distribution

### Autocorrelation & the Durbin-Watson-test

Similar to the two other industry specific regressions, the DW shows signs of autocorrelation. The DW statistic is 0.84, which is lower than  $d_L$  1.52 (Stanford.edu).

### F-test & Prob(F-statistics)

By controlling for the p-value of the f-statistic we can see that the null hypothesis will be rejected and that we could statistically establish that at least one of the coefficients are different from zero.

## 4.5 Overall regression discussion and limitations

When doing a panel data multivariate regression, the alternative to use the White-test disappears. This means that we have not been able to test the models for heteroscedasticity. When there is heteroscedasticity in a model it means that there is no longer minimum variance among the independent variables. The coefficients are still unbiased but the standard deviation could be wrong, which can result in a misinterpretation when making the conclusions (Brooks, 2008). We have made the active decision to not adjust for some statistical issues that we have been confronted with. We argue that these adjustments are out of the scope of this thesis, on the basis of our prior knowledge. We have the opinion, based on presented statistical theory, that these issues will not have any major implications for the interpretation of the statistics. We have chosen to have full disclosure in order to keep the validity and reliability in our thesis and let the readers make up their mind regarding the acceptance of the results from a statistical point of view.

## 5. Analysis

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*In this chapter we will analyze the data from the empirics chapter, and we will use the theoretical framework as a bases. The analyses focus on the results of the regressions, and we will make economic interpretations and have discussions based on these results.*

---

As mentioned earlier in the thesis, we believe that IC affects all industries' market values. Thus, in a regression analysis, IC, measured as VAIC™, as an independent variable should show significance in affecting market value. How much this effect would be could be debated, the theory chapter discussed the limitations of the VAIC™ as an external measurement method of IC. However, the regressions from Chapter 4 showed that the VAIC™ did not affect all industries' market values significantly. Despite these results, and the limitations of the VAIC™, we still believe that it fits the objective and purpose of the thesis, as IC awareness still is at a growing stage, both when it comes to measuring and disclosing it. Also, since no better method for external IC measurement exists, we accept VAIC™ as a sufficient measure of IC and method for drawing conclusions about the connection between IC and market value. As a reminder, the purpose of this thesis is to indentify which industry / industries that should become path makers in the disclosure of intellectual capital to the financial markets. In order to pursue this purpose, we need to single out how the different VAIC™ elements statistically affect the market values of each industry, and then take it one step further carrying out an analytical discussions about it, to understand why some industries are affected more than others. These discussions will involve assumptions that are our own, which we will connect to the theoretical framework.

### 5.1 Analysis of the entire sample

We begin by analyzing the entire sample to get a general view of how the VAIC™ has influenced the different industries' market values. For the descriptive statistics, we have chosen the periods 2003-2006 and 2006-2009 to see how the VAIC™ and its components have changed over the mentioned time periods. The motif behind the chosen time periods is simply that we believe that if any major changes are due within an industry, such as technological shifts or structural renewals, these will take time to

produce any significant effects, why we believe that three year periods are sufficient to see such changes. The blue arrows on the right in the graphs of the descriptive statistics are indicators for changes in mean Value Added in the between 2003-2006 and 2006-2009, read from the left. Thus, in Exhibit 5.1, between 2003-2006, mean VA increased for the entire sample, while in 2006-2009, it was rather unchanged.

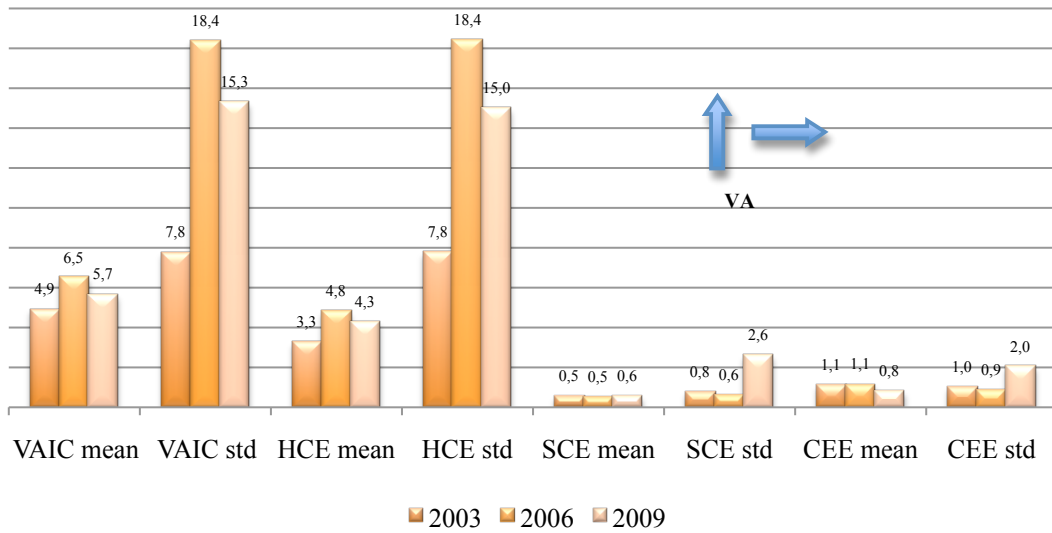


Exhibit 5.1 - Total sample descriptives

The VAIC<sup>TM</sup>-regression is summarized in Table 5.1. The three industries in bold (Energy, IT, and Retail) are the industries where the VAIC<sup>TM</sup> variable had an influence on the market value of the company that could be statistically established with a 5% confidence interval.

Dependent Variable:	Market Value	
<i>Variable:</i>	<i>Coefficient:</i>	<i>Prob.</i>
Intercept (C)	0.013582	0.000
VAIC <sup>TM</sup> Telecom industry	0.004768	0.1222
VAIC <sup>TM</sup> Consumables industry	0.009709	0.5688
<b>VAIC<sup>TM</sup> Energy industry***</b>	<b>0.030420</b>	<b>0.0000</b>
VAIC <sup>TM</sup> Financial industry	-0.000668	0.7446
VAIC <sup>TM</sup> Health care industry	-0.001987	0.6353
VAIC <sup>TM</sup> Industrial industry	0.028901	0.3164
<b>VAIC<sup>TM</sup> IT industry***</b>	<b>0.027037</b>	<b>0.0000</b>
VAIC <sup>TM</sup> Material industry	-0.001176	0.9731
<b>VAIC<sup>TM</sup> Retail industry***</b>	<b>0.061952</b>	<b>0.0264</b>
	Adjusted R <sup>2</sup> = 41.79%	Prob(F-stat) = 0.0000

\*\*\* Variable with significance at a 5% confidence level



Table 5.1 – VAIC™ regression summary

Based on our theoretical discussions about IC and knowledge, we would expect, for example, the Health care industry to be a good representative of a collection of knowledge companies, where IC would have a statistical significance in explaining its change in market value. However, according to Table 5.1, there is no statistical significance. This may depend on a number of reasons, the very first that comes to mind is that there are, as mentioned, a vast number of explanatory variables that affect market value. Secondly, as the VAIC™ does not contain all IC measures, for example R&D costs / investments, which we believe are rather large in the Health care industry, the lack of significance might be due to the shortcomings of the VAIC™. The VAIC™ might thus be an insufficient measure for explaining Health care industry market value changes that relate to IC, mainly because it does not take such IC-elements into consideration, mainly since there are difficulties in quantifying them, with the current disclosure standards.

However, the regression shows that there are three industries where we can see clear indications of significance using the VAIC™ measure as an explanatory variable for the changes in market value. The industries are Energy, IT, and Retail, and the question arises what is it in these specific industries that makes the VAIC™ variable significant. Starting with the Energy industry, we see in Table 5.1 that the explanatory coefficient is 3%, which indicates that, all things equal, a 1% change in the VAIC™ would lead to a 0.03% increase in the market value of the company. We find it interesting that the Energy industry showed significance when having in mind that EnBW, the German energy company discussed in the theory chapter, is one of the companies that have adopted the ICS in their annual report.

Our regression indicates that 2.7% of the change in market value of the IT Industry could be explained by the VAIC™. IT is, intuitively, an industry to which the core competency of the employees is of great importance. A clear indication of this is that the industry is acquisition heavy, and the main outspoken reason for these acquisitions is that the purchasing company wants to get access to the competency of the personnel, i.e. the human capital of the acquired company. In the words by a tycoon in the IT industry:

*“The people who are doing the work are the moving force behind the Macintosh. My job is to create a space for them, to clear out the rest of the organization and keep it at bay.”*

Steve Jobs , CEO of Apple Inc.  
(woopidoo.com)

In other words, the Human Capital of the IT industry will most likely be of importance in the eyes of the financial market.

The VAIC™ coefficient for the Retail industry is 6.2%, which is more than twice the coefficient for each of the other two industries. The Retail industry is characterized as being personnel dependent, having employee costs as one of the major cost items. We have discussed the limitations of the VAIC™ model in the theory chapter, when it comes to Human Capital it measures it as being the cost of employees. The definition is based on that the level of expertise is measured by total cost of personnel. It is questionable to think that the cost of employees constitutes a valid benchmark for the level Human Capital in a company within the retail industry. Hence, therefore it is hard to predict how the VAIC™ definition of HC will affect the market value. Capital employed could also be of great importance having in mind that stock and inventories constitute a significant part of the working capital and capital employed. Another characteristic typical for the Retail industry is its high personnel turnover, which means that it is of great importance for a company to have the right procedures and structure to enable the organization to become less dependent on the knowledge of the individual employee and instead have a high organizational knowledge. This should, at least in theory, be one of the main foci of the internal work with Structural Capital and organizational development. Our intuitive belief is that Structural Capital is the factor which is of greatest importance for the retail industry, high personnel cost combined with high personnel turnover will most likely make it important for a company to leverage and focus on the multiplying effect of the Structural Capital. The question is though if the way the VAIC™ components are calculated will capture this. One could easily see that there are clear and important elements in the industry characteristics, which the components of the VAIC™ captures. It is therefore not a

surprise that the Retail industry is one of the industries where the VAICT™ showed signs of being significance.

What is it then that separates the Energy, IT, and Retail industry from other industries where the VAICT™ did not show significance? To answer this, it is important to keep in mind that we are not directly measuring the impact of IC, but that of the VAICT™. We will therefore further break down the VAICT™ and analyze its different components of each industry, which showed statistical significance in our regression.

### 5.2 Analysis of the Energy industry

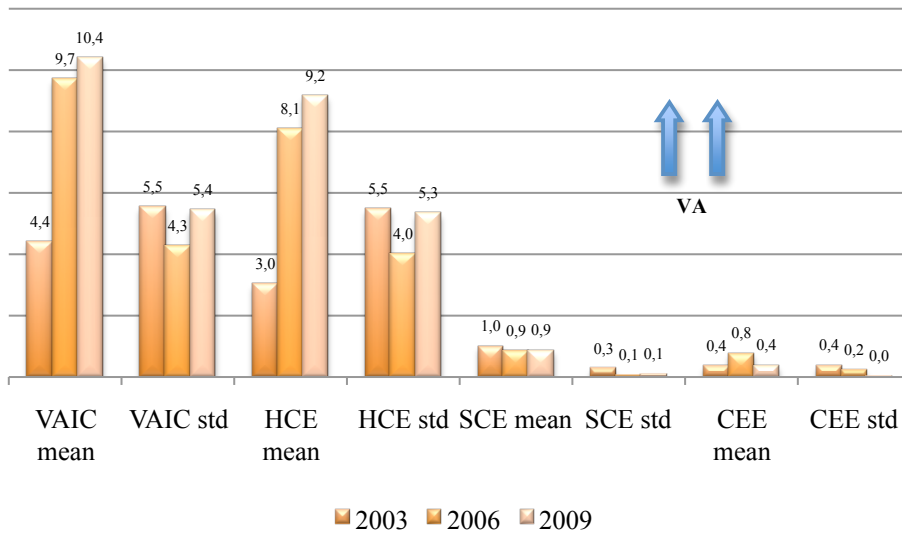


Exhibit 5.2 - Energy industry descriptives

Intuitively the Energy industry is characterized as being asset heavy, having a great need for large long-term investments and we therefore believe that it is likely that CEE will be of significance. Competent personnel are of course of great importance, but we do not predict personnel costs as being of the same importance in this industry such as in the IT industry. In relation, the Structural Capital should, at least from a theoretical perspective, be of greater importance.

Dependent Variable:	Market Value	
Variable:	Coefficient:	Prob.
Intercept (C)	-0.158419	0.0142
SCE	<b>-0.071439</b>	<b>0.0003</b>

<b>HCE</b>	<b>0.021572</b>	<b>0.0004</b>
CEE	-0.066708	0.2863
	Adjusted R <sup>2</sup> = 53.37%	Prob(F-statistic) = 0.001057

Table 5.2 - Regression analysis of the Energy Industry

The regression analysis tells us that two of the components of the VAIC™, Structural Capital Efficiency and Human Capital Efficiency, show indications of being statistically significant for the change of market value in the Energy industry. SCE has a negative coefficient meaning that a one per cent change in the SCE will give a 0.071% opposite change in the market value of the company. This could seem somewhat paradox, that a positive change in SCE would generate a lower market value. In order to shed some light on how this could occur we need to derive what generates a change in SCE. It will either occur due to Structural Capital growing stronger compared to Value Added, in other words, HC is decreasing, ceteris paribus, and thus SC's leveraging effect is mitigated or it could be that Value Added is declining. However, looking at Exhibit 5.2, we see that neither mean VA, nor mean HCE have decreased over the period. Based on this argumentation the only theoretical reason for this behavior is that the increase in SCE has been due to a reduced Value Added, which in turn the financial markets perceive as negative.

The HCE is statistically significant in the model, with a positive coefficient, giving us an indication that the financial markets perceives Human Capital as important to the industry and the value creation within it. This result is somewhat surprising, but it might be that the market sees an increase in HCE as an indication to that the company has improved their processes, for example a higher Value Added given the same Human Capital which generates a higher Structural Capital as well. The combined effect will be positive in the long-term.

### 5.3 Analysis of the IT industry

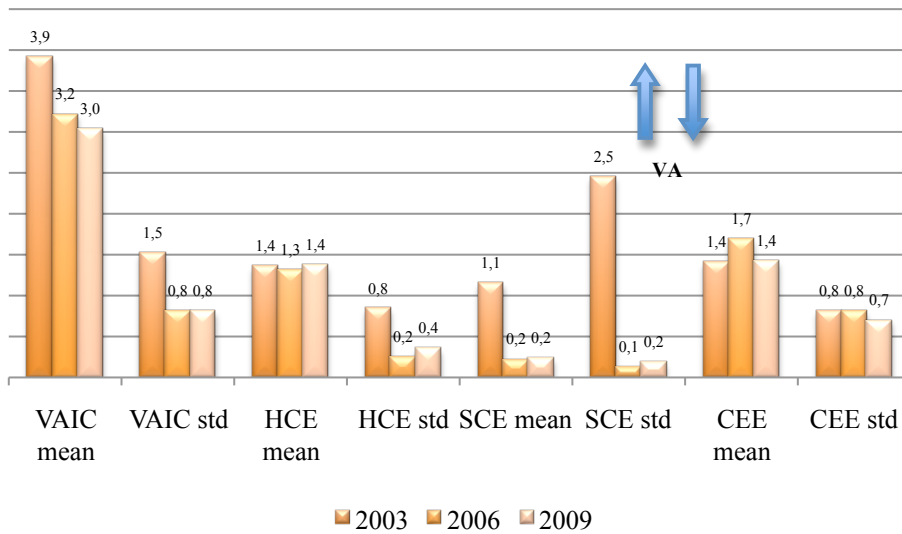


Exhibit 5.3 - IT industry descriptives

We performed a regression analysis to statistically derive which of the components that the financial market considers being more important. The summary of the regression analysis is presented in Table 5.3.

Dependent Variable:	Market Value	
Variable:	Coefficient:	Prob.
Intercept (C)	-0.053643	0.6664
SCE	-0.000276	0.9214
<b>HCE</b>	<b>0.123850</b>	<b>0.0007</b>
CEE	0.000777	0.5234
	Adjusted R <sup>2</sup> = 19.51%	Prob(F-statistic) = 0.002745

Table 5.3 - Regression analysis of the IT-industry

The regression in Table 5.3 indicates that our prediction was correct and the only variable which indicates statistical significance is the Human Capital Efficiency. The variable has a positive explanatory coefficient meaning that an increase in HCE tends to lead to an increased market value. In other words, if the company will be able to increase the Value Added per employee this will most likely generate a positive response from the financial market. As discussed above, the personnel cost is one of the major cost items but also one of the most important assets for this industry, this is a reflection that the regression supports. We believe that using personnel costs as a measure for HC is more applicable for the IT industry compared to the Retail

industry. The transaction costs for changing company in the IT industry is higher than in the Retail, which means that the companies are more willing to pay higher salaries in order to retain important personnel, hence cost of personnel makes a better benchmark.

### 5.4 Analysis of the Retail industry

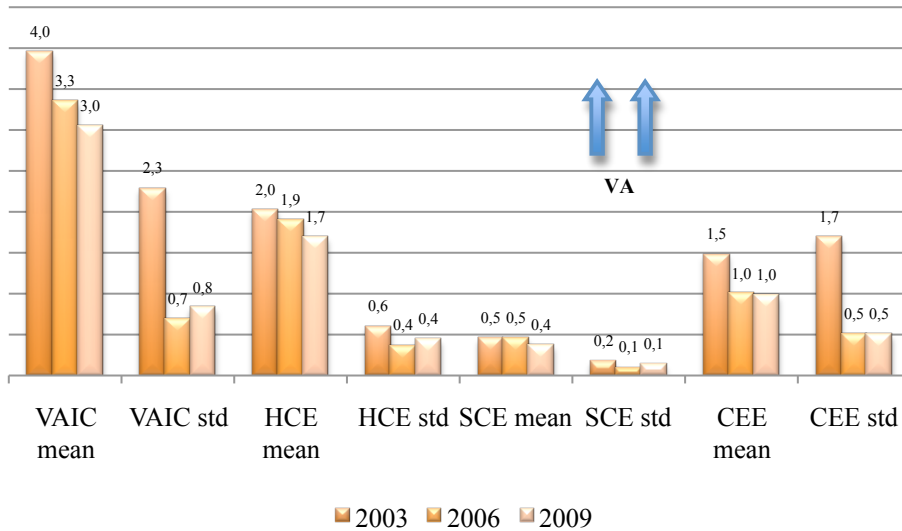


Exhibit 5.4 - Retail industry descriptives

We performed a regression analysis to statistically derive which of the components that the financial market considers being more important. The summary of the regression analysis is presented in Table 5.4.

Dependent Variable:	Market Value	
Variable:	Coefficient:	Prob.
Intercept (C)	-0.015652	0.8454
SCE	-0.001206	0.5631
HCE	0.021852	0.5347
<b>CEE</b>	<b>-0.022911</b>	<b>0.0021</b>
	Adjusted R <sup>2</sup> = 12.97%	Prob(F-statistic) = 0.006744

Table 5.4 - Regression analysis of the IT-industry

The regression analysis shows that it is only one of the three components that is significant, the Capital Employed Efficiency. The coefficient of -0.022911 means that a one per cent change in the CEE will have an opposite effect of 0.022911%, or that 2.23% of the change in market value is explained by the opposite development in

CEE. How could we then interpret this result? Thinking of the discussion above this result is unexpected. One would think that the market would react positively to an increasing CEE, which means that the financial performance of the company has developed faster than the capital employed, i.e. the company gets higher value added per capital employed, than earlier. There are two possible reasons to why CEE would increase, either that Value Added increases relative to CE, or that the CE decreases relative to VA. In theory, both changes should be perceived as something positive by the financial market, however there might also be other, larger influencing factors that might dilute this effect, as mentioned earlier. However, we see it as rather peculiar that CEE actually has a statistically negative effect on market value.

### **5.5 Remarks about limitations of the analyses**

It would seem a bit contradictive and hard to understand that for example the VAIC<sup>TM</sup> coefficient explained 2.7% of the change in market value in the IT industry and that the HCE, which is a part of the VAIC<sup>TM</sup>, explained roughly 12%. This is a great limitation of the statistical regression model. The comparability between two regressions is slim to none (Brooks, 2008). The regressions have different Adjusted R-squared, i.e. explanatory fitness. A way to make the regressions more similar would have been to use other independent variables as control variables and keep them constant in the two different equations. We have made the active decision not to do this adjustment because the exact explanatory percentage is not of great interest based on the purpose of this thesis. It is important to remember when analyzing the results that some of our models showed signs of non-normality and that we could not statistically prove to disregard the risk for autocorrelation in some of the models, see chapter 4 for more details. We do not aim to use the VAIC<sup>TM</sup> or its components as a forecasting tool for future market value changes, that some of the prior research have done, or try to create a theory which component that is of greatest importance. Instead we want to find indications of the industries and we have therefore chosen to focus just on the variables discussed. The implications of this is that we cannot be completely certain about the results, but we believe that this statistical question mark will not be problematic for the purpose of this thesis.

## 6. Conclusion and key take-aways

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*In the final chapter we will discuss our conclusions from our analysis and compare it to other studies. We will also discuss how the Intellectual Capital disclosure could develop so that the VAIC™ could become more precise. We will further present our 'research journey', what we have learned, suggestions for future research, and finally summarize the thesis with key take-aways.*

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As stated early on in the thesis, a company cannot, in order to be competitive, solely rely on its size or its competencies, it needs to be able to adjust to the changing environment, i.e. become resilient and adaptive. The theory of Intellectual Capital has many purposes and based on its implementation, it could serve both as a way of measure development internally as well as being a tool to enhance a company's focus on the future. As we have discussed, the value of a company, i.e. the market value, depends a great deal on the expectations that the market have about the company, at least over shorter time periods. We therefore argue that it is in the interest of companies, financial markets, and finally the overall economy that companies would disclose more information about what will happen in the future, how the company works with development, and plans to meet challenges. We argue that IC measurements can partially satisfy this interest. More disclosure means less uncertainty, which in turn reduces the risk premium of the company, increasing its value, at least in theory, which increases shareholder wealth, a general goal for all companies. Also, disclosing IC information would put pressure on management from the investor community, and other stakeholders, to manage its IC in a value-creating way, which in turn would benefit companies, in a long-term perspective.

There are today few indicators that help an external stakeholder to measure or even estimate a company's IC development. We have in this thesis used the VAIC™ as a correct measurement method for IC in companies, despite its limitations. The purpose of this thesis has been to analyze, based on the financial markets' reaction to the present IC disclosure, which industry that should become the pioneers in extensive IC disclosure.



## **6.1 Main results and discussion**

We have conducted a regression analysis in order to establish which industry / industries that should take on the role as a groundbreaker in IC disclosure. The industries that we have identified as the ones that should become the pioneers are the Energy, IT, and Retail industry. These are industries where we have found indications of a statistical relationship between the changes in VAIC™ and the changes in market value. We also investigated these industries more thoroughly in order to see what component(s) of the VAIC™ that showed signs of a statistical relationship with market values. We found that for the Energy industry, both Human Capital Efficiency and Structural Capital Efficiency were significant, however the former affected market value positively, whereas the latter affected negatively. For the IT industry, we found that HCE affected market value significantly positively. Finally, the Retail industry showed that the Capital Employed Efficiency significantly affected market value, negatively. To summarize it, we cannot draw any generalizing conclusions about which component that affects market value the most, it is different based on industry.

### **6.1.1 Answers to questions in the problem formulation**

- According to our analysis, the Energy, IT, and Retail industries' market value are affected the most by IC disclosure, as measured by the VAIC™.
- These same industries should also be the most interested in expanding the IC disclosure.
- The industries which would be affected most depends on what form of disclosure that is increased, as different industries show different results in the VAIC™ components regression analysis.
- The reasons might be many to why these industries do not have a higher degree of disclosure, one answer that we find like is however that they are uncertain about what to disclose, and how to disclose it.
- The answer is somewhat similar to the previous one: it is difficult to know what to disclose and how to disclose it, but in addition, companies might believe that their competitive position will be threatened if they expand their disclosure. This belief might in turn be a result of the first reason.

## 6.2 The future of IC disclosure and Intellectual Capital Statements

Our foci in this thesis have been on the external perspective, how the IC disclosure could affect the financial market and other external stakeholders. We argue that there needs to be a difference when it comes to an ICS for internal use and one for external disclosure. Our exhibit below shows our view of how the IC reporting needs to differ in order to make sure that it fulfills its objective.

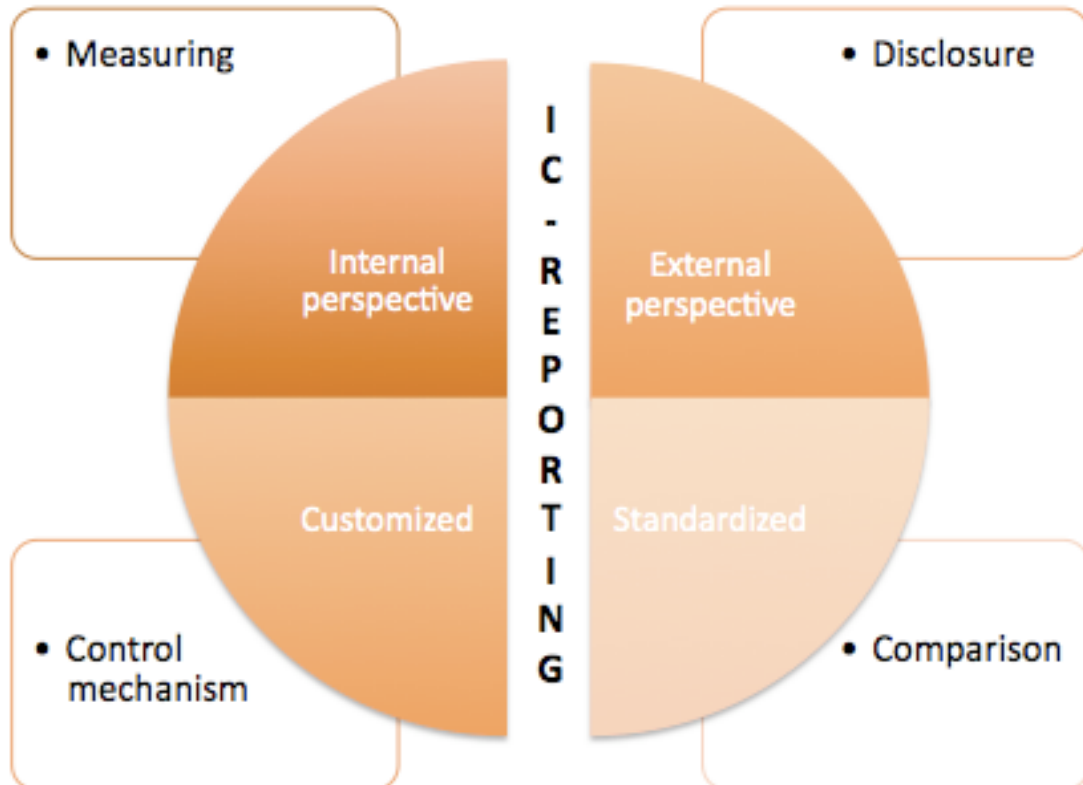


Exhibit 6.1 – Our perspective of the difference of Internal vs. External perspective of IC reporting

In order to establish the difference between both the internal and the external reporting perspectives we need to break them down and define what the purpose of each of them is, respectively. The purpose of the internal perspective of ICS is, from a management point of view, that IC reporting will work ambiguously as both a measuring tool, to analyze progress and development in the area, and simultaneously as a control mechanism for setting goals for the future and giving the organization guidance in daily operations something to work against. In order to fulfill this two-parted objective / purpose, the internal Intellectual Capital Statement needs to be customized for the specific company. EnBW, discussed in the theory chapter, is an

example of how a company has achieved this purpose. The usage of the guidelines of InCas works as a great tool for establishing this ICS from an internal perspective.

If we on the other hand take a look at the external perspective, we see that the purpose is different. The external perspective is addressing the need of the stakeholders outside the company, who, by nature, have less insight into the company. The purpose is therefore for the external ICS to disclose more information to the stakeholders, making the development more holistic, as well as it must fulfill the criteria of being comparable. In order to satisfy these objectives, the external ICS need to be standardized over a market wide level. Again, looking back at the IC-statement of EnBW, it does not say that much to the stakeholders, despite enabling a trend analysis of the company. EnBW do not describe how they have calculated the figures and therefore the ability to fully understand and to compare between different companies disappears, which reduces the value of the statement for the stakeholders. Another problem with having a non-standardized ICS is that IC does not have the same meaning for all companies or industries.

Trying to work towards a solution, the works of EFFAS and WICI are good first steps in reaching a standardized external disclosure. We also agree with WICI, in that there are great difficulties with achieving a worldwide implementation of a standardized framework, without a regulatory support. There is in general an overall anxiety among public companies not to disclose too much information, both to the financial market and that the competitors can use the information in the disadvantage of the company. We believe that there needs to be a financial reason for companies to take initiative by themselves to disclose this kind of information. It is here our paper fills its purpose, studies like this show that there should be an interest among companies to be uncompelled about implementing a more extensive IC disclosure.

### **6.3 Future research**

We have discussed the limitations and drawbacks with our regression analyses in both chapter 4 and 5. For future research we suggest that a larger sample would be of interest, in order to make the analysis more statistically rigid. For example, all European markets could be included or the American markets could be investigated.

Based on the latest 15 years of research within the area of Intellectual Capital we believe that there is a need and a demand for further empirical research, analyzing and mapping how companies manage their IC. We propose that, based on our quantitative report, conduct a qualitative analysis of one of the industries that IC had the greatest affect on (Energy, IT, and Retail) and build an external IC Navigator adjusted for that particular industry, with the help of EFFAS guidelines.

#### **6.4 Our research journey - What have we learned?**

First of all, obviously during the process of writing this thesis our knowledge about Intellectual Capital have increased substantially. We have become fully aware, after having reviewed over 700 annual reports, of the limitations the current external disclosure of Intellectual Capital has. The companies do not disclose much more than they are, by law, obligated, and due to limited disclosure of information the measuring tools become limited in their effectiveness, for example the VAIC™, even though its limitations, discussed throughout the thesis, considered as the best external measurement. We have also learnt about the very opened and helpful IC community, which is getting bigger for each day that passes.

The process itself has also been educating. We started out wanting to conduct a qualitative case study, but when we did not get any case study companies and time were running away from us we decided to change the purpose. The need to be pragmatic and open-minded presented itself, this change of purpose meant that we needed to go back and much of the research made were no longer applicable. Now when the thesis is finalized we feel that this change of purpose have benefited us in many ways: we have thereby gotten a wider knowledge of both the Intellectual Capital theory as well as of the theoretical background of conducting qualitative and quantitative studies, which might help us in our future careers. Also, we believe that the thesis as it ended up contributes more to the academic field of IC than our original thesis would. Thus, we believe that it was a 'win-win situation' in changing the theme.

## 6.5 Key take-aways

Here we present the four most important take-aways from our thesis:

- There are indications of being a statistical significance in explaining market value with the VAIC™ measurement.
- In our opinion the pioneers in extensive IC disclosure in Sweden should be companies from the Energy, IT, and Retail industry. These industries show significance in being affected by the VAIC™ and its components to some extent.
- For the VAIC™ to become better there needs to be an improvement in the disclosing of IC statements and measures, something that WICI is currently working on to develop and implement.
- A separation between internal and external IC-statements is needed, in order to become valuable for its purpose, respectively, something that EFFAS is currently working on.

Thence, this thesis ends with the same quote that launched it:

*”Indeed, the new source of wealth is not material, it is information, knowledge applied to work to create value”*

Walter Winston (Edvinsson & Malone, 1997 p.3)

## Appendix I Sample companies

Sample N=88	Industry		Large Cap (N=44)	Small Cap (N=44)
Industry	Large Cap (N=44)	Mid Cap (N=44)	Finance (N=20)	
Energy (N=3)	<b>Alliance Oil</b> <b>Lundin Petroleum</b>	EnQuest Plc <b>PA Resources</b>	<b>Castellum</b> Faberge <b>Hufvudstaden</b> Industrivärden <b>Investor</b> Kinnevik <b>Latour</b> <b>Lundbergs</b> Melker Schörling <b>Nordea</b> <b>Ratos</b> <b>SEB</b> <b>SHB</b> <b>Swedbank</b>	<b>Atrium Ljungbergs</b> <b>Avanza</b> Brinova <b>Bure Equity</b> East Capital Explorer <b>Fast Partner</b> <b>Heba Fastigheter</b> <b>HQ</b> Klövern <b>Kungsleden</b> Neonet <b>Nordnet</b> Säki <b>Wallenstam</b> Wihlborgs Vostok Nafta Investment <b>Öresund</b>
Material (N=7)	<b>Boliden</b> <b>Holmen</b> Lundin Mining <b>SCA</b> <b>SSAB</b> <b>Stora Enso</b>	<b>Billerud</b> <b>Höganäs</b>		
Industrial (N=27)	ABB Ltd Alfa Laval <b>Assa Abloy</b> <b>Atlas Copco</b> <b>Hexagon</b> NCC <b>SAAB</b> <b>Sandvik</b> <b>Scania</b> <b>Seco Tools</b> <b>Securitas</b> <b>Skanska</b> <b>SKF</b> <b>Trelleborg</b> <b>Volvo</b>	<b>Addtech</b> <b>B&amp;B Tools</b> BE Group <b>Beijer Alma</b> <b>Beijer Electronics</b> <b>Cardo</b> <b>Fagerhult</b> <b>Gunnebo</b> <b>Haldex</b> Hexpol Intrum Justitia ITAB Shop Concept Loomins <b>Munters</b> <b>Nibe</b> Niscayah Group <b>PEAB</b> <b>SAS</b> <b>Sweco</b> Systemair Transcom Worldwide <b>VBG Group</b> ÅF	Telecom (N=3) <b>Millicom</b> <b>Tele2</b> <b>TeliaSonera</b>	<b>H&amp;M</b> Autoliv Inc <b>Electrolux</b> Husqvarna <b>MTG</b>
IT (N=8)	<b>Ericsson</b> <b>Tieto</b>	<b>Axis</b> <b>HiQ International</b> <b>IFS</b> <b>LBI International</b> Net Entertainment <b>Net Insight</b> <b>Orc Software</b> TradeDoubler	Health care (N=8) <b>Astra Zeneca</b> <b>Elekta</b> <b>Getinge</b> <b>Meda</b>	<b>Betsson</b> Björn Borg <b>Clas Ohlson</b> Duni <b>Eniro</b> Hemtex <b>JM</b> KappAhl <b>Mekonomen</b> <b>New Wave Group</b> Nobia Rezidor Hotel Group <b>Skistar</b> Unibet Group
			Consumables (N=2) <b>Axfood</b> Hakon Invest Oriflame Cosmetics <b>Swedish Match</b>	

Companies in **bold** are companies that were included in the sample, the other ones were excluded due to not sufficient disclosure.

## Appendix II: Reference list

### Literature

Arvidsson, Susanne; *Demand and Supply of Information on Intangibles – The Case of Knowledge-Intense Companies*; 2003; Doctoral thesis, Institute of Economic Research, Lund University

Backman, Jarl; *Rapporter och uppsatser*; 1998; Studentlitteratur, Lund

Brooks, Chris; *Introductory Econometrics for Finance*; 2008; Cambridge University Press

Bryman, Alan; Bell, Emma; *Företagsekonomiska forskningsmetoder*; 2005; Liber AB, Slovenien

Bryman, Alan; *Social Research Methods*; 3<sup>rd</sup> edition; 2008; Oxford University Press, New York

Edvinsson, Leif; Malone, Michael S.; *Intellectual Capital: Realizing your Company's True Value by Finding its Hidden Brainpower*; 1997; Harper Collins, New York, NY

Grant, Robert M.; *Contemporary Strategy Analysis*; 6<sup>th</sup> edition; 2008; Blackwell Publishing, Malden

Halvorsen, Knut; *Samhällsvetenskaplig metod*; Tryckning 14; 2006; Studentlitteratur, Lund

Koller, Tim; Goedhart, Marc; Wessels, David; *Measuring and Managing the Value of Companies*; 2005; John Wiley & Sons, Hoboken, N J

Lundahl, Ulf; Skärvad, Per Hugo; *Utredningsmetodik för samhällsvetare och ekonomer*; 2<sup>nd</sup> edition; 1992; Studentlitteratur, Lund.

Patton, Michael Quinn; *Qualitative evaluation and research methods*; 1990; Sage Publications, Newbury Park, CA

Roos, G; Fernström, Lisa; & Pike, Stephen; *Den värdeskapande organisationen – Intellektuellt kapital i praktiken*; 2006; Studentlitteratur, Lund

Stewart, T.A.; *Intellectual capital: The new Wealth of Organization*; 1997; Nicholas Brealy, London.

Strauss, Anselm; Corbin, Juliet; *Basics of qualitative research*; 1990; Sage Publications, Newbury Park, CA

Sveiby, K; *The New Organizational Wealth; Managing and Measuring Knowledge Based Assets*; 1997; Berrett-Koheler, San Fransisco, CA.

Westerlund, Joakim; *Introduktion till Ekonometri*; 2005; Studentlitteratur, Lund.

## Articles

Appuhami, B.A. Ranjith; *The impact of intellectual capital on investors' capital gain on shares: an empirical investigation in Thai banking, finance & insurance sector*; 2007; Journal of internet banking and commerce, Vol. 12, No 1, pp14-25

Barney, Jay B.; *Is the Resource-Based "view" a useful perspective for strategic management research? Yes*; 2001; Academy of Management Review, Vol. 26, No 1, pp44-56

Barney, Jay B.; *Organizational Culture: Can It Be a Source of Sustained Competitive Advantage?*; 1986:no1; The Academy of Management Review, Vol. 11, No 3, pp656-665

Barney, Jay B.; *Strategic Factor Markets: Expectations, Luck, & Business Strategy*; 1986:no2; Management Science, Vol. 24, No 10, pp1231-1241



Barney, Jay B. & Zajac, Edward J.; *Competitive Organizational Behavior: Toward an Organizationally-Based Theory of Competitive Advantage*; 1994; Strategic Management Journal, Vol. 15 Special Issue: Competitive Organizational Behavior (Winter, 1994), pp5-9

Bontis, Nick; *Intellectual capital; an exploratory study that develops measures and models*; 1998; Management Decisions 36/2

Christensen, Clayton M.; Kaufman, Stephen P.; Smith, Willy C; *Innovation Killers - How financial tools destroy your capacity to do new things*; 2008; Harvard Business Review, Vol. 86, No 4, pp129-131.

Dumay, C. John; *Intellectual capital measurement: a critical approach*; 2009; Journal of Intellectual Capital; Vol. 10, No 2, pp190-210

Edvinsson, Leif; *Developing Intellectual Capital at Skandia*; 1997; Long Range Planning, Vol. 30 No 3, pp366-373

Edvinsson, Leif & Sullivan, Patrick; *Developing a Model for Managing Intellectual Capital*; 1996; European Management Journal, Vol. 14, No 4, pp356-364

Firer, S.; Williams, M. S.; *Intellectual Capital and traditional measures of corporate performance*; 2003; Journal of Intellectual Capital; Vol. 4, No 3, pp348-360

Hamel, Gary; Välikangas, Liisa; *The Quest for Resilience*; 2003; Harvard Business Review, September issue

Li, Dong-wie; Wang, Ke-yi; *Empirical study on factors influencing on corporate market value in IT industry based on Skandia Navigator*; 2009; 2009 International Conference on Management Science & Engineering (16<sup>th</sup>), Moscow

Lynn, Bernadette; *Intellectual capital*; 1998; CMA Magazine, Vol. 72, Issue 1, pp10-15

Mouritsen, Jan; Bukh, Per Nikolaj; Marr, Bernard; *Reporting on Intellectual Capital: why, what and how?*; 2004; *Measuring Business Excellence*; Vol. 8, No 1, pp46-54

Nazari, A. J.; Herremans, M. I.; *Extended VAIC model: measuring intellectual capital components*; 2007; *Journal of Intellectual Capital*, Vol. 8, No 4, pp595-605

Powell, Walter W.; Snellman, Kaisa; *The knowledge economy*; 2004; *Annual Review of Sociology*, Vol. 30, pp199-220

Pulic, A.; *VAIC<sup>TM</sup> – an accounting tool for IC management*; 2000; *Int. J. Technology Management*, Vol. 20, No:s 5/6/7/8, pp702-715

Pulic, A.; *Intellectual capital – does it create or destroy value?*; 2004:a; *Measuring business intelligence*, Vol. 8, No 1, pp62-68

Pulic, A.; *Do we know if we create or destroy value?*; 2004:a; *International Journal of Entrepreneurship & Innovation Management*, Vol. 4, No 4, pp1-2,

Pulic, A.; *The Principles of Intellectual Capital Efficiency – A Brief Description*; 2008; [Was given to us by the author himself 2010-05-16]

Stegmann, Juan Pablo; *Strategic Value Management (Chapter 3: Drivers of Capital)*; 2009 [Part of the course literature on BUSM37 Strategic Management, Spring 2010]

Zhang, J.; Zhu, N.; Kong, Y.; *Study on intellectual capital and enterprise's performance – empirical evidence from the Chinese securities market*; 2006; *Journal of modern accounting and auditing*, Vol. 2, No 10, pp35-39

Zéghal, Daniel; Maaloul, Anis; *Analysing value added as an indicator of intellectual capital and its consequences on company performance*; 2010; *Journal of Intellectual Capital*, Vol. 11, No 1, pp39-60

## Theses

Ek, G.; Klang, M.; and Nilsson, M.; *Intellectual Capital's Importance for Corporate Performance*; 2009; Master thesis, Lund University

Berglund, R.; Grönvall, T.; and Johnson, M.; *Intellectual Capital's Leverage on Market Value*"; 2002; Master thesis, Lund University

## Electronic

effas.net; no1

[http://effas.net/index.php?option=com\\_content&view=article&id=50:effas-organisation&catid=34:effas&Itemid=64](http://effas.net/index.php?option=com_content&view=article&id=50:effas-organisation&catid=34:effas&Itemid=64) - visited 2010-05-28

effas.net; no 2

[http://effas.net/index.php/index.php?option=com\\_content&view=article&id=86:wici-world-intellectual-capital-initiative&catid=48:related-institutions&Itemid=68](http://effas.net/index.php/index.php?option=com_content&view=article&id=86:wici-world-intellectual-capital-initiative&catid=48:related-institutions&Itemid=68) - visited 2010-05-28

EnBW Annual Report 2008

[http://www.enbw.com/applikationen/en/investors/annualreport/2008/servicepages/downloads/files/entire\\_enbw\\_ar08.pdf](http://www.enbw.com/applikationen/en/investors/annualreport/2008/servicepages/downloads/files/entire_enbw_ar08.pdf) - visited 2010-05-24

Federal Ministry of Economics and Labor, Germany; 2004; *"Intellectual capital statement – Made in Germany"*

[http://www.akwissensbilanz.org/Infoservice/Infomaterial/Leitfaden\\_english.pdf](http://www.akwissensbilanz.org/Infoservice/Infomaterial/Leitfaden_english.pdf) - visited 2010-05-24

incas-europe.eu; no1

[http://www.incas-europe.eu/index.php?option=com\\_content&view=article&id=3&Itemid=2](http://www.incas-europe.eu/index.php?option=com_content&view=article&id=3&Itemid=2) - visited 2010-05-24

InCas; *"Intellectual Capital Statement – Made in Europe" (InCaS)*;

[http://www.incas-europe.eu/images/stories/InCaS\\_Publishable\\_Guideline.pdf](http://www.incas-europe.eu/images/stories/InCaS_Publishable_Guideline.pdf) - visited 2010-05-24

Standford.edu

<http://www.stanford.edu/~clint/bench/dw05a.htm> - visited 2010-05-24

Unic.net

[http://www.unic.net/bilder/big\\_tree2.jpg](http://www.unic.net/bilder/big_tree2.jpg) - visited 2010-05-30

woopidoo.com

[http://www.woopidoo.com/business\\_quotes/](http://www.woopidoo.com/business_quotes/) - visited 2010-05-23

psych.lse.ac.uk

<http://www.psych.lse.ac.uk/incas/page18/page18.html> - visited 2010-05-30

