

# Design: The driving force behind intangible capital? Case Design Index companies

International Design Business Management (IDBM)

Master's thesis

Anni Harju

2012

## DESIGN: THE DRIVING FORCE BEHIND INTANGIBLE CAPITAL? CASE DESIGN INDEX COMPANIES

Nowadays design is considered as a source of competitive advantage in the business world (e.g. Nyberg & al., 2005; Gemser & al., 2011) and its impact on financial performance has been demonstrated (e.g. Design Council, 2004; Teknikföretagen, 2011). Yet, the underlying connection between the use of design and financial performance remains relatively unknown (Hertenstein & al., 2005).

One way to understand this connection is through the reinforcing effect of design on the return on investment in other tangible or intangible capital. The relevance of intangible capital is particularly high in the knowledge-intensive economy (Daum, 2004, pp. vii-viii), though few have studied or demonstrated the impact of design on it. In addition to the theoretical shortage of design as a resource accumulating intangible capital, the empirical demonstration of its effect has received little attention.

The purpose of this study is to understand the relevance of design as a resource driving the intangible capital of a company. The first part of the study establishes through theory how design builds the intangible capital of a company by impacting all its three categories of human, structural and relational capital. On the basis of earlier studies the market-to-book ratio is found as a possible indicator for the level of intangible capital within a company. Finally a case study on active users of design chosen on the basis of prior research by the UK Design Council is conducted with comparing 19 design effective companies against a control group of 76.

Results of the case study show that although the case study companies do not have markedly higher portion of intangible capital, a further division of the companies into three subgroups of product, service and retail offers interesting insights. In particular it is noted, that product offering firms with active use of design tend to have significantly higher share of intangible capital in comparison to the control group. Data was obtained through the London Stock Exchange for the years 2007-2011.

## MUOTOILU AINEETTOMAN PÄÄOMAN RAKENTAJANA - TAPAUSTUTKIMUS DESIGN INDEX YRITYKSET

Muotoilun ymmärretään tuovan kilpailuetua (esim. Nyberg & al., 2005; Gemser & al., 2011) ja monet tutkimukset ovatkin osoittaneet sen yhteyden yrityksen taloudelliseen menestykseen (esim. Design Council, 2004; Teknikföretagen, 2011). Taustalla oleva vaikutusmekanismi näiden kahden välillä on kuitenkin yhä jossain määrin epäselvä (Hertenstein & al., 2005).

On mahdollista tarkastella muotoilun vaikutusta sen kautta, miten se vaikuttaa muun pääoman kertymiseen yrityksessä. Huolimatta siitä, että aineettoman pääoman merkitys liiketoiminnassa on nykyään suuri (Daum, 2004, pp. vii-viii), on olemassa vähän tutkimuksia aiheesta miten muotoilu rakentaa aineetonta pääomaa.

Tämän tutkimuksen tarkoituksena on ymmärtää muotoilun merkitys aineettoman pääoman rakentajana. Tutkimuksessa yhdistetään kaksi tyypillisesti erillään olevaa tieteenhaaraa – muotoilun johtamisen ja aineettoman pääoman – ensin teorian, sitten tapaustutkimuksen kautta.

Kolmivaiheinen tutkimus tarkastelee aluksi teorian pohjalta miten muotoilu rakentaa yrityksen aineetonta pääomaa vaikuttamalla inhimilliseen, rakenne- sekä suhdepääomaan. Aiempien tutkimusten valossa nähdään, että yrityksen markkina- ja kirja-arvon välistä suhdelukua voidaan käyttää aineettoman pääoman osuuden arvioimiseen koko yrityksen arvosta. Lopuksi toteutettiin tapaustutkimus Lontoon pörssissä noteeratuista yrityksistä vertaillen kahta ryhmää: 19 muotoilua aktiivisesti käyttävää yritystä Design Council 2004 tutkimuksen perusteella sekä kontrolliryhmää, johon kuului 76 yritystä.

Tapaustutkimus osoitti, että vaikka kokonaisryhmänä aktiivinen muotoilunkäyttö ei reflektoitunut muotoiluaktiivisilla yrityksillä suhteessa suuremmalla osuudella aineetonta pääomaa, jako pienempiin ryhmiin tuotetarjonnan, palvelutoiminnan tai kaupan alan perusteella tuotti selkeämpiä tuloksia. Erityisesti tuotetarjoavilla aktiivisen muotoilukäytön omaavilla yrityksillä oli suhteessa merkittävästi suurempi osa aineetonta pääomaa yrityksen arvossa. Aineisto haettiin Lontoon pörssin tiedoista vuosilta 2007-2010.

## CONTENTS

List of Tables and Figures .....	vi
I. Introduction .....	1
A. Research gap .....	1
B. Research objective and questions .....	4
C. Central definitions.....	4
D. Structure of study .....	5
II. Theoretical background .....	7
A. Intangibles definitions .....	8
B. Design definitions .....	10
III. Design and Intangible Capital .....	14
A. Overview of intangible capital .....	14
B. Previous literature on design building intangible assets.....	15
C. Design and human capital .....	18
D. Design and structural capital.....	21
E. Design and relational capital.....	27
F. Framework on impact of design on intangible capital .....	29
IV. Intangible Capital and Market-to-Book Ratio .....	30
A. Intangible capital and the book value .....	30
B. Intangible capital and market valuation .....	31
C. Design and market valuation .....	34
D. Intangible capital and market-to-book ratio.....	35
E. Limitations of market-to-book ratio.....	36
F. Use of market-to-book ratio in this study .....	37
V. Methodology and data collection .....	38
A. Research method .....	38
B. Case study companies .....	39
a. Design Index companies .....	40

b.	Comparison groups .....	41
C.	Data and calculations .....	43
VI.	Case Study Findings & Discussion .....	45
A.	Variance between analysis groups .....	45
B.	Product offering subgroup analysis .....	48
C.	Service offering subgroup analysis .....	51
D.	Retail offering subgroup analysis .....	56
E.	External factors and further discussion .....	61
F.	Summary of key findings .....	64
VII.	Conclusions .....	65
VIII.	BIBLIOGRAPHY .....	70
APPENDIX I: Selection of case companies.....		75
APPENDIX II: Complete results of case study .....		76
APPENDIX III: Differences between the comparison groups .....		77
APPENDIX IV: List of Emerging Index companies in the control group(s).....		78

## LIST OF TABLES AND FIGURES

Table 1	Summary of the composition of human capital.....	19
Table 2	Summary of the composition of structural capital.....	22
Table 3	Summary of the composition of relational capital .....	27
Table 4	List of design award categories as criteria (Design Council 2004).....	40
Table 5	Number of design effective companies under analysis.....	44
Table 6	Standard deviation of control groups .....	46
Table 7	Differences between the average values of the two comparison groups.....	46
Table 8	Difference between the market-to-book ratios of the two comparison groups for companies with service offering .....	52
Figure 1	Development of the value of intangible assets as a percentage of total market value of S&P 500 companies between 1982 and 1999 (Daum, 2003, p. 4).....	3
Figure 2	Illustration of the structure the study .....	6
Figure 3	The theoretical setting of this thesis.....	7
Figure 4	Assets of an organization.....	8
Figure 5	Definitions of intangibles within this study .....	9
Figure 6	Viewpoint of design in this research .....	12
Figure 7	Commonly classified categories of intangible capital .....	14
Figure 8	Value of design-driven innovation (Verganti, 2009, p.92).....	16
Figure 9	A model for managing design as a core competency (Borja de Mozota & Kim, 2009) .....	17
Figure 10	Value of the Nike brand is about 14,528 \$m according to Interbrand (2011) .....	24
Figure 11	The combination of orange, grey and black in axes is a trademark owned by Fiskars (Rehbinder 2011) .....	24
Figure 12	Protected design or not, the classic Jokapoika-stripe by Vuokko Eskolin-Nurmesniemi is distinctly “Marimekko” in the eyes of many Finns .....	25
Figure 13	The effect of graphic design on brand value (Koostra & Vink, 2007) .....	26
Figure 14	Framework summarizing areas of intangible capital design may impact.....	29
Figure 15	Development of the value of intangible assets as a percentage of total market value of S&P 500 companies between 1982 and 1999 (Daum, 2003, p. 4).....	32
Figure 16	The total market value of a company (adopted; Sveiby, 2007, p. 12) .....	33
Figure 17	Development of Design Index compared to the industry average (Value of Design Factfinder report 2007, p. 14) .....	34
Figure 18	Illustration on the deficiency of market value as an indicator of the value of intangible capital.....	35
Figure 19	Comparison group 1.....	42

Figure 20	Comparison group 2.....	42
Figure 21	Example of the calculation of the market-to-book ratio.....	43
Figure 22	Market-to-Book ratios of all companies in comparison group 2 .....	45
Figure 23	Coefficient of variation of the three subgroups from control group 2.....	47
Figure 24	Market-to-book values are significantly higher in design effective companies for the years 2007, 2008 and 2010 .....	48
Figure 25	Market-to-book ratios of companies in Comparison group 2 product offering subgroup, excluding Senior plc.....	49
Figure 26	Senior plc's MBR outperforms the mean of the control group 2 2007,2009 and 2010 .....	49
Figure 27	Senior plc is increasingly successful designing fluid conveyance systems (Senior plc Annual Report 2010).....	50
Figure 28	Book value fails to explain as much as 93 % of the market value of design effective companies (2007-2010).....	51
Figure 29	Market-to-book ratios in service offering firms (comparison group 2).....	51
Figure 30	Market-to-book ratios of comparison group 2 (service) excluding Heavitree Brewery and Domino's Pizza.....	53
Figure 31	Heavitree Brewery offers a wide variety of pubs in South West of England .....	53
Figure 32	Development of market-to-book ratios of design effective companies and the respective control groups 2007-2010 .....	54
Figure 33	Book value of design effective firms offering services fails to explain on average 70% of the market value of the company [second non-design group exc. Heavitree Brewery and Domino's Pizza] .....	56
Figure 34	MBR of comparison group 2 (retail).....	57
Figure 35	Market-to-book values of the retail companies in control group 2 .....	57
Figure 36	Standard deviation chart of retail subgroup's control group 2 .....	58
Figure 37	The four main retail brands of Kesa Electrics plc .....	60
Figure 38	Design effective case companies book value in the retail subgroup fails to explain 71% of the market value the corresponding value of control group being 68% .....	61
Figure 39	Companies in Non-design group 2 listed in the original Emerging Index (n:11 .....	61
Figure 40	MBR of Emerging Index companies 2008 (n11) against non-design group 2 (n66).....	62
Figure 41	Design Effective companies MBR retained on a higher level all other years except 2008.....	63
Figure 42	Development on MBR's between 2007-2010 in Comparison group 1 .....	64
Figure 43	Framework on areas of intangible capital design may impact.....	66
Figure 44	Average Market-to-book ratios of comparison group 2 (2007-2010).....	67

## I. INTRODUCTION

Although design has long been seen to bring competitive advantage, current theory lacks the notion of design as a resource that builds the value of organizational assets. This study aims to define the relevance of design in building the intangible capital of a company, through both theory and quantitative case study analysis.

### A. Research gap

According to various studies, design has gained importance as a source of competitive advantage in today's business (e.g. Nyberg & al., 2005; Gemser & al., 2011). In fact, up to 85% of all consumer goods companies rate the importance of design to market success as exceptionally high (Zec & Jacob, 2010, p. 49). A recent national study on firms' perceptions toward design by Suomalaisen Työn Liitto (2012) asked the purpose for investing in design, and 31% of the 1500 respondents claimed that design is part of strategy. A total of 62% of those who thought that design is part of firm strategy said that design is an important resource for the company.

According to the respondents of this recent study, the relevance of design in business will increase slightly or a lot (51%) over the next two years. However, the study also reveals that although management of design as a function is acknowledged to bring competitive advantage (slightly or a lot 82 %), it continues to stay in the shadow of core activities in the company (ranking 8<sup>th</sup>) and the effect on business performance is not recognized by 94 % of the respondents. (Suomalaisen Työn Liitto, 2012)

Meanwhile, in response to design's apparent anonymity, the prevailing interest among many scholars and practitioners has turned to discussing the issue of return on design investment (e.g. Whicher & al., 2011; Design Council, 2007). Quantifying the impact of design as a profitable investment would demonstrate the conceptual arguments of the power of design as a strategic factor affecting companies' financial performance.

Several authors such as Design Council (2004) and the Teknikföretagen have studied the impact of design on company performance. The findings have been notable including design effective firms outperforming 200% on the stock market (Design Council 2004) and profitability of companies with long-term investment into design bearing 50% higher than those that do not use design (Teknikföretagen 2011). Regardless of the studies on economic impact of design,



the connection between financial performance and design is still relatively unknown (Hertenstein & al., 2005).

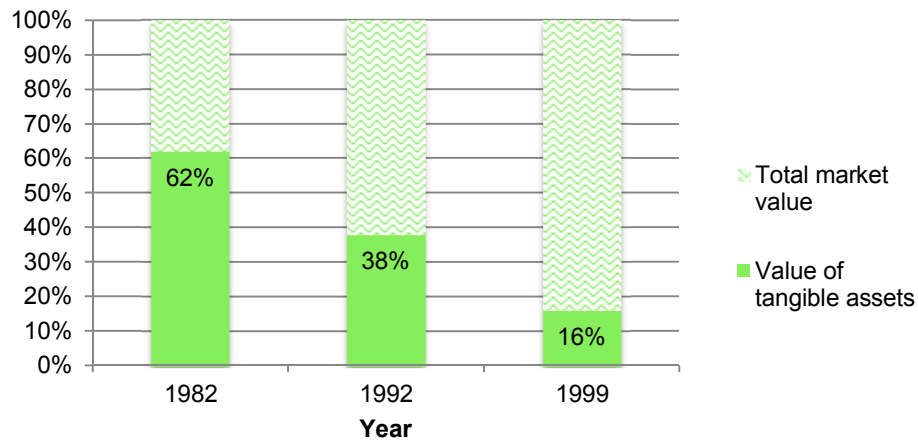
Also, measuring the value of design is challenging for three primary reasons. First, the lack of common definitions for the design discipline is often associated with challenges of evaluating or exploring the impact of design (e.g. Whicher & al., 2011; Moultrie & Livesey, 2010). Second, the time-lag between the design investment and the accumulating profit makes the assessment difficult (Hertenstein & al., 2005). Finally, the isolation of the impact of design on business success (Whicher & al., 2011) is, perhaps, the greatest challenge of all.

Although the measurement of the financial value of design is difficult, the principles of shareholder value creation can help in understanding how the value is created. One approach to understanding the financial value of a strategic resource such as design is through its impact on shareholder value as introduced by Rappaport (1986; see Srivastava & al., 1999). Rappaport defines the four shareholder value drivers as the following:

- (1) Acceleration of cash flows
- (2) Enhancement of cash flows
- (3) Reduction in the risk and volatility of cash flows
- (4) Accumulation of tangible and intangible assets

The fourth value driver presented concerns the augmentation of the long-term value of the business through investments in processes that result in both tangible and intangible assets (Srivastava & al., 1999). In other words, understanding of the value of design through the accumulation of assets acknowledges that design investments can have a reinforcing effect on the return on investment for other assets – in addition to being a valuable asset in itself.

The shift from the industrial age into the knowledge-intensive economy has raised the importance of intangible assets. While factories and assembly lines will no longer form the wealth of the company, the focus of value-creation is now in creativity and capacity for learning, innovation and maintaining long-term customer and business-partner relationships. (Daum, 2003, pp. vii-viii) Some authors (e.g. Sveiby 1997, pp- 3-7) consider that the interest towards intangible assets increased as studies attempted to explain the growing difference between the market and the book value of the company as illustrated in Figure 1. Although this gap has reduced since the release of the study, it remains significant (Sáenz 2005).



**Figure 1** Development of the value of intangible assets as a percentage of total market value of S&P 500 companies between 1982 and 1999 (Daum, 2003, p. 4)

Regardless of the growing importance of intangible capital, few recent studies have identified design as an intangible asset or systematically analyzed its contribution to employee capabilities, an organization's resources and ways of operating, or an organization's relationships with stakeholders. Of those studies, Borja de Mozota & Kim (2009) claim that design managers should acknowledge International Financial Accounting Standards (IFRS) adopted by the International Accounting Standards Board (IASB), as design as a resource reaches into its four areas of intangible capital: technology, customer relationship, brand and human capital.

Although the study by Borja de Mozota & Kim (2009) is a good starting point toward understanding the value of design as a company resource, it is more of a descriptive study on how seven design-intensive Korean companies moved from understanding design as a competitive advantage, to understanding design as a core competency. The study lacks further theoretical background in precisely how design builds intangible capital, as well as a methodology for empirically assessing the impact of design on corporate intangibles.

The impact of design in driving shareholder value can be analyzed by looking at the accumulation of intangible or tangible capital of a company. Intangible capital is particularly interesting, as studies have shown the dominance of it in corporate capital. The wide range of studies on the effect of design offers possibilities to combine the two traditionally separate fields of study – accounting and design management – in order to understand the relevance of design as a strategic factor in building the intangible capital of a company.

## B. Research objective and questions

The purpose of this study is to understand the relevance of design as a corporate resource in building the intangible capital of a company. In particular, the study addresses three research questions presented below.

1. *Does design build the intangible capital of a company?*
2. *How can the effect of design on building intangible capital of a company be empirically demonstrated?*
3. *Based on a set of case study companies chosen from prior research by the UK Design Council (2004), do active users of design have relatively bigger shares of intangible capital?*

The first research question concerning how design builds intangible capital of a company is addressed with a theoretical literature review comprising of previous studies, primarily conceptual ones, of design building intangible capital. Prior research on the analysis of the value of intangible capital of a company is used to develop a methodology to analyze the effect of the active use of design on the intangible capital of a company. Finally, empirical analysis on a set of case study companies is made to test the methodology, and to acquire preliminary results on the effect of design on the intangible capital of a company.

Although this research attempts to tie the conceptual reasoning of design as a resource in building the intangible capital of a company and empirical evidence of its impact on shareholder value, the purpose is not to find a valuation method for design or intangible capital itself. The quantitative analysis on design's impact on shareholder value focuses on the viewpoint of the effect of design, excluding other likely factors affecting the indicator of intangible capital – market valuation – such as company performance in general. Additionally, it must be noted that whilst this study focuses on the impact of design on corporate intangibles, the impact on tangible capital of a company is not researched.

## C. Central definitions

*Design* can be considered as an outcome of a creative process (e.g. Best, 2006; Borja de Mozota, 2003), the process of designing (e.g. Best 2006; Borja de Mozota, 2003) as well as a capability (Borja de Mozota, 2006; Borja de Mozota & Kim, 2009) enabling design (see Chapter IIB Design definitions).

*Intangible capital (IC)*, also known as intangible resources, is the non-physical and non-monetary resources of an organization (Roos & al., 2006, p. 13) (see Chapter IIA Intangibles definitions).

*Market-to-Book ratio* is commonly defined as the market value of a company's equity divided by the book value of equity, in other words the amount by which the market value of the company surpasses the accounted book value (see Chapter IVD Intangible capital and market-to-book ratio).

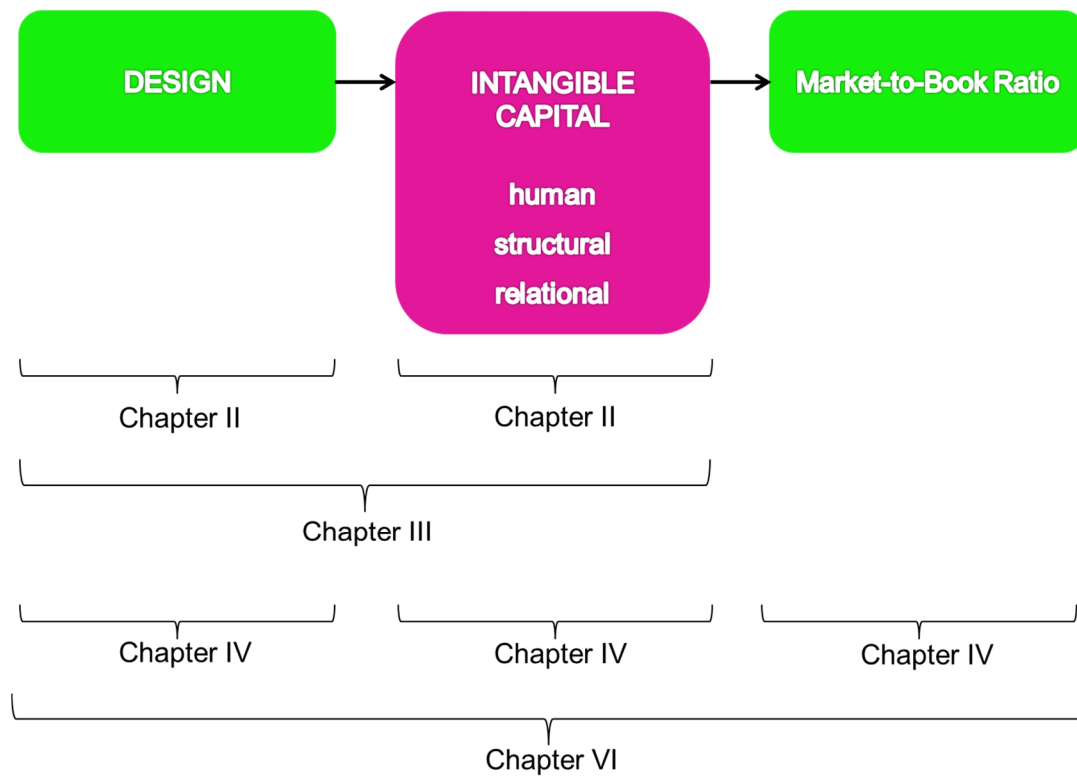
*Goodwill* refers to the difference between the book value and the purchase price of a company, which is accrued under this sole title on the balance sheet (e.g. Daum, 2003, p. 16).

*Net assets* refer to the difference between the assets and the liabilities of a company, as informed in financial reporting.

## **D. Structure of study**

As a starting point, the first chapter (Chapter II) of this study covers the theoretical background of the research, and explicates central definitions and concepts from both accounting and design management fields of study. Taking a resource-based view into design, Chapter III moves into understanding the composition of intangible capital and reviews design literature from the viewpoint of building the capital of a company. Through the extensive literature review, the position of design as a resource building intangible capital of a company is summarized in a framework (Chapter IIIF). The research continues toward understanding the relationship between market value, book value and design in order to develop a methodology for empirical analysis of design accumulating intangible capital (Chapter IV).

The study methodology – case study with focus on quantitative analysis – and the data collection method are explained in Chapter V. Chapter VI is a case study analysis on active users of design, chosen on a basis of prior research by Design Council (2004). In addition to testing the methodology, preliminary results are obtained and discussed. The research concludes with final words of main findings, managerial implications and suggestions for further research (Chapter VII). Figure 2 below illustrates the structure of the study.



**Figure 2** Illustration of the structure the study

## II. THEORETICAL BACKGROUND

This thesis works in the interface of two traditionally separate different fields of research: design management and accounting (see Figure 3). The study also draws viewpoints from strategic management literature, more specifically resource-based theory. Resource-based theory acknowledges organizational resources as a value-driving source for firms – a view point covered in the final part of this chapter.

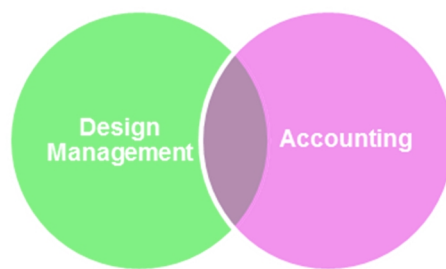


Figure 3 The theoretical setting of this thesis

This study derives the definition of design from the design management field, as a large part of studies related to the financial value of design are grounded in this arena (e.g. Borja de Mozota 2006). Design management research can be organized into two streams including organizational studies and descriptive studies on specific methods of design management (Borja de Mozota, 2002). This study is more of a descriptive study on how design builds intangible capital of a company.

In broad terms accounting as a science can be divided into financial accounting and management accounting. *Financial accounting* is restricted to set accounting principles and define for example types of items that are classified as assets, liabilities or owners' equity in balance sheets. *Management accounting* on the other hand is more concerned about the measurement and reporting of both financial and qualitative information to managers, as a mean of support to pursuit organizational goals. (Horngren & al, 1999) Return on design investment calculations for example are under management accounting, whereas the value of design depends on the definition of design. If design is considered intellectual property and entails for example a protected trademark with monetary value, to some extent it can be acknowledged in financial accounting. As recognizing intangible capital in financial reporting is restricted but possible (see Chapter IVA Intangible capital and the book value), the management or acknowledgement lies somewhere in between these two categories.

There are few scholars who have worked to combine accounting and design theories. Of those worth mentioning Brigitte Borja de Mozota for example with her work on design as a core competency (Borja de Mozota & Kim, 2009) and adapting the balanced scorecard developed by Kaplan and Norton for design management (Borja de Mozota, 2006; see also Kaplan & Norton, 1992).

## A. Intangibles definitions

Organizational assets are commonly divided into three different types: tangible assets consisting of both physical and financial assets and intangible assets (Figure 4 below, e.g. Brennan, 2001).

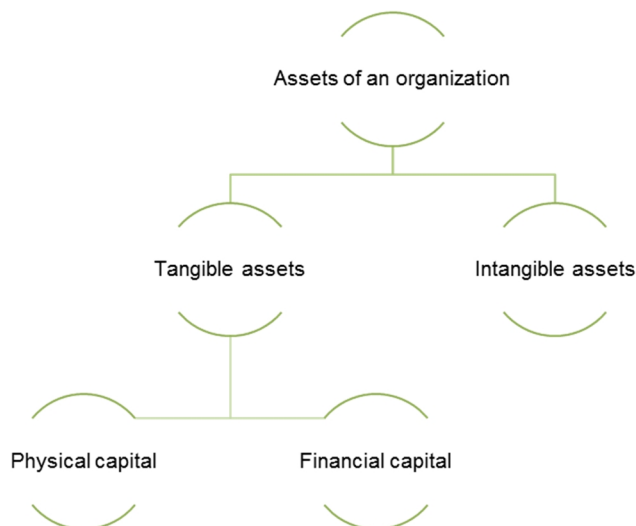


Figure 4 Assets of an organization

The terms intangible assets, resources, intellectual capital and intangibles can cause a headache to those indulging in accounting literature. Although these all have their own notions, they are often used interchangeably depending on authors' preference.

*Intangible assets*, a term acknowledged in financial accounting, are resources owned or controlled by the company which can be expected to bring economic value in the future (Roos & al., 2006, p. 15). It is often used to refer to items activated on the balance sheet (Ihantola & Leppänen, 1998, p. 196 in ref. Lönnqvist, 2004, p. 34), although the accounting principles vary according to the country and the accounting standards in use. Possible items to activate on the balance sheet include for example research and development expenses, immaterial property

rights and goodwill (Ihantola & Leppänen, 1998, p. 196 in ref. Lönnqvist, 2004, p. 34), of which the latter refers to the difference between the book value and the purchase price of a company accrued under this sole title (e.g. Daum, 2003, p. 16).

Whereas intangibles is a common term used in accounting to refer to non-physical or non-monetary resources, studies relating to management or legislation often refer to *intellectual capital* (Lev, 2001, p. 5). Intellectual capital, often used as a synonym to *intangible resources*, is defined as intangible resources and its transformations, which are at least partly under the organizations control and bring value to the company. Intangible resources can be defined as all of the company's non-monetary and non-physical assets, regardless of their character or if they are under the organizations control. (Roos & al., 2006, p. 13)

Regardless of the various definitions, the terms presented above are used interchangeably (Lönnqvist, 2004). For example Daum (2003, p. 16) defines intangible assets as company's intangible resources. In the end, all these terms essentially refer to a non-physical claim to future profits. It is not until this claim is legally secured with patents, trademarks or copyrights that you can refer to those as *intellectual property*. (Lev, 2001, p. 5)

In this thesis the words intangible resources, intellectual capital and intangible capital are used side by side to refer to any assets under the control of or used by a company, which are neither physical nor monetary. Activated intangible assets and intellectual property are seen as a part of intangible capital as exemplified in Figure 5.

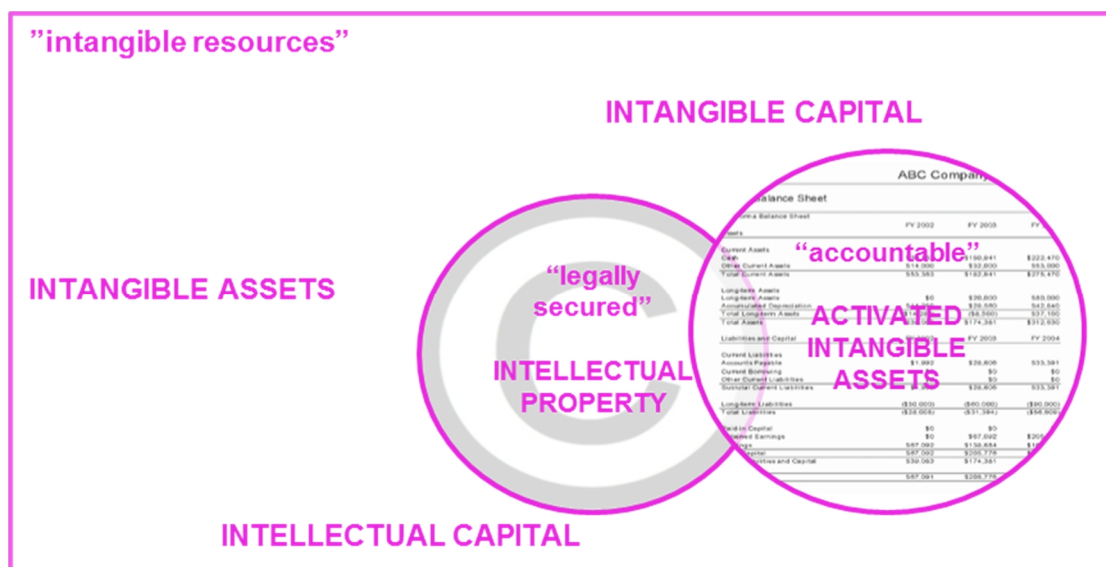


Figure 5 Definitions of intangibles within this study



## B. Design definitions

The lack of common definitions for the design discipline is often associated with challenges of evaluating or exploring impact of design (Whicher & al., 2011; Moultrie & Livesey, 2010, pp. 27-28). As Peter Butenshøn, the former president of ICSID put it:

*“Discussing design has become an increasingly complex affair, since the agenda seems to be shifting all the time” (Verganti, 2009).*

According to Moultrie and Livesey (2010, pp. 27-28), studies tend to define design narrowly, provide ambiguous definitions for design, or alternatively avoid any specific definitions. For example the Design Council in Britain has followed the latter resolution by leaving it up to participants to rely on their own view of design. The lack of clarity in design definitions is a reflection of its integrative roles between technology and experience, firm and its customers or even art and science. (Moultrie & Livesey, 2010, pp. 27-28)

Although it seems that no definition of design or design practices sufficiently cover the diversity under the label (Buchanan, 1998), various scholars have attempted to define design through different means. Within the design management literature a common mean to understand design is as its definition – both an *activity and an outcome* (e.g. Best, 2006; Borja de Mozota, 2003, p. 3; Verganti, 2009, pp. 22-25).

Concerning the latter, Borja de Mozota (2003, p. 20) sees the design outcome as a form or artifact involving unity between structural, functional and symbolic constraints. Best (2006, p. 12) brings the definition to a more concrete level by explaining the design outcome to entail physical items such as products, buildings and interiors as well as intangible items such as software and service. Verganti (2009, pp. 22-25) sees the extremity of design as an outcome to entail merely ‘form of products’ and considers this an outdated viewpoint of seeing design purely as styling still dominant among business people today.

Verganti (2009, pp. 22-25) considers the other end of the extremity to concern literature which refers to ‘design’ instead of the word ‘development’. Here design is a process focused on idea generation and takes strong attention to user needs, a broader notion that associates design with any creative activity. Likewise Best (2006, pp. 12, 112) specifies design process as user-centric, and further a cyclical, problem-solving process of enquiry and creativity. Bringing these two extremes of design as an outcome and a process together, some studies have shown that good design as an outcome is a result of a managed process (e.g. Chiva & Alegre, 2009).

Another way to define design is through *the area of design*. As an example, Buchanan (1998) suggests four broad areas in which design is explored: design of symbolic and visual communications, design of material objects, design of activities and organized services, and design of complex systems or environments. Whereas the first one of these includes for example graphic design and illustrations, product design is naturally considered a part of the design of material objects. Buchanan (1998), however, notes that these areas are interconnected. Material objects, for example, can become instruments of action and designers find new avenues of exploration by thinking about them in the context of signs or as a mean of communication. The definition set forth by Buchanan (1989) by no means is contradictory with the sense of understanding design as a process or an outcome, but can rather be considered as supplementary to the viewpoint of design as a process or an outcome.

Finally, few authors have taken a resource-based view into understanding design as organizational competence or in other words *a strategic capability* (e.g. Borja de Mozota & Kim, 2009). Resource-based theory is a stream of research which has evolved under strategic management in the attempt to explain superior firm performance through an efficiency based explanation (Barney & Clark, 2007, p. v, 49).

According to resource-based theory, sustained competitive advantage is built on strategic resources controlled by companies. The concept of sustained competitive advantage is defined in this case as creating more than average economic value in the industry with strategy competitors cannot duplicate. Unlike most other literature identifying environmental opportunities and threats (e.g. Porter's five forces framework), this stream of research builds on two atypical central assumptions: strategic resources controlled by firms may be heterogeneous and long-lasting. (Barney & Clark, 2007, pp. 51-52) The four central attributes of resources to be able to generate a sustainable competitive advantage are as follows: valuable, rare, imperfectly imitable and exploitable (Barney & Clark, 2007, p. 57).

Relating to the concept of value, Lönnqvist (2004, p.41) claims that a large part of intangible assets are difficult or impossible to purchase with the exception of those whose ownership can be clearly defined. In fact, resource-based logic has been applied in several disciplines related to intangible capital, including human resource management, marketing, management information systems, and technology and innovation management (Barney & Clark, 2007, p. 238). There is, however, limited amount of design management research from the resource-based theory viewpoint.



long-term approach. Whereas the first considers design as a product-based activity focused on aesthetics, the latter is more an integrated approach which uses design methods to guide business strategy and enable innovation (Design Council 2005). The broad, long-term, approach of seeing design as a coordinated approach into different activities including branding and communications understands design's contribution to various activities in an organization. This fits the outlay and definitions of design chosen for this study, as the current research at hand aims to identify the impact of design on organizational assets.

Combining the definitions of design and intangible capital, one can argue the presence of design as a capability or resource in the latter as it is neither tangible nor monetary. However, Lönnqvist reminds us that it is not always easy to determine whether an asset is tangible or intangible (2004, p.41). Often intangible assets are embedded into tangible assets, quite like knowledge is embedded in employees or programmes in physical computers (Lönnqvist, 2004, p. 41). Likewise design skills is tied to people, service design often to physical space or design process to tangible form, making this analysis multidimensional.

### III. DESIGN AND INTANGIBLE CAPITAL

Interestingly, regardless of design's relevance to business success, there is little research on how design builds intangible capital of a company. This chapter first details the components of intangible capital of a company, and then moves on to analyzing the effect of design on the accumulation of intangible capital from various viewpoints.

#### A. Overview of intangible capital

Intangible capital, the non-monetary and non-physical assets of the company, is commonly divided into human capital and structural capital. Some researches add a third separate category, relational capital, when referring to intangible assets (e.g. Ordoñez de Pablos, 2002, Roos & al., 2006, Daum, 2003), or consider it as a subset of structural capital (e.g. Edvinsson & Malone, 1997, p.52, Bontis & al. 1999). While there are many ways of seeing intangible capital, the perspective of dividing it into employees' capabilities, organizations' resources and way of operating and the relationships with stakeholders is most commonly used in literature (Lönnqvist, 2004, p. 40) as shown in Figure 7 below.



Figure 7 Commonly classified categories of intangible capital

Each subcategory consists of elements building up the capital, which in some cases can be measured with different indicators (Ordoñez de Pablos, 2002). However, none of these classifications of capital are *additive*, meaning the total value of two elements within these categories adding up to zero regardless of their value measured separately, or the synergy of the two can be higher (Roos & al., 2006, p. 14).

The division into subcategories not only helps to identify resources within an organization, but also to define their necessity for value creation and their relevance and uniqueness regarding competitive advantage. However, the three-way categorization is not strictly defined when in action as these resources can also be used as transformations (Roos & al., 2006). For example,

with an employee's personal knowhow you can build structural capital through profitable inventions and process enhancement.

From the viewpoint of value creation, three major differences can be noted between tangible and intangible assets. First, intangible assets do not follow the economic law of diminishing returns, but rather follow the phenomena of increasing returns (Daum, 2003, p.6). Second, whereas tangible assets may be used only for one purpose at a time, intangible assets can be used simultaneously for several purposes (Lev, 2001, p.22). Third, something worth mentioning is that as the ownership of intangible assets is not always clear (Edvinsson & Malone, 1997, p. 11), they cannot always be purchased or sold. Whereas most of the structural capital can be at least partly controlled by the company, the organization cannot own human capital, merely strengthen the tie with contractual agreements. Comparing monetary and physical resources, the tangible capital of the company are additive, and at least partly owned or controlled by the company, thus making their valuation and accounting much simpler (Roos & al., 2006, p. 14).

Prahalad and Hamel (1990; see Borja de Mozota & Kim, 2009) argue that intangible capital such as technology, customer trust, brand image, corporate culture, and management skills are the real resources of competitive advantage for three central reasons: they are difficult and time-consuming to accumulate; they are difficult to imitate; and they can be used in multiple ways simultaneously. Naturally, the requirements for long-term success and converting intellectual capital into results remain the same – tangible assets, financial capital and of course profit-creating company activities (Daum, 2003, p. viii).

## **B. Previous literature on design building intangible assets**

Although definitions found in accounting literature omit any mentions of it, design can be understood as an intangible resource of a company. In addition to the framework presented by Borja de Mozota and Kim (2009) of design building the intangible capital of a company, few studies exist from this perspective. Among these studies is Verganti's conceptual framework from his book *Design-Driven Innovation* (2009) (Figure 8).

## Model of the value of design-driven innovation

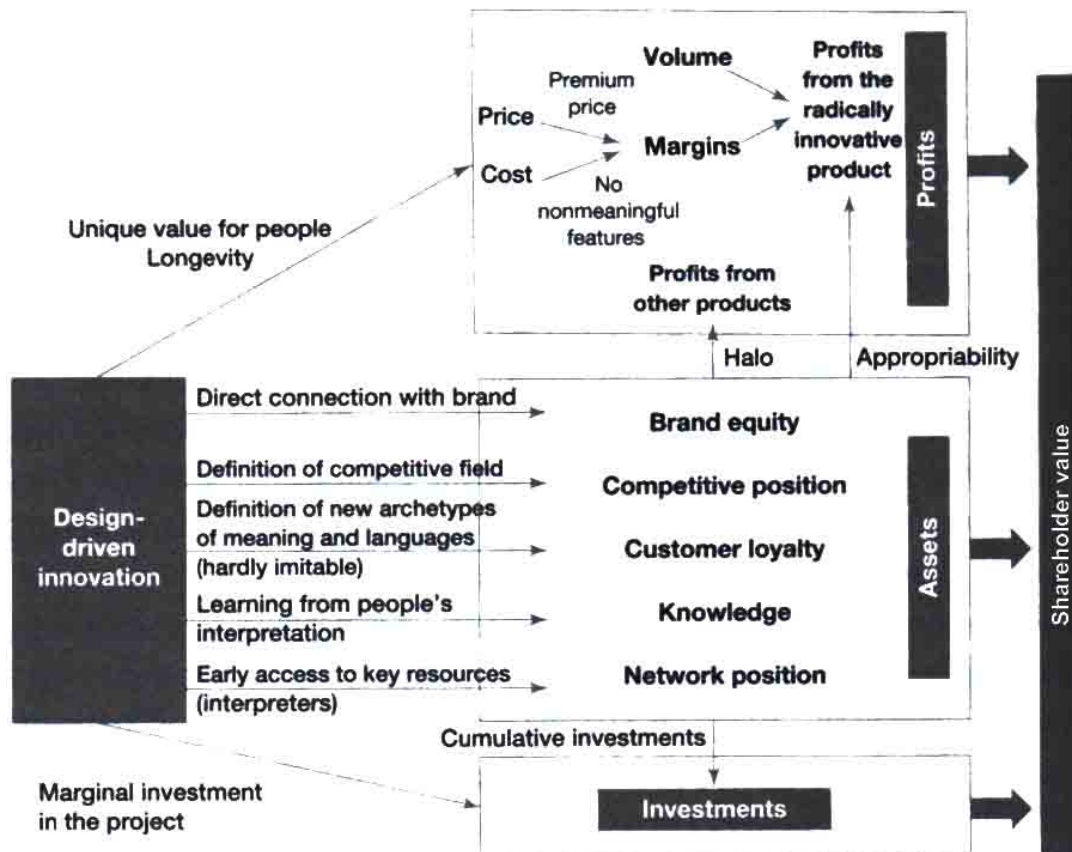


Figure 8 Value of design-driven innovation (Verganti, 2009, p.92)

In his book, Verganti (2009) introduces his view on a strategy for business success, which is a process with an aim to create new markets and push radically new meanings. The process Verganti presents is integrated into relational capital, in which the focus is on 'key interpreters' as opposed to numerous anonymous innovators. These collaborations are the driving force for innovation by creating a competitive advantage that is difficult to copy (Verganti, 2009, p. 14). The value built by design-driven innovation also impacts the assets of an organization, particularly brand equity, competitive position, customer loyalty, knowledge and network position as indicated in the framework presented above.

Whereas Verganti looks into design through its impact on innovation, this thesis follows more in the lines of Borja de Mozota and Kim's (2009) logic to incorporate a resource-based view into design meaning, and that design management ultimately involves the enhancement of the value of corporate intangibles. As stated earlier, the research in question argued that the new International Financial Accounting Standards (IFRS) adopted by the International Accounting

Standards Board to measure corporate intangibles must be acknowledged by design managers, as design reaches into each of the four intangible areas measured in the IFRS (Borja de Mozota & Kim, 2009). Publicly noted corporations in the European Union have had to follow the international accounting standards since 2005 (Pörssisäätiö 2011).

The evaluation framework of corporate intangibles measured in the IFRS include technology, customer relationship, brand and human capital (Borja de Mozota & Kim, 2009). Borja De Mozota and Kim (2009) analyzed design as a resource, which builds human, knowledge, cultural and technology capital as shown in Figure 9 below.

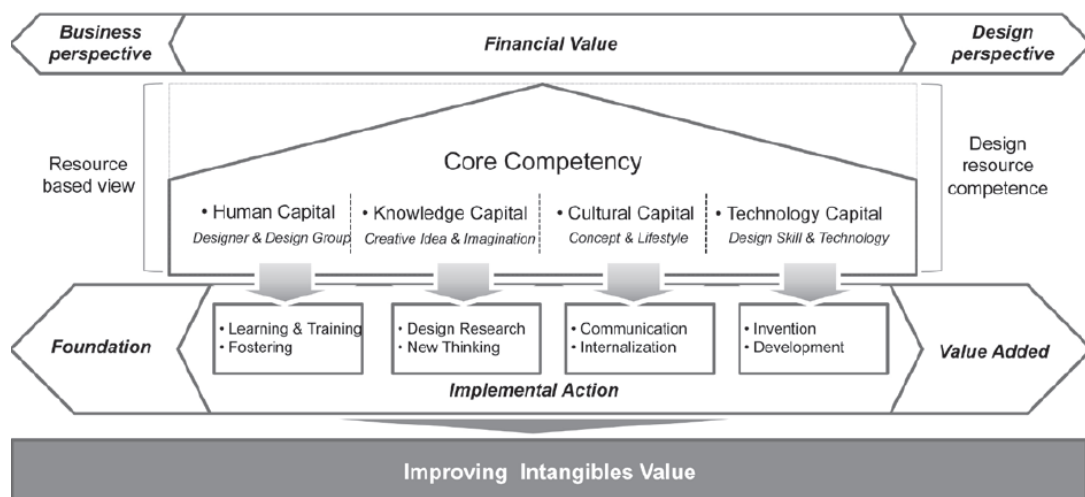


Figure 9 A model for managing design as a core competency (Borja de Mozota & Kim, 2009)

Borja De Mozota & Kim (2009) argue that the resource-based view of strategic design will be fundamental to linking design management to norms of international accounting, yet their study is more descriptive research on how seven, design-intensive Korean companies have moved from understanding design as a competitive advantage, to understanding design as a core competency.

Although studying these companies is a good starting point toward understanding the value of design as a company resource, the work by Borja de Mozota and Kim (2009) lacks both the analyses of the attributes of design resources (whether it is rare, imperfectly imitable, valuable and exploitable) as well as the analysis of how those design resources built sustainable competitive advantage. However, the most significant weakness of the study by Borja de Mozota and Kim (2009) is the lack of linkage between the conceptual significance of design in



building the intangible assets of a company, and empirical, quantitative evidence of design's contribution to shareholder value.

This study aims to contribute to these weaknesses by first fortifying the concept of design as a building block for intangible capital of a company, and then empirically analyzing the impact of the active use of design on shareholder value.

In the following section intangible capital of a company is detailed and impact of design on it is analyzed. Borja De Mozota and Kim's (2009) reasoning of design as a core competency works as a basis for the analysis, allowing us to view design as a core competency which incorporates internal skills, process and knowledge (Borja De Mozota & Kim, 2009). Their work is further fortified with other relevant literature on design building the intangible capital of an organization by acknowledging the effect of a successful design outcome and design as a process. A framework summarizing design's effect on intangible assets built on the basis of this analysis is presented in the final part of this chapter (Chapter III F).

### **C. Design and human capital**

Human capital, in essence, is the collection of intangible resources embedded in the members of the organization (Bontis & al., 1999). This part of intellectual capital can be only partly controlled – never owned – by the organization, as workers take the knowledge building the human capital in and out of the company (Daum, 2003, p. 10).

Following Bontis and al. (1999) human capital can be divided into three main groups summarized in Table 1.

**Table 1**                      **Summary of the composition of human capital**

<b>HUMAN CAPITAL</b>			
<b>COMPETENCIES</b> (Bontis & al., 1999)	<b>ATTITUDE</b> (Bontis & al., 1999)	<b>INTELLECTUAL ABILITY</b> (Bontis & al., 1999)	<b>OTHER</b>
<ul style="list-style-type: none"> <li>• skills (Bontis &amp; al., 199, Edvinsson &amp; Malone, 1997, p.52)</li> <li>• know-how (Bontis &amp; al., 1999)</li> </ul>	<ul style="list-style-type: none"> <li>• motivation (Bontis &amp; al., 1999)</li> <li>• leadership qualities of the top management (Bontis &amp; al., 1999)</li> </ul>	<ul style="list-style-type: none"> <li>• the ability of organizational members to be 'quick on their intellectual feet' (Bontis &amp; al., 1999)</li> <li>• innovation and entrepreneurship (Bontis &amp; al., 1999)</li> <li>• the ability to adapt and cross-fertilize (Bontis &amp; al., 1999)</li> </ul>	<ul style="list-style-type: none"> <li>• knowledge (Edvinsson &amp; Malone, 1997, p.52)</li> <li>• experience (Roos &amp; al., 2006, p. 13)</li> <li>• capabilities (Roos &amp; al., 2006, p. 13)</li> <li>• personal characteristics (Roos &amp; al., 2006, p. 13)</li> <li>• innovativeness of employees (Edvinsson &amp; Malone, 1997, p.52)</li> </ul>

One way to look at human capital is to take Daum's (2003, p. 19) viewpoint and see human capital as the core of intellectual capital – the source of innovation and an essential basis for corporate value creation. Interestingly, most corporate annual reports boldly state that the company's most important asset is its people (Barney & Clark, 2007, p. 121). This notion takes into account, that e.g. regardless of wide IT-systems, people, in the end, are the end force in using the information provided. The Swedish company Scandia, described as a pioneer in intellectual capital management and reporting, divides human capital into values, competence and relationships. However, common corporate values make up Scandia's corporate culture and are thus seen as a part of the company's structural capital (Daum, 2003, p. 19).

## Competencies

*“All men are designers. All that we do, almost all the time, is design. For design is basic to all human activity.” Victor Papanek (Borja De Mozota, 2003)*

From the design point-of-view, designers and design teams are a part of human capital, referring to the talents and skill they possess either at an individual level or in design groups (Borja de Mozota & Kim, 2009). Also Best (2006, p. 191) has noted design's importance, as investors interested in a design consultancy will look at the design team – or in other words the human resources – to establish whether the company's design assets are valuable enough to deliver a return on investment.

A resource-based view in human resources (HR) as a basis of sustained competitive advantage takes into account that HR executives play a key role in nurturing, developing and managing human capital such as skills, employee commitment, culture and team work (Barney & Clark, 2007, p. 140). Borja De Mozota & Kim (2009) also remind that designers and design groups must be supported with education and skill development, in order to boost motivation as well as enhance the recruitment of new members. However, the authors also take a viewpoint that “the core competency also values design as a way of improving talent and creativity in the workforce, and fostering the recruitment of talent in other functions” (Borja De Mozota & Kim, 2009). This implies that design should also work as a means to developing human capital in general.

The size of the company affects the composition of the resources and their importance. The importance and dominance of human capital is greater in small companies, whereas larger companies rely more on process and system resources (Roos & al., 2006, p. 11).

## Attitude

Although not widely studied, design as an outcome may contribute to employee satisfaction through usability, as suggested by Lockwood (2007). A case analysis of an interior design program at Storage Trek affected 5000 employees and had a significant impact on employee morale, mood and stress level according to a survey carried out before and after the project. After this ‘modest’ interior design renovation, 60% of the respondents also found that their ‘way finding’ was improved (Lockwood 2007). Although this study cannot be used to confirm the effect of design on employee satisfaction and motivation, it provides an insight into the different levels of human capital that design can impact.

### **Knowledge**

In the listing by Borja De Mozota & Kim (2009), knowledge capital in terms of design includes design ideas, design thinking, research and research tools. The case study sample companies examined the research by Borja De Mozota & Kim (2009) all believed that “design knowledge capital” is the most important competency in building their business success. In the case companies, a wide range of activities ranging from design thinking workshops to seminars in order to improve design research and development supported this capital (Borja de Mozota & Kim, 2009).

Whereas Borja de Mozota and Kim (2009) treat design as *knowledge*, an article by Bertola and Teixeira (2003) analyzes design as a *knowledge agent*. The research on 30 case studies of applying design as a strategic competence for product innovation showed how design contributes to innovation. The research states that design acts as a knowledge agent in two distinct ways: first as an integrator in global corporations, and second as a ‘knowledge broker’ in companies. Design, both as product or process, collects, analyzes and synthesizes knowledge in the three domains of knowledge: users community knowledge, organizational knowledge and network knowledge (Bertola & Teixeira, 2003). As an outcome, design contributes to the development of product and business innovation (Bertola & Teixeira, 2003), and thus contributes to the structural capital of a company as well.

Human capital becomes productive through structured, easily accessible and intelligent work processes (e.g. Daum, 2003, p. 21, Ordoñez de Pablos, 2002), in other words structural capital.

### **D. Design and structural capital**

Structural capital consists of all the intangible property and knowledge embedded within the routines of an organization (Bontis & al., 1999). As the company primarily owns this capital (Roos & al., 2006, Ordoñez de Pablos, 2002, Bontis & al., 1999) it is thus traditionally described as anything that remains in the company after 5 o'clock. Structural capital can be defined as intangible property of the company, as in most cases there is also a market for buying and selling structural capital. Evaluating the value of these intangibles is naturally problematic, but otherwise the market, although a very limited one, is similar in terms of dynamics to traditional resources (Bontis & al., 1999). Some examples of these include the trade of patents and the licensing of software.

As mentioned, structural capital is not additive by nature, and although most of it is property of the company some cannot be fully controlled. For example, a company's image and

organizational culture are at least partly created by external stakeholders or employees' opinions and sentiments (Roos & al., 2006, Ordoñez de Pablos, 2002). Structural capital can be both reproduced and shared (Daum, 2003, p. 20). Concrete examples of these include building new facilities with the same processes or using open innovation to include stakeholders in product development processes.

Daum (2003, p. 20) divides structural capital into organizational, innovation and process capital. Edvinsson & Malone (1997, pp. 34-36) on the other hand, define organizational capital as innovation and process capital. In the list below the identified elements from existing literature building structural capital are compiled according to Daum's (2003, p.20) grouping.

**Table 2**                      **Summary of the composition of structural capital**

<b>STRUCTURAL CAPITAL</b>			
<b>ORGANIZATIONAL CAPITAL</b> (Daum, 2003, p. 20) (Edvinsson & Malone, 1997, p. 36)	<b>INNOVATION CAPITAL</b> (Daum, 2003, p. 20) (Edvinsson & Malone, 1997, p. 36)	<b>PROCESS CAPITAL</b> (Daum, 2003, p. 20) (Edvinsson & Malone, 1997, p. 36)	<b>OTHER</b>
<ul style="list-style-type: none"> <li>• structure (Bontis &amp; al., 1999)</li> <li>• culture (Bontis &amp; al., 1999)</li> </ul>	<ul style="list-style-type: none"> <li>• all plans for the future, e.g.: <ul style="list-style-type: none"> <li>▪ R&amp;D</li> <li>▪ new plants</li> <li>▪ new products</li> </ul> (Bontis &amp; al., 1999)</li> <li>• immaterial rights (Roos et al., 2006, p. 13)</li> <li>• intellectual property (Edvinsson &amp; Malone, 1997, p. 36)</li> <li>• registered trademarks (Roos et al., 2006, p. 13) (Edvinsson &amp; Malone, 1997, p. 36)</li> </ul>	<ul style="list-style-type: none"> <li>• routines (Bontis &amp; al., 1999)</li> <li>• processes (Bontis &amp; al., 1999) (Edvinsson &amp; Malone, 1997, p. 36)</li> <li>• systems (Roos et al., 2006, p. 13)</li> <li>• way of working (Roos et al., 2006, p. 13)</li> <li>• techniques (Edvinsson &amp; Malone, 1997, p. 36)</li> </ul>	<ul style="list-style-type: none"> <li>• Brand, image (Roos et al., 2006, p. 13)</li> <li>• Organizations ability to learn, innovate and adapt quickly to changes in technologies and in markets (Daum, 2003, p. 21)</li> </ul>

According to Bontis & al. (1999) structural capital can be divided into three main groups (organization, renewal and development, relationships), of which the group relationships will be examined under relational capital. Also Edvinsson & Malone (1997, p. 35) divides structural capital into organizational capital and customer capital, of which the latter will be discussed under relational capital.

Although human capital can be seen as the most essential part of intellectual capital, structural capital is a prerequisite for its productive usage. Daum (2003, p. 20) underlines that knowledge-based value creation and leading edge innovation come through interaction and sharing. These are enhanced through structural capital elements of the company such as culture, procedures and working schemes. Implementing structures, processes and procedures that help transform human capital into structural capital under the property of the organization is one of the most important tasks of management. Technology, process descriptions, manuals and networks are likely to ensure this conversion of competences (Daum, 2003, pp. 20-21).

### *Organizational capital*

Borja De Mozota and Kim (2009) define cultural capital of design as the internalization of design culture within the organization. The case companies in their study ran programs to improve the understanding of design thinking and processes, so that the whole organization shares the same 'design mind' and information. Design awards, events and networks are all means of improving the design culture of a firm. The authors also suggest that cultural capital grows from building unique brand value and customer relationship (Borja De Mozota & Kim, 2009).

### *Innovation capital*

Design is often treated narrowly as a component of innovation or research and development, such as the aesthetic element of new product development, although it could be viewed at a wider span and would benefit from being treated independently. R&D accounting guidelines view design essentially as producing drawings within new product development, regardless of design's wider impact on services, brands, communications and developing customer offerings (Moultrie & Livesey, 2010, pp. 25-28). Supported by Bertola and Teixeira (2003), design through working as a knowledge agent (see IIIC p.18) contributes to the development of product and business innovation in various contexts.

On its own, design as an outcome can also be a valuable asset for a company. Many companies have managed to create and protect graphic or product designs in the past which have immense commercial value today. For example, the Nike swoosh created in 1971 (see Figure 10) for 35 US dollars by Caroline Davidson has evolved into a prime asset for Nike (Cohen, 2006).



**Figure 10** Value of the Nike brand is about 14,528 \$m according to Interbrand (2011)

Cohen (2006) claims that full commercial value of design cannot be obtained without transforming the designs into protected assets. Immaterial rights both give companies the right to use an innovative design without infringing the rights of others, as well as prevent others from using that particular design. Under United States law, innovative designs such as advanced aesthetics, performance, manufacturability and brand identity can be protected with various Intellectual Property (IP) rights. For example, ornamental package and product designs can be protected with design patents, and functional aspects of products and processes can be protected through utility patents and source identifying symbols with trademarks. Even copyrights and trade secrets may protect parts of design innovations (Cohen, 2006).

In Finland there are three primary ways to legally protect a design. The copyright of design (FIN: *mallioikeus*) is the most important for design protection, granted for five years at a time for a maximum of 25 years. Copyrights are possible protections for highly unique or classic designs and provide a strong protection against competitors for up to 75 years. Trademarks can also protect designs on some level, and if granted the right to use and protect the design can be valid infinitely (Rehbinder, 2011).



**Figure 11** The combination of orange, grey and black in axes is a trademark owned by Fiskars (Rehbinder 2011)

Person and Schoormans (2010), however, listed defensibility as a potential strategic property of a design trait which can shield against competition also without legal protection. In other words, unique design or the ability to successfully launch a design in an industry can contribute to claiming a perceptual position among consumers in the market (Person & Schoormans, 2010).



Figure 12 Protected design or not, the classic Jokapoika-stripe by Vuokko Eskolin-Nurmesniemi is distinctly “Marimekko” in the eyes of many Finns

### *Process capital*

Borja De Mozota and Kim (2009) classify design technology capital independently to include research skills, technical skills and programming, in addition to skills used in developing patents and intellectual property. Working with an external research group for new ideas and innovative technologies was one of the dominant methods to develop design technology capital among the case companies in their study (Borja de Mozota & Kim, 2009).

An earlier study by Borja de Mozota (2002) notes design’s importance more widely as a coordinating tool in making other organizational processes more effective or efficient. In particular, the article addresses design as a coordinating tool in the innovation process, as a facilitator and differentiator in the production process, and as a coordinator between marketing and production. In addition to these, design works as a tool for managing change as well (Borja de Mozota, 2002).

One way to analyze the effect of design on processes is through its impact on the product development process, production process, and other organizational processes in more general terms. The latter was exemplified by Borja de Mozota (2002) through design working as a coordinator and relates to the factor of design as a knowledge agent (Bertola & Teixeira) as presented earlier. Design’s contribution to the product development process has been mentioned as a benefit by various authors, such as Lockwood (2007), Hertenstein and al. (2005), and Borja de Mozota (2006). Of these, Herteinstein and al. (2005) drew a conceptual model on how industrial design relates to a new product development process that translates into financial performance. Furthermore, the authors provided quantitative evidence on the positive relationship between good industrial design and several financial measures. Finally, regarding design as an outcome, many studies have underlined design’s contribution to the

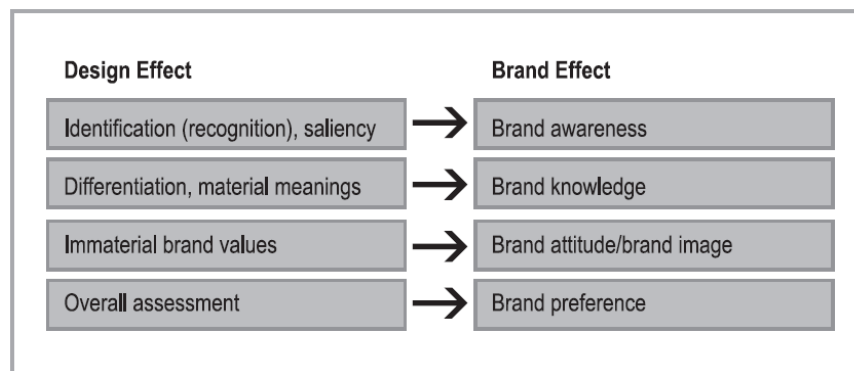


production process by enhancing manufacturability (e.g. Nyberg & Lindström, 2005; Gemser & Leenders, 2001; Hertenstein & al., 2005).

### **Brand value**

Various articles exist on the relationship between brand and design, such as Borja de Mozota (2003) and Koostra and Vink (2007). In addition to graphic design in the brand name and logo, one can find product design in product performance, package design in promotional displays and environmental design in the retail setting. All of the design disciplines mentioned penetrate the assets that build brand value: mission, promise, positioning, expression, notoriety and quality. Design is crucial in creating coherence between the different means of brand communication (Borja de Mozota (2003, p. 97-99).

An article by Koostra and Vink (2007) examines the specific effect of graphic design on brand value. The research conceptually builds the connection between graphic design and brand attributes, as illustrated in Figure 13.



**Figure 13** The effect of graphic design on brand value (Koostra & Vink, 2007)

Moving to the power of product design, appearance and usability of products may build brand awareness and differentiation from competitors as they help associate products with a brand (Hayes, 1990; Bohemia, 2002; Trueman & Jobber, 1998 in Valencia & al., 2011). Both usability and appearance, the core capacities of industrial design (Candi & al., 2010 in Valencia & al., 2011), contribute to the consumers' perceived quality and value for products (Beardsley, 1994; Bohemia, 2002; Trueman & Jobber, 1998 in Valencia & al., 2011).

According to a recent survey by Suomalaisen Työn Liitto (2012), 79% of respondents who found that design improves their position on the market specified that design helps them to differentiate from competitors. Nearly half of the respondents also thought that design improves

their image (48%), builds their brand (52%) and enhances the identification of their products (49%).

### E. Design and relational capital

Large partner networks in sales and marketing present a valuable asset for companies. The possibility to generate superior earnings increases, as networks can enable higher growth rates and market domination through effective distribution channels, for example. However, relational networks including customer and partner relations are not owned by the company and are never in full control of management (Daum, 2003, p. 11). The possibilities for control are affected by the formality of the relationships and their interdependency (Roos & al., 2006, Ordoñez de Pablos, 2002).

Relational capital includes all relations with external actors (Bontis & al., 1999) and can be seen as either a part of structural capital (Bontis & al., 1999, Edvinsson & Malone, 1997, p. 52) or not (Ordoñez de Pablos, 2002, Roos & al. 2006).

Table 3                      Summary of the composition of relational capital

RELATIONAL CAPITAL		
CUSTOMERS	SHAREHOLDERS	OTHER
(Bontis & al., 1999, Roos & al. 2006, Ordoñez de Pablos, 2002)	(Bontis & al., 1999, Roos & al. 2006)	
		<ul style="list-style-type: none"> <li>allies (Bontis &amp; al., 1999)</li> <li>societal relations (Roos &amp; al. 2006)</li> <li>local communities (Bontis &amp; al., 1999)</li> <li>government (Bontis &amp; al., 1999)</li> <li>partners (Roos &amp; al. 2006)</li> <li>funders (Roos &amp; al. 2006)</li> <li>diffusion and networking</li> <li>intensity, collaboration and connectivity (Ordoñez de Pablos, 2002)</li> </ul>

### Customers

It is generally acknowledged among scholars and practitioners that product design builds customer relations through design's impact on aesthetics and brand differentiation. Borja de Mozota (2006) claims that through acting as a differentiator, design builds customer loyalty for a company. Lockwood (2007) mentioned in his framework for measurement of design both the power of design to have a positive effect on customer's emotional relationship with the brand, as well as design's power to develop communities of customers. Practical real-life examples include the boom of Apple's products in the high-tech sector of smartphones and personal computers – of which the loyalty of customers have extensively been attributed to successful product design.

In his article *Lock-in to Lock-out: Using Design to Build Fiercely Loyal Customers*, Alexis (2006) argues that design managers have an important role in building customer loyalty particularly through three levers: distinctive solution, emotional connection and favorable economics. According to the author, the success of the products of Apple relate to applying multiple levers, particularly emotional connection with customers and favorable economics, or in other words, design solutions which reduce complexity.

### Shareholders

Borja de Mozota (2003, p. 113) notes that in the future, design will play an important role in a firm's financial (owner) relationships, among other relationships – and remarks that the design process is an identity process that defines the company for itself, its customers and its investors (p. 17). One significant research proving the conceptual argument of design's role in building a company's financial relationships (e.g. Borja de Mozota, 2003, p. 113) is a study by Aspara (2009) on the behavior of Finnish investors in the financial market. In his research, Aspara (2009) found that investors' subjective product design evaluations positively influenced the willingness to invest in that particular company's stock. Aspara (2009) suggests that the results imply a company's potential to utilize a product design's potential in attracting investments.

### Other stakeholders

Best (2006, p. 188) sees that there is a growing trend in design-intensive companies to leverage the value of design research and education through relationships with external parties. For example, such collaborations include 'knowledge transfer relationships' with universities and research clusters (Best 2006, p. 188).

Another way design can be seen to build relational capital is through its snowball effect on new potential customers or investments. As investors look at the design team and the client list of a design company before establishing if the design assets are likely to build value (Best, 2006, p.

191), existing relational capital is prone to build up more capital should the network of a company be particularly interesting.

All in all, there seems to be a general claim in the market that design as an outcome, such as a differentiated product or coordinated or attractive brand identity can make a company attractive to all stakeholders (Aspara 2009, p.26).

## F. Framework on impact of design on intangible capital

To conclude, the literature review including studies from the design management field and the viewpoint on the composition of intangible assets can be combined to form a framework on the different aspects of intangible capital design accumulates (Figure 14 below). It must be noted that the framework includes identified areas within this study design may impact and thus some areas are left without notion. As the figure below illustrates, through brands, rights and processes design seems to impact particularly the structural capital of a company.

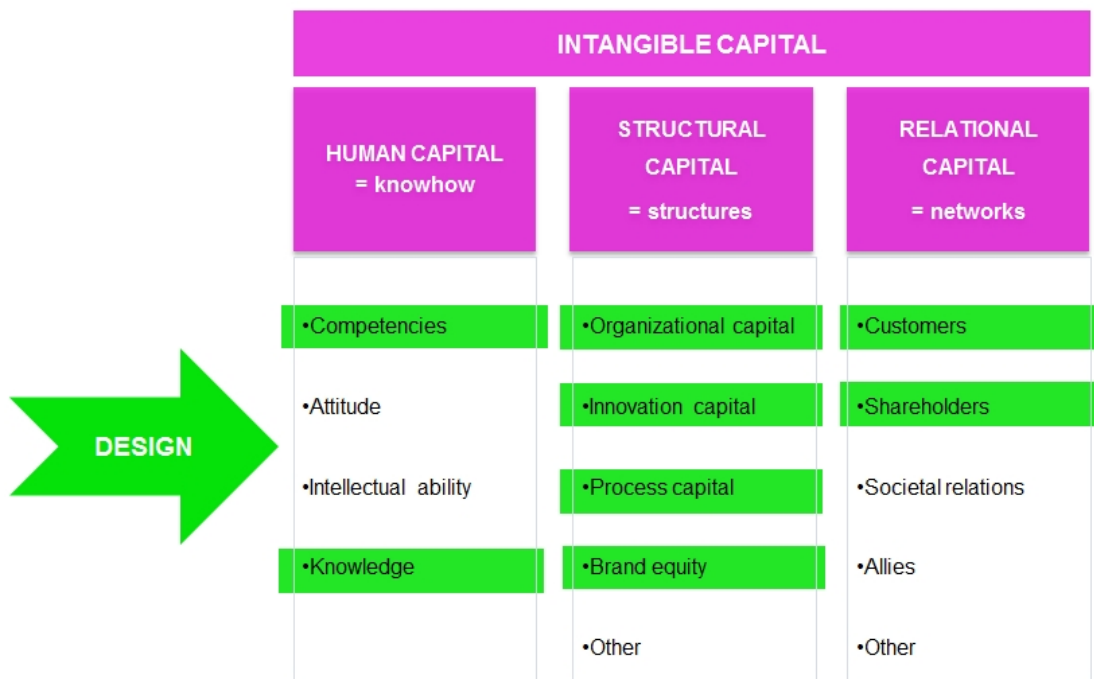


Figure 14

Framework summarizing areas of intangible capital design may impact

## IV. INTANGIBLE CAPITAL AND MARKET-TO-BOOK RATIO

Having established through theory that design builds the intangible capital of a company (research question 1), this chapter moves the focus toward discovering a method to empirically demonstrate the effect of design on a company's intangible capital. In this chapter, the possible use of market-to-book ratio, or the relative amount by which the market value of the company surpasses the accounted book value, as an indicator of the level of intangible capital of companies actively using design is examined.

Various scholars have studied the relationship between intangible capital and the market-to-book ratio both conceptually (e.g. Sveiby 1997) and empirically (e.g. Lev 2001). The first part of this chapter breaks down the market-to-book ratio by establishing the connection between book value, market value and intangible capital. Alongside this, the accounting of design and previous research on the relationship between the market value of a company and active use of design is covered. The latter part of the chapter establishes market-to-book ratio as an indicator of the level of intangible capital and acknowledges the limitations set forth by its use.

### A. Intangible capital and the book value

The purpose of this section is to give a short overview of the intangible assets acknowledged in financial accounting, or in other words the intangible assets that are activated on the balance sheet as an asset or reported on using accounting standards. As explained earlier, in financial accounting "intangible assets" is a term used to refer to intangible capital that can be activated on the balance sheet (Ihantola & Leppänen, 1998, p. 196 see Lönnqvist, 2004, p. 34). Intangible assets are typically long-term and difficult to value until the company is sold (Daum, 2003, p. 16). The accounting standards in use vary between countries.

International Financial Accounting Standards (IFRS), adopted by the International Accounting Standards Board (IASB), are financial reporting standards in place in over 100 countries worldwide including the United Kingdom and Finland (IFRS, 2012). The accounting of intangible assets is regulated in IAS 38 (World Gaap Info 2012a), which requires a company to recognize an intangible asset if, and only if, specified criteria are met.

IAS 38 defines an intangible asset as an identifiable, non-monetary asset without physical substance. In order to account for the intangible asset, the item has to meet (1) the definition of an intangible asset and (2) the recognition criteria. Concerning the criteria for identifying an intangible asset, the asset meets the criteria if it (1) is separable, in other words capable of

being sold, transferred, licensed, rented or exchanged as it is or together with a related contract asset or liability, or (2) arises from other contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights or obligations. Other criteria include the control of the asset and its probable expected economic benefit (World Gaap Info 2012a).

Intangible assets on the IFRS balance sheet are divided into three main categories: research and development (R&D), goodwill and other intangible assets. In special cases, R&D expenses and immaterial property rights can be activated if they are expected to bring economic value in the future. In the case of company acquisitions, the difference between the book value and purchase price is deducted to represent the value of intangible assets and accrued under the sole title of 'goodwill' (Daum, 2003, p. 16). The accounting of intangible assets, however, remains difficult.

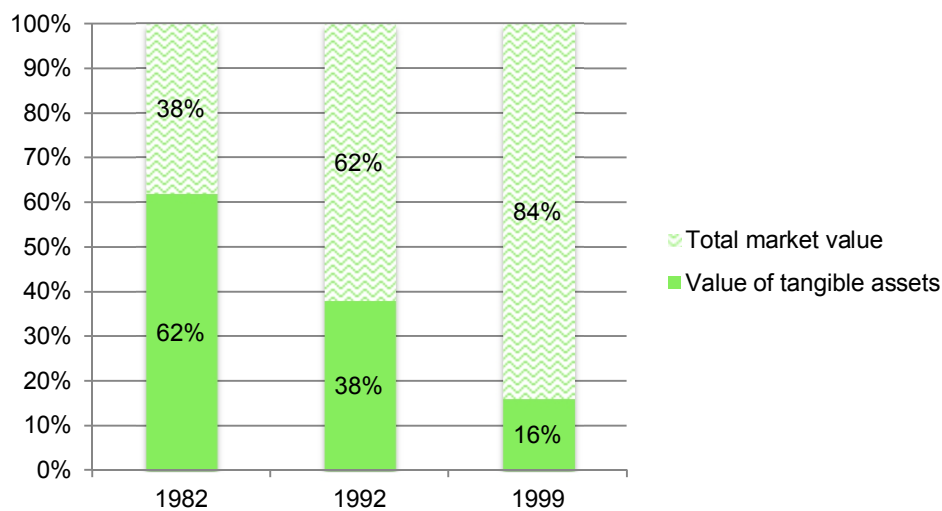
Similarly, activating design on the balance sheet is difficult as design is neither monetary nor tangible, and considering that design is defined as an outcome (essentially plan), process or capability. Examples of identifiable parts of design that can be activated on the balance sheet include acquired or licensed rights, patents or trademarks. It could be argued however that from a holistic viewpoint, the value of design may prevail through the accounting of goodwill.

IFRS 3 (World Gaap Info 2012b) requires that all assets and liabilities, whether tangible or intangible, acquired through a business merger are to be valued at the residual amount and categorized as goodwill. However, internally generated goodwill such as brands and customer lists cannot be recognized as assets because the cost of such items cannot be distinguished from developing the business as a whole (World Gaap Info 2012a). Thus, the accounting of such items is limited to acquired goodwill of which the value can be traced back to specific transactions and events. This has not been seen to give a sufficient picture of a company creating added value with its intangible assets and the success of its process, as the rules only apply to acquired intangible assets (Daum, 2003, p. xvi). This finding provides the basis for the notion that the financial statements do not explain the full value of companies.

## **B. Intangible capital and market valuation**

As presented in this study's introduction, conventional financial reporting fails to explain a large part of corporate market value. For example, Lev (2001, p. 9) studied 500 corporations from US Standard and Poor's (S&P) over the period of 1977-2001 and found that 80% of the value of the company is not accounted for on the balance sheet.

According to some authors such as Sveiby (1997, pp- 3-7), definitions of intangible assets were originally presented to explain the growing difference between market value and book value of a company in the latter part of 1990's. Although this gap, presented in Figure 15 below, has narrowed since 1999 it is still significant (Sáenz 2005). Granting this difference cannot be used as itself to measure value of intangible assets (Lev, 2001, p. 9), the connection between intangible assets, book value and market value of company prevails through accounting goodwill as established in the previous section.



**Figure 15** Development of the value of intangible assets as a percentage of total market value of S&P 500 companies between 1982 and 1999 (Daum, 2003, p. 4)

Daum (2003, p. 12) notes that the one of the most fundamental changes that intellectual capital acknowledgement has brought is that economic control is no longer solely based on the ownership of financial capital and assets.

The current knowledge-based economy and its supposed influence on the stock market is generally explained through two opposing views (Bond & Cummings in Hand & Lev, 2003, pp. 95-119). A prevailing view among major authors such as Sveiby (1997, p.12), Daum (2003, p.4) and Edvinsson and Malone (1997) regard the difference between a company's market and book value as the effect of investments on intangible capital. According to the other view, stock market valuations of a company – unless the market is strongly efficient – do not reflect the fundamental value of a company (Bond & Cummings in Hand & Lev, 2003, pp. 95-119). These limitations are discussed further throughout this chapter.

These opposing views, however, generally share the notion that the capital of a company consists of both tangible and intangible components. Likewise, it is generally noted in conventional stock market theory and among intangible capital authors that the market value of a company reflects expected future earning potential (Sveiby, 1997, p. 8). The vagueness surrounding this subject stems from the question of the extent to which market value reflects the value of intangible assets that fail to be grasped by conventional financial statements.

Although debate remains on whether or not market value reflects the value of intangible assets (e.g. study by Bond & Cummins in Hand & Lev, 2003, pp. 95-119), stock market valuation prevails as an indicator of the value of the intangible capital owned by the company, both in the academic field (Daum 2003, p.4; Wang 2008) and in the business world.

*“Nokian osake on kallistunut kuluvalla viikolla Helsingin pörssissä jo lähes 15%. Kehitys alkoi maanantaina, kun ohjelmistoyhtiö Google kertoi aikeistaan ostaa Motorolan matkapuhelintoiminnot.”*

MOTOROLA-KAUPPA PALJASTI NOKIAN PATENTTISALKUN ARVON

*” Nokia’s share price rose 15% in the Helsinki stock exchange during the past week. The development started on Monday, when Google informed about its intentions to buy Motorola’s mobile technology functions.”*

MOTOROLA ACQUISITION UNCOVERS THE VALUE OF NOKIA’S PATENTS

HS 17.8.2011, B-osa

The dominance of stock market valuation as an indicator of the value of intangible capital in the academic world was evident in an article by Marr & al. (2004) that reviewed four key models that addressed the measurement of knowledge assets. Of these four key models, the authors of the Scandia Navigator (Edvinsson & Malone 1997), the IC-Audit Model (Brooking, 1996) and the Intangible Asset Monitor (Sveiby, 1997) all have based their reasoning for the difference between a company’s market and book value companion the intangible elements possessed by an organization as presented in Figure 16 below.

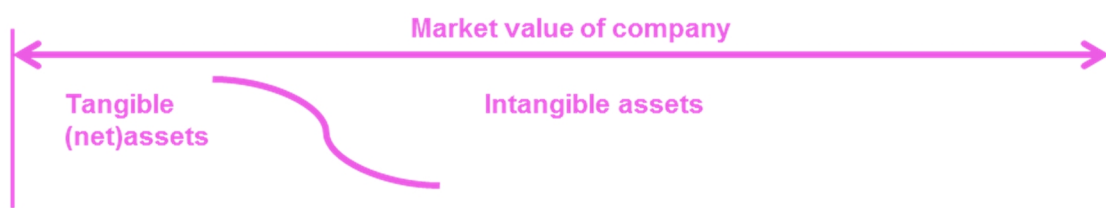


Figure 16 The total market value of a company (adopted; Sveiby, 2007, p. 12)



### C. Design and market valuation

Recent studies in the design field have noted the impact of design on business performance. For example a study by the Design Council (2004) found that design effective companies outperformed others by 200 % on the stock market (see Figure 17 below). Teknikföretagen (2011) corroborates with their findings of profitability of companies with long-term investment into design bearing 50% higher than those that do not use design.

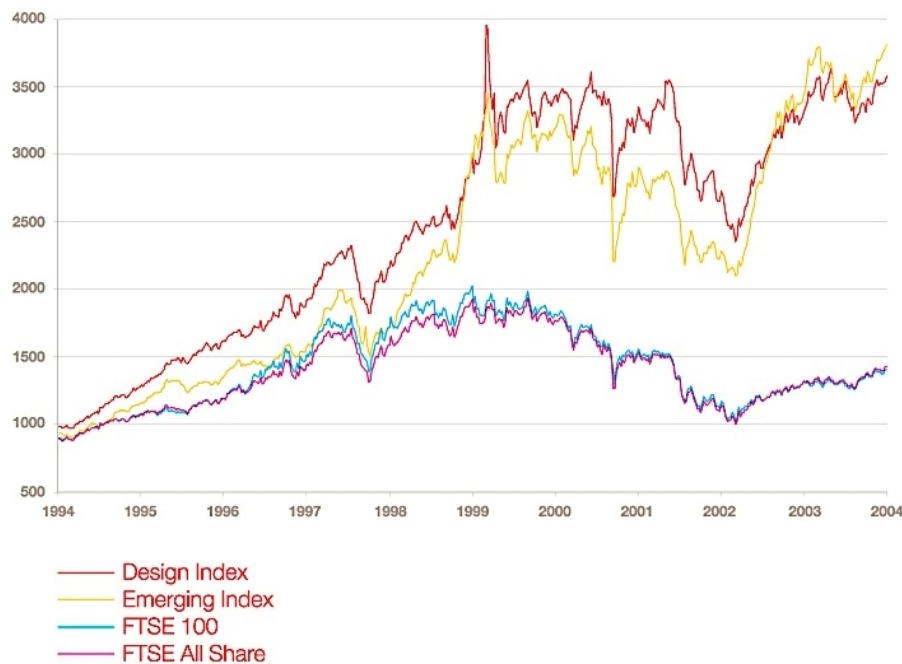
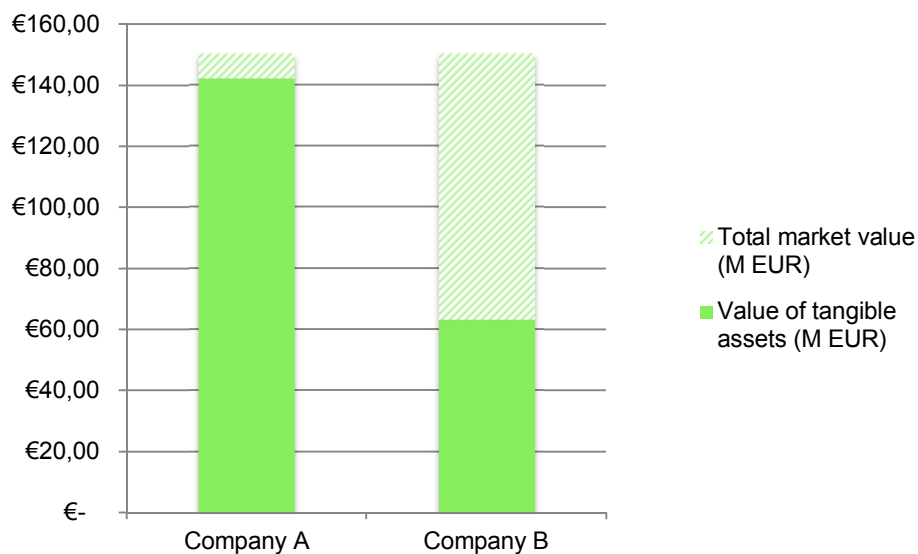


Figure 17 Development of Design Index compared to the industry average (Value of Design Factfinder report 2007, p. 14)

Hertenstein & al. (2005) examined the relationship between industrial design and company financial performance. The results showed that the use of effective industrial design and stock market performance correlated positively. A study by Nyberg & Lindström (2005) concluded that the relationship between investments in design and the price-to-earnings ratio is positive in the metal industry, but significant statistical evidence could not be obtained.

However, few studies exist that examine the relationship between market-to-book ratio and design. Of these, a study by Pauwels & al. (2004) studied investor reactions to new product introductions and redesign in the automobile industry, though the setting differs quite a bit from the outlay of this thesis.

As the market value of a company includes the valuation of its tangible assets, by itself it does not reflect the value of intangible capital. For instance, a company with heavy investments in machinery and plants and no debt might have an equal market value as a company with low tangible investments as illustrated in Figure 18 below. Showing the relationship between the book value and the market value of a company allows the assessment of items excluded from the balance sheet – including design.



**Figure 18** Illustration on the deficiency of market value as an indicator of the value of intangible capital

#### D. Intangible capital and market-to-book ratio

The market-to-book ratio (MBR) measures the relative amount in which the market value of a company surpasses its stockholders equity (Sáenz 2005). The market value added and the market-to-book ratio are identical, with the only difference being that market value added is an absolute measure and market-to-book ratio is a relative measure. According to a number of studies, the market value of companies with high intangible assets is significantly higher than the calculated book value (e.g. Chen & al., 2005; Sáenz, 2005). These studies have been done in different sectors and with different methods.

In their research, Chen and al. (2005) used the Value Added Intellectual Coefficient (VAIC<sup>TM</sup>) – a measure of the efficiency of value added by corporate intellectual ability – as an aggregate measure of a corporation's intellectual ability. A study conducted on companies listed on Taiwan's stock exchange found that MBR is positively related with VAIC, and in particular with the two components of corporate intellectual ability: capital employed efficiency and human

capital efficiency (Chen & al., 2005). However, a recent article criticized the use of VAIC as an indicator of intellectual capital, as it indicates instead the efficiency of the company's labor and capital investments (Ståhl & al., 2011).

A study by Sáenz (2005) introduces a methodology to study the relationship between intellectual capital (IC) indicators and the market-to-book ratio. In its explanatory application within the Spanish banking industry, preliminary results showed a clear, positive relationship between human capital indicators collected from IC reports and MBR. This study assumed that information regarding human capital may only affect the market value of shares once published, so the correlation analysis was done comparing the average human capital rate with MBR the following year.

Some studies have found conflicting results of the relationship between MBR and IC. For example, a study of 75 publicly traded companies in South Africa found no clear correlation between intellectual capital and market value (Firer & Williams, 2003). However, it is unknown whether or not the implications of intangible capital in creating firm value differ in emerging economies. Also, another study on the Greek economy presented similar results (Madinios 2011), again with external factors (economic trends 2006-2008) making the findings dubious.

Market-to-book ratio has been previously shown to correlate with more specific parts of intangible capital as well. Kerin and Sethuraman (1998) found a positive relationship between MBR and brand value, revealing the linkage between the conceptual argument of brand as an asset with economic value and empirical documentation of its shareholder value. The setting of this study is similar to that of Kerin and Sethuraman (1998) in the marketing field as the aim of this study is to examine whether there is a correlation between the MBR and active use of design, in order to provide empirical evidence for the conceptual argument of the power of design in building intangible capital of a company.

## **E. Limitations of market-to-book ratio**

Two major limitations related to the use of market-to-book ratio to examine the level of intangible capital include (1) exogenous factors affecting stock market valuation and (2) the valuation of tangible assets in the financial statements (IFAC 1998). Detailing these points further:

- (1) The expectations of future profits of the company are not only based on internal factors or management capacity of the companies, but also depend on external factors such as general economic situation and the political context. (IFAC 1998)

- (2) The book value of a company does not fully reflect the value of its tangible assets. As fixed assets are often valued at their historic cost, this might substantially differ from its current market value. Also depreciation policies in use can distort the true value of the tangible assets. (IFAC 1998)

Sáenz (2005), however, notes that despite these limitations the use of MBR and its interpretation as reflection of intangible capital is valid, when the companies being compared employ the same types of fixed assets (resolving limitation number 2 above) in addition to competing on the same market and sector of activity (whereby the external factors affect all companies equally, resolving limitation number 1).

A third limitation to add regarding the use of MBR to IC indicators is the concept of asymmetrical information.

- (3) Studies have found a positive, significant correlation between IC disclosure and market capitalization. (Abdolmohammadi, 2005)

This study does not take into account the possible reporting of intangible assets or design effectiveness, unless the publicity of design awards is noted as such.

## **F. Use of market-to-book ratio in this study**

Through theory it is acknowledged that although the market-to-book ratio as an indicator of the level of intangible capital carries its weaknesses, it is a relatively common method of examining the appreciation of a company and its intangible assets. Alike intangible assets, limited amount of design can be activated on the balance sheet. This thesis adopts the viewpoint shared by many authors in the field of intangible capital theory: the difference between the market value of a publicly held company and book value reflects the value of the company's intangible assets. Previous studies showing the connection between high market value and active use of design may imply that design can contribute to a higher level of intangible assets.

In part, choosing the market-to-book ratio as a key variable answers the second research question of how to demonstrate the effect that design has in building up the intangible capital of a company. In the following chapter the methodology is developed further in order to carry out a case study analysis to test the methodology and to obtain indicative results.

## V. METHODOLOGY AND DATA COLLECTION

This study uses mixed methods to address the three research questions presented in Chapter I. Qualitative methods are used to establish relationships between design, intangible capital and the market-to-book ratio (research questions 1 & 2, also partly research question 3), whereas quantitative methods within a case study are used to test and apply constructs (research question 3). The case study companies were chosen from a prior study by the UK Design Council (2004) on active and effective users of design named as Design Index companies. The following chapter explains further the research method of this study and the data collection.

### A. Research method

The first part of the thesis was a theoretical study combining literature from design field and intangible capital theory in order to develop a construct on how design builds intangible capital of a company. Literature review was also used to view the possibility of using the market-to-book ratio, the amount by which the market value of a company surpasses its book equity, as an indicator of the level of intangible capital especially in the context of companies with active use of design. The third research question is addressed in the following chapter with a multiple case study method bordering on quantitative study. The chosen Design Index companies are examined mainly with quantitative methods, although qualitative methods are used to bring further insight into the research question at hand.

The approach on designs impact on intangible capital is an inductive, theory building research based on case studies. The case studies are particularly strong in early stages of research on a topic when little is known about a phenomenon and current perspective do not have sufficient empirical substantiation (Eisenhart, 1989) such as combining two traditionally very separate research fields, design research and accounting.

As a side-note to be mentioned some perceive case studies as described by Eisenhart (1989) mainly for applied social or organizational studies. The method as it seems is familiar in the management accounting field as well (e.g. Keating 1995). Although the case study method is not used as a mean to develop intimate, contextually sensitive knowledge of actual management practices for accounting research (Keating 1995) the outlay of the study carries similarities to this. The value of design established through theory lies in the organizational context. Although the empirical study focuses on company exterior information (market value), the implications of results lie in the hands of the management decision to value the impact of design.

Building theory from case study research focuses on understanding the dynamics present within single settings, although single or multiple cases can be involved (Eisenhart, 1989). In order to gain a good understanding of the phenomenon and have the possibility to generalize the results of the study into preliminary findings, this research consists of multiple cases.

In addition to different levels of analysis the data collection is typically diverse in case studies, as this provides stronger substantiation of constructs and hypothesis. (Eisenhart, 1989) In this study the case companies are primarily analyzed with quantitative methods, although qualitative data, which according to Eisenhart (1989) is particularly useful for understanding why or why not emergent relationships hold, is used to elaborate and comprehend single cases.

Although ideally adding cases until saturation of findings is the answer, typically in case study research 4-10 companies is a sufficient number as more adds to the complexity of analysis (Eisenhart 1989). The large number of case companies chosen for this research diminishes the possibilities for qualitative research in this study and thus case descriptions are rare and rather presented to provide insight. The large number of cases within this study also prevents becoming intimately familiar with each case as a stand-alone entity generally assumed by the methodology (Eisenhart 1989).

Granting it is likely that theory-building from case-study research generates novel theory, which can be empirically valid or testable with constructs that can be readily measured and hypotheses that can be proven false, the methodology carries its weaknesses as well. Depending on use of empirical evidence, the resulting theory may be complex theories or turn out narrow and idiosyncratic. (Eisenhart, 1989) The purpose of this study is to contribute to a fairly new stream of research of how design builds intangible capital. As well as lacking further theoretical background research, up-to-date few have managed to use quantitative methods to validate the construct of designs impact on intangible capital. While using case studies hinders the possibility to extract generalizable fact on the effect of design on intangibles, the methodology introduced may be used in future studies to validate the construct further.

## **B. Case study companies**

Random selection of case studies is neither necessary nor preferable in case study research as the goal of the theoretical sampling is to choose cases likely to replicate or extend the emergent theory in oppose to cases chosen for statistical reasons (Eisenhart, 1989). The selection of the

case was done on the basis of a previous study by the UK Design Council (2004), which had developed a method to identify design effective companies.

*“This study sought to develop an objective, comprehensive, means of identifying companies that were active and effective users of design and then to compare their performance as a group with that of quoted companies in general.” (Design Council 2004, p. 6)*

#### a. Design Index companies

The case study companies were chosen from a previous research by the UK Design Council (Design Council 2004; Design Council 2005), which analyzed the stock market performance of design effective companies. The Design Council (2004) chose companies which are active and effective users of design on the basis of a number of nominations and awards in different design competitions. Additionally a separate panel reviewed FTSE 350 for design effective companies to ensure completeness of the analysis. Companies were awarded points for nominations or awards in the five categories listed in Table 4 below. (Design Council 2004)

**Table 4** List of design award categories as criteria (Design Council 2004)

Name of Scheme	Scheme sponsor	Type	Time period
Design Effectiveness Awards	Design Business Association	Awards for <b>commercially successful design</b>	1993 to 2003
D&AD Awards	D&AD	Awards in 27 different categories encompassing all aspects of the <b>visual communications</b> mix	1993 to 2003
Interbrand	Interbrand	Publishes a list of the most <b>valuable brands</b> on the market, only 6 achieved in this sample	1999 to 2003
Millennium Products	Design Council	Awards for new products and processes, leans towards <b>innovation</b>	2000
Panel Nominations	Design Council	Design Council experts considered FTSE 350 companies which should be <b>considered as effective users</b> of design	2000

The Design Council (2004) divided the emerged 163 companies into two groups – the Design Index and the Emerging Index on the basis of total number of points from these schemes. Whereas the first required a minimum of seven points for inclusion, for the latter only one point was enough for the listing. In this study only the companies in the Design Index group were chosen for analysis, because one nomination which was enough for the inclusion in the Emerging Index was not considered to be a sufficient demonstration of the level of active use of design.

As the study of design intensive companies is relatively old, a number of firms listed in the Design Index have been de-listed since December 2004. Of the original 63 companies, 29 have been acquired, re-structured or bankrupt. For these data was not available through the London Stock Exchange service of company profiles.

As the analysis was focused on analyzing a relative ratio, companies with negative net assets were not chosen under closer examination. Although negative net assets might imply a greater difference to the market valuation of the company, the analysis of relative numbers enables the comparison between different companies regardless of their size. Leaving out the companies with negative net assets during the years 2007-2010 lead to elimination of a total of 13 companies. Additionally for two companies the financial data available through the London Stock Exchange website was not sufficient for calculations.

Although leaving out design intensive companies which have been de-listed or have negative net assets may potentially affect the results of the study, the possibility to collect reliable data from the London Stock Exchange company profile service was valued higher. The final count of design effective companies for the purposes of this study was 19.

#### b. Comparison groups

For the analysis of non-design effective companies, a selection was made from the population for analysis under the criteria of

- (1) listed in FTSE 350
- (2) available data for the calculation of MBR (2010-2007)
- (3) not listed in the original Design Index

According to Sáenz (2005), the despite the limitations of MBR (covered in Chapter IVE Limitations of market-to-book ratio) the use of the market-to-book ratio may be suitable when the companies under analysis compete in the same market and sector of activity, employing the same type of fixed assets. As the number of comparable companies is limited in the FTSE350, two different comparison groups were formed. The first comparison group includes companies from the same sector and sector of activity, forming a high-quality but small group for comparison. The second comparison group was formed to have a high number of comparable companies with same proportion of companies from the same or similar type of sector.



In the *first comparison group*, for each design effective company operating in a sector and subsector, two companies not listed in the original Design index from the same field and activity were chosen for the analysis (illustrated in Figure 19 below).

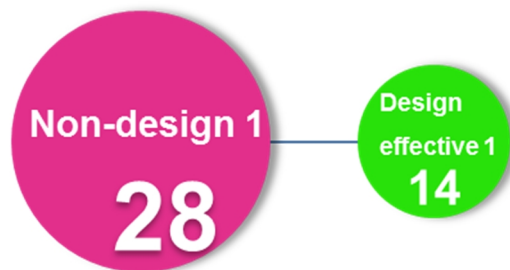


Figure 19 Comparison group 1

When there were more the needed amount of companies listed on the same market and activity, the comparable companies were chosen randomly. In cases in which there were not enough comparable companies in the same sector and sector of activity, the design effective company was eliminated. Thus the total of design effective companies resulted in 14, with a comparison to 28 non-design effective companies.

The *second comparison group* was formed by selecting randomly a control group four times the size of design effective group in the same proportion of comparable companies from the same sector, or same type of sector. For example, when there were not enough companies with positive net assets listed in the FTSE350 on a sector such as Food and drug retailers, some companies from the General retail sector were chosen to supplement for the loss. The total of design effective companies for the second comparison group was 19, with the sample from the population being 76.

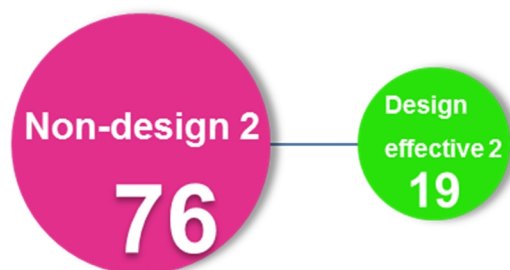


Figure 20 Comparison group 2

### C. Data and calculations

The data for analysis was gathered through the website of London Stock Exchange. In order to ensure high comparability between the companies, a company profile service on the London Stock Exchange website was used to get financial data in the same form from each company (London Stock Exchange 2012a).

The calculation of MBR requires the details on share price and the value of net assets per share. Net assets per share –ratio is informed in the company profiles excluding intangibles, which adds a great deal of comparability in the figures, as companies may activate to different extent their intangible assets. Details on share price for different years were not included in the company profile sheets.

The closing share price was calculated by two different means. The primary method for calculating the share price was through dividing dividend per share with dividend yield. For years during which no dividend was shared among shareholders, a secondary method of multiplying the price-to-earnings (PE) ratio with earnings per share was used. The secondary method was found less accurate as the price-to-earnings ratio is stated as informed by the company directly (London Stock Exchange 2012b). Nevertheless, excluding a few larger differences, the difference between the final MBR figures was continually less than 2,5 %.

Wetherspoon J D plc	£				
	25.7.2010	26.7.2009	27.7.2008	29.7.2007	
Dividend per share (p)	12,00	n/a	12,00	12,00	
Dividend Yield	2,80 %	n/a	5,20 %	2,10 %	
Earnings per share - adjusted (p)	36,00	32,60	27,60	28,10	
PE ratio - adjusted	11,9	13,8	8,4	20,5	
Closing share price (p)	428,57	#VALUE!	230,77	571,43	
Closing share price (p)	428,40	449,88	231,84	576,05	
Net Asset Value per Share (exc. Intangibles) (p)	115,22	117,29	124,70	114,79	
Market-to-Book ratio	3,72	#VALUE!	1,85	4,98	
Market-to-Book ratio	3,72	3,84	1,86	5,02	
	-0,04 %	#VALUE!	0,46 %	0,81 %	

Figure 21

Example of the calculation of the market-to-book ratio

Naturally, the fiscal years vary between the companies. For the purposes of this study, a simplification was made by accounting the calculated ratios under full calendar years. In other words, the calculated total MBR average of design effective companies in 2010 for example could include a ratio of one company in June 2010 and a ratio of another from December 2010. This simplification adds to the limitations of this study, as the exogenous factors affecting the share price might differ in the different times. As the set under analysis was limited, a further break down into ½ years or quarters would not have served the purposes of this study.

The years chosen for analysis were 2007 to 2010. The chosen years include both bear market periods (general decline in the stock market) during years 2008-2009 and bull market periods in 2007 and 2010.

All companies analyzed were divided according to their primary offering: product, service or focus on the retail sector (Table 5). Attempts at a division in business-to-consumer versus business-to-business commerce were found fruitless, as many of the firms directed their offering equally to both target groups.

**Table 5**                      **Number of design effective companies under analysis**

<b>DESIGN INDEX COMPANIES - GROUP 2</b>				
	<b>2010</b>	<b>2009</b>	<b>2008</b>	<b>2007</b>
<b>Count (all)</b>	19	19	18	19
<b>Count (Product)</b>	5	5	4	5
<b>Count (Service)</b>	10	10	10	10
<b>Count (Retail)</b>	4	4	4	4

## VI. CASE STUDY FINDINGS & DISCUSSION

The results of the case study in both comparison groups 1 and 2 show, that product offering design effective firms tend to have significantly higher market-to-book ratios than the control groups. The similar relationship is dominant in the retail subgroup as well, although the strength of the trend is considerably lower. The results of the service subgroup as well as all companies together are too unclear to lead to credible conclusions. The Figure 22 below shows the full results of the empirical analysis in the larger, less qualitative comparison group.

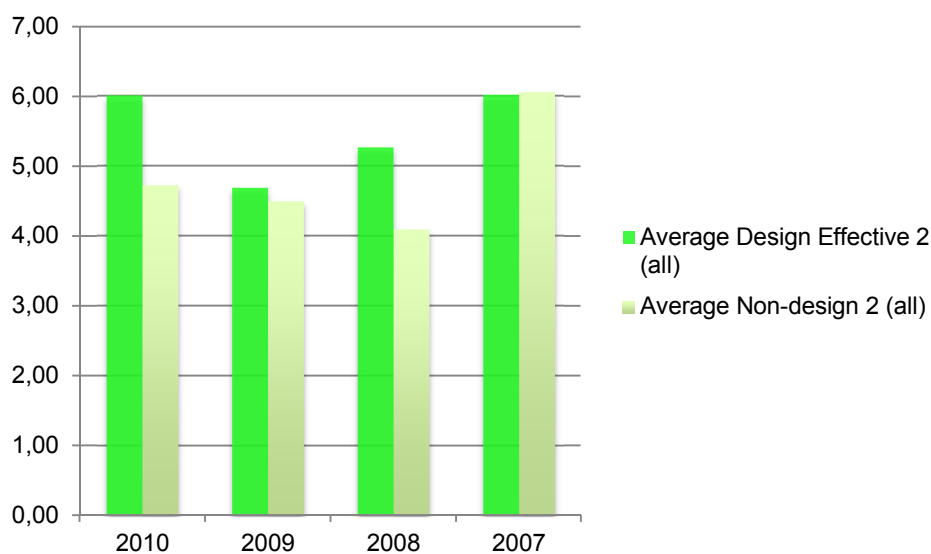


Figure 22 Market-to-Book ratios of all companies in comparison group 2

In the following chapter we look at the underlying reasons behind the results by separately analyze the three subgroups: product offering, service offering and retail sector. Differences between the results of the two comparison groups as well as the subgroups are considered in the first section. In the final part the external factors and other agents affecting the results are analyzed.

### A. Variance between analysis groups

As explained earlier, the analysis of design effective companies against a control group was done in two comparison groups. The first was considered more qualitative as the control group was formed of companies in the same sector and subsector as the group of design effective companies. The small number for companies under analysis in the first comparison group,

however, may skew the results of the study in cases in which one company has a markedly larger value than the mean in the group. The second comparison group, although substantially bigger, is also subject to skew to a certain point in this case. Table 6 below shows the standard deviation of the control groups.

**Table 6** Standard deviation of control groups

Standard deviation	2010	2009	2008	2007
Non-design 1 (n28)	6,02	13,32	7,52	14,68
Non-design 2 (n76)	10,87	8,81	5,29	10,12

Variation from the mean is as expected smaller in the larger comparison group of non-design companies, with the exception of 2010. If, however, one particular company with high values (Cobham plc) which is included in the control group 2 is excluded from the analysis, the sample standard deviation drops to 4,36 in 2010 – bringing the standard deviation of control group for the second comparison significantly lower than the Non-design 1 control group.

Although the second control group has lower standard deviation, the first comparison group is considered equally qualitative due to the outlay of chosen companies representing the same industry as explained in V Methodology and data collection. Analyzing the results the outcome is considered more reliable if both comparison groups 1 and 2 support the same trend.

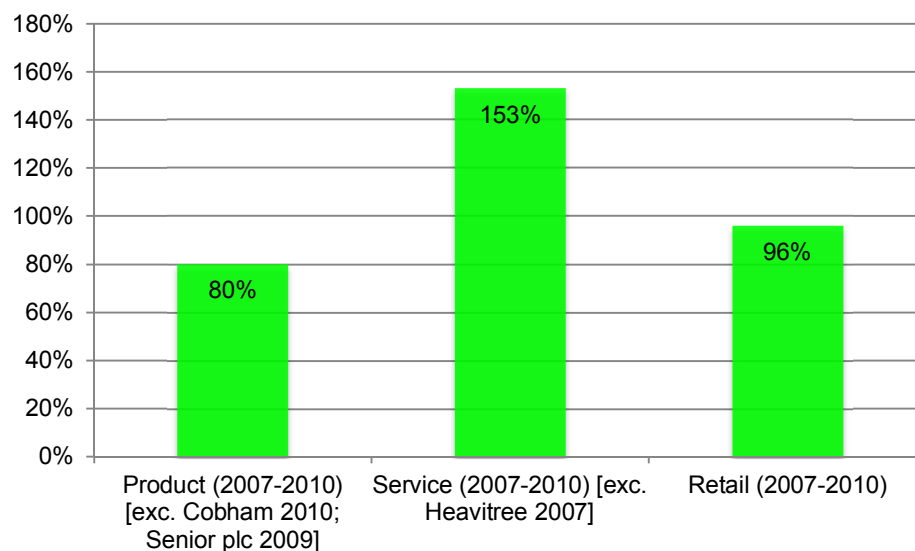
The outcome from the different comparison groups differed to some extent (full list in appendix III). As we see from Table 7 below, the differences between the two comparison groups were relevant especially for non-design companies (the control groups).

**Table 7** Differences between the average values of the two comparison groups

Differences between the two comparison groups	2010	2009	2008	2007
Average Design Effective 1 (n14)	7,36	4,42	5,99	7,23
Average Design Effective 2 (n28)	6,01	4,69	5,26	6,02
Difference all (%)	22 %	-6 %	14 %	20 %
Average Non-design 1 (n19)	4,56	6,71	4,96	8,82
Average Non-design 2 (n76)	4,73	4,50	4,09	6,05
Difference all (%)	-3 %	49 %	21 %	46 %

Analyzing the differences between the two comparison groups shows us, that leaving out the companies deviating from the mean the most brings the two results of the two groups closer to each other. Although this does not explain to full extent the figures, it suggests that the differences are caused by a few marginal cases affecting the results heavily. In the analysis of the results this aspect is taken into account. Also the companies with market-to-book values differing from the mean offer interesting areas of qualitative analysis.

Another explanatory factor for the difference in results between the two comparison groups shown in Table 7 is the service subgroup, where the first control group (n12) on average returned an average of 76% higher values on the market-to-book ratio than the second control group (n40). In fact, analysis on the relative variability between the three subgroups product, service and retail shows, that variation within the service subgroup is by far the highest. Figure 23 shows the coefficient of variation of the three subgroups excluding one or two values for each year which deviate from the mean the most, as the inclusion of these would have an excessive impact on the results. The excluded values were Cobham plc 2010 (MBR 85,85), Senior plc 2009 (MBR 66,33) and Heavitree Brewery 2007 (MBR 71,65).



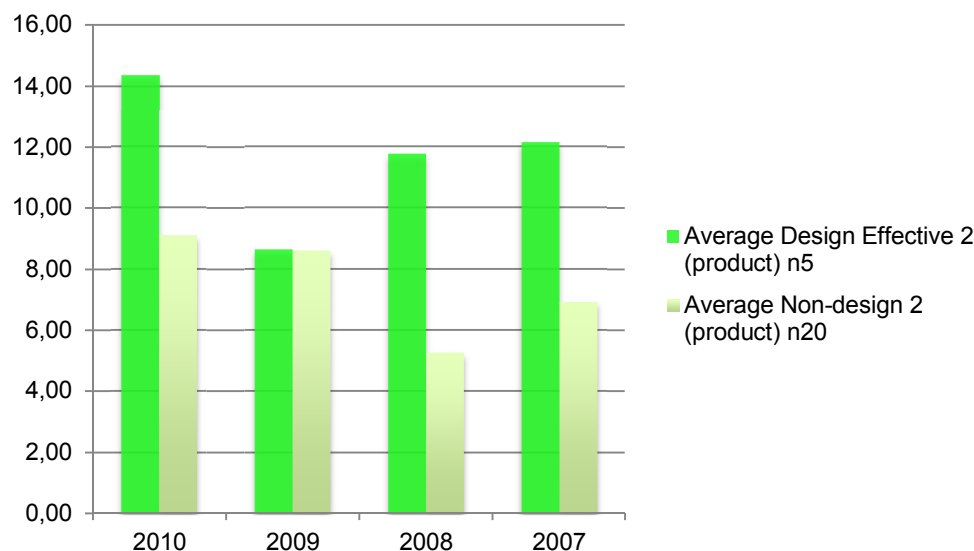
**Figure 23** Coefficient of variation of the three subgroups from control group 2

The implications of the analysis presented in Figure 23 suggest, that the results from subgroups product and retail are more likely to deliver reliable results. It must be noted, however, that the standard deviation of the companies under analysis was relatively high in all subgroups which reduces the reliability of the results. However, the outlay of the research is considered strong

enough to obtain preliminary results on the relationship between design effective companies and market-to-book value.

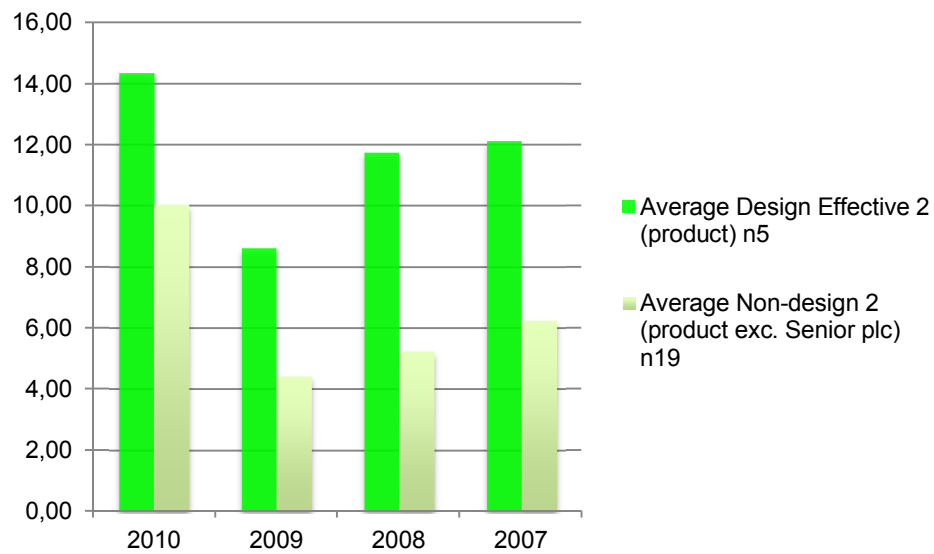
## B. Product offering subgroup analysis

Analysis in both comparison groups 1 and 2 of companies in the product offering subgroup show clearly, that the case companies have higher market-to-book ratios than the control group during the years 2010, 2008 and 2007. The biggest difference between the two groups can be found in 2008, when the book value of the design effective companies on average failed to explain 91 % of the market value while the corresponding percentage of the control group was 81%. Figure 24 below shows the full results of the market-to-book ratio for the product offering subgroup 2.



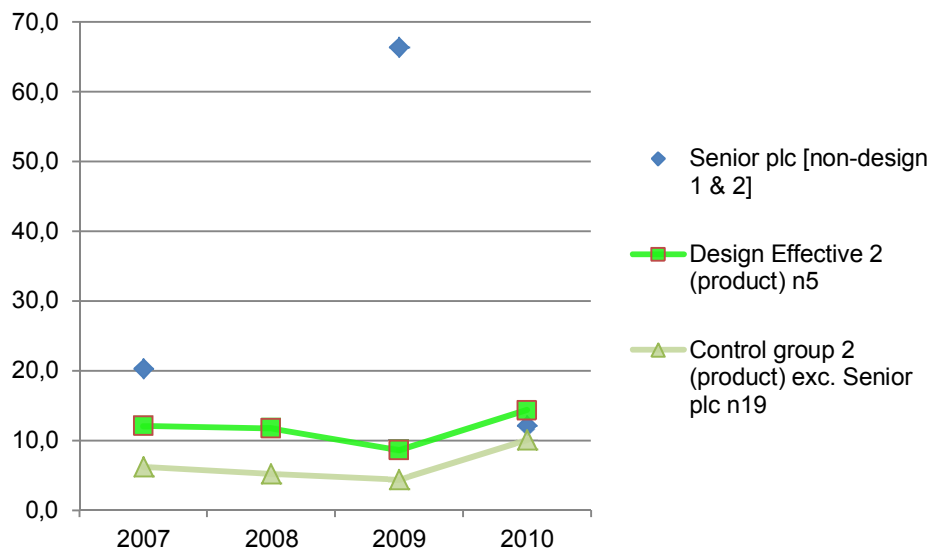
**Figure 24** Market-to-book values are significantly higher in design effective companies for the years 2007, 2008 and 2010

As the sample group is relatively small, single companies with substantially higher market-to-book ratios have a large impact on the average result of the whole group. Sensitivity analysis suggests that the trend of higher MBR of design effective companies prevails in 2009 as well if one company is excluded from the control group. Senior Plc's market-to-book value fluctuated on a wide range between 2007 (MBR 20,30) and 2010 (MBR 12,08), attaining a peak in 2009 of a market-to-book ratio 66,33. When Senior plc is excluded from the analysis, the results show a clear positive relationship between design effectiveness and the market-to-book ratio among companies focusing on product offering (Figure 25).



**Figure 25** Market-to-book ratios of companies in Comparison group 2 product offering subgroup, excluding Senior plc

A closer examination of the development of the market-to-book ratio of Senior plc shows, that the value has been significantly higher than the mean of the product subgroup (see Figure 26 below).



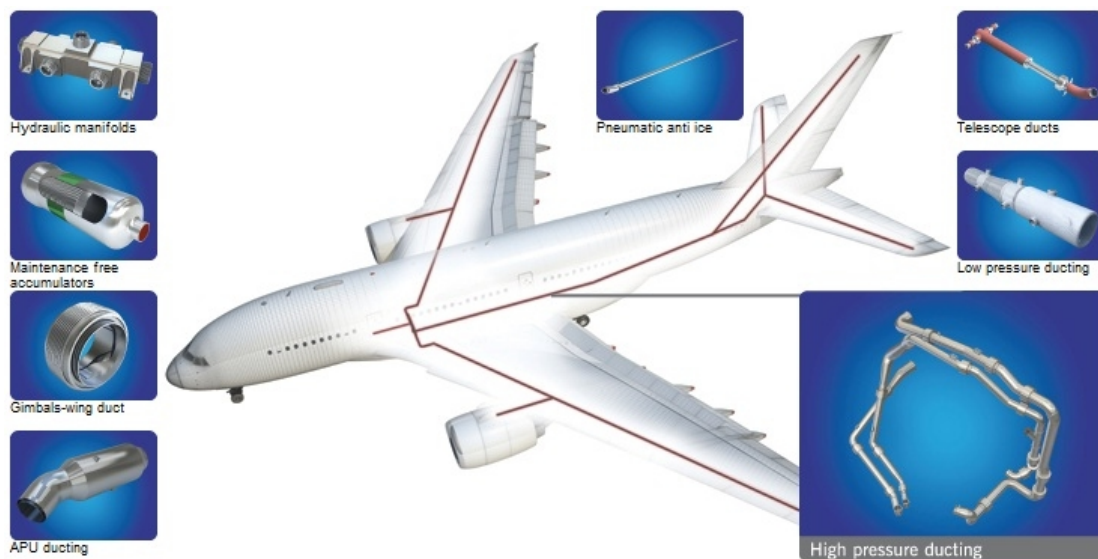
**Figure 26** Senior plc's MBR outperforms the mean of the control group 2 2007,2009 and 2010



*Senior plc designs, manufactures and markets hightechnology components and systems for the principal original equipment producers in the worldwide aerospace, defence, land vehicle and energy markets.*

*The group claims to possess significant design and manufacturing engineering capabilities as stated in the annual report 2010. In fact, their expenditure on research and development of £10,6m in 2010 (£9,7m 2009) incurred mainly on these activities. The key strengths in design and manufacturing engineering capabilities are considered essential to enhance the Group's reputation for delivering as well as development of value-added products to customers.*

*All information extracted from Senior plc Annual report 2010<sup>1</sup>*

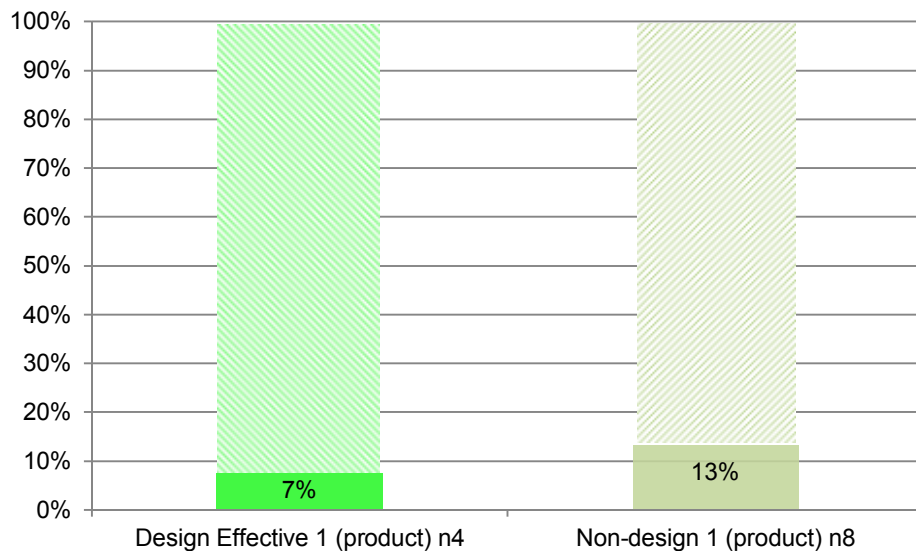


**Figure 27** Senior plc is increasingly successful designing fluid conveyance systems (Senior plc Annual Report 2010)

Results in the first, more qualitative comparison group (comparison group 1) are similar and support the deduction that design effective companies have higher market-to-book ratios than the set of companies with no acknowledged design effectiveness. In the more qualitative comparison group, the difference between the design effective companies and non-design group is even larger. Figure 28 shows, than book value fails to explain 93 % of the market value of design effective companies, while the corresponding value for the control group is 87%.

<sup>1</sup> Senior plc, Annual report 2010 retrieved 2.4.2012

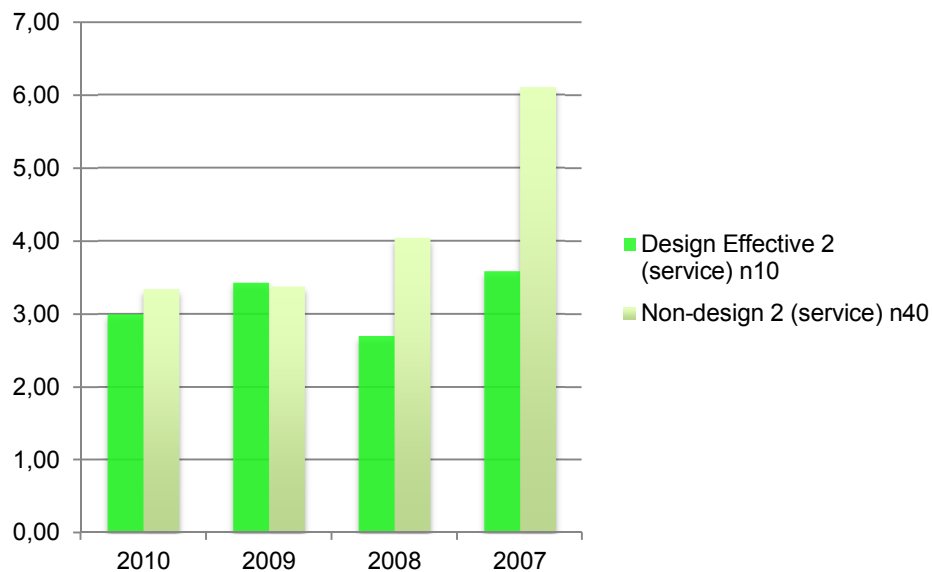
[http://www.senioraerospace.com/documents/reports/annual\\_report\\_2010.pdf](http://www.senioraerospace.com/documents/reports/annual_report_2010.pdf)



**Figure 28** Book value fails to explain as much as 93 % of the market value of design effective companies (2007-2010)

### C. Service offering subgroup analysis

Looking at the results from the service offering subgroup presented below, at first it seems as though design effective firms tend to have lower market-to-book ratios than the control group (Figure 29 below).



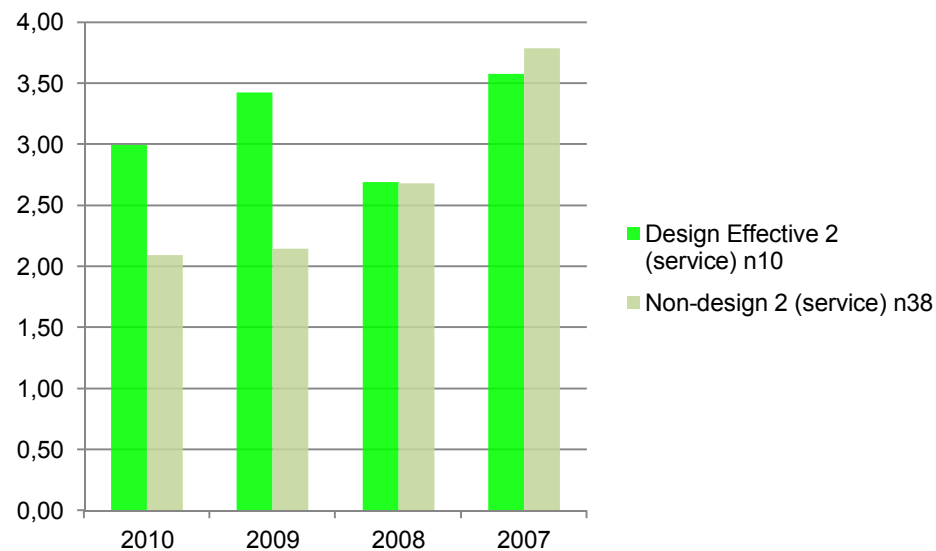
**Figure 29** Market-to-book ratios in service offering firms (comparison group 2)

This trend among service offering subgroup was also supported by the first comparison group (design effective companies n6, non-design n12), in which the correlation between low design effectiveness and high market-to-book ratio was even stronger. A more detailed analysis shows that the results of the service offering subgroup vary particularly in the case of the non-design control groups (Table 8).

**Table 8**                      **Difference between the market-to-book ratios of the two comparison groups for companies with service offering**

	<b>2010</b>	<b>2009</b>	<b>2008</b>	<b>2007</b>
<b>Average Design Effective 1 (service) n6</b>	3,14	3,29	2,96	4,04
<b>Average Design Effective 2 (service) n10</b>	3,00	3,43	2,69	3,58
<b>Difference (%)</b>	5 %	-4 %	10 %	13 %
<b>Average Non-design 1 (service) n12</b>	5,42	6,50	6,44	11,66
<b>Average Non-design 2 (service) n40</b>	3,36	3,35	4,03	6,17
<b>Difference (%)</b>	61 %	94 %	60 %	89 %

Sensitivity analysis in the service subgroup shows, that the results presented above are relatively unstable. In fact, leaving out two companies which significantly differ from the mean of the control group reverses the outcome in the service subgroup. Figure 30 below shows the results of the service subgroup in comparison group 2 if Heavitree Brewery and Domino's Pizza are left out from the calculations. Heavitree Brewery carries high MBR values ranging from 24,54 (2010) to 71,65 (2007) and Domino's Pizza with ratio values 21,25 (2010) to 29,13 (2007), from control groups 1 and 2. As the results are so sensitive to the exclusion of two companies out of 40, the results of the service subgroup in general are questionable.



**Figure 30** Market-to-book ratios of comparison group 2 (service) excluding Heavitree Brewery and Domino's Pizza

Qualitative analysis of Domino's Pizza (see few pages forward) suggests that the high market-to-book ratios could relate to design effectiveness; whereas the reasoning of high MBR is unclear in the case of Heavitree Brewery.

*The Heavitree Brewery Plc principal activities include ownership and operation of pubs, featured houses and tenancies. Although the corporation claims to have "award winning destination food pubs"<sup>2</sup>, few references can be found which would reflect design effectiveness or any interest in such. Left to the level of one notice on the refurbishment of one pub, the company has paid little interest in graphic design of annual reports and generally retains low level of corporate communication.*



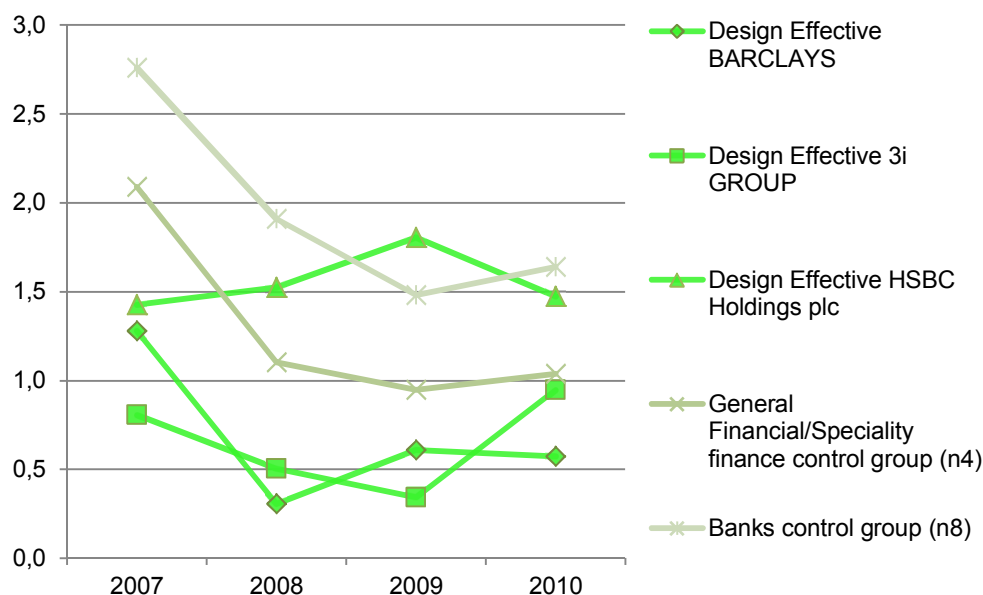
**Figure 31** Heavitree Brewery offers a wide variety of pubs in South West of England

<sup>2</sup> Company website 1.4.2012 <http://www.heavitreebrewery.co.uk/>

There are two possible directions for the attempt to analyze the results in the service subgroup: two of which would favor the hypothesis that design effective companies tend to have a higher proportion of intangible capital and one which questions the reliability of the results in general.

The latter explanatory factor questions the reliability of the results in the product subgroup, as the number of companies under analysis on the service subgroup is substantially higher (double the size). In other words, it is possible that the results supporting the hypothesis in the others subgroups is merely coincidental and that the service subgroup offers a clarification that no clear trend between design effectiveness and market-to-book ratio is visible. However, seeing that two companies of the control group (Heavitree Brewery and Domino's Pizza) had a major impact on the results, this deduction as itself is dubious.

Also, few low MBR values within the design effective companies' service subgroup affected the results. Specifically banks and general finance corporations underperformed within the design effective group, as exemplified in Figure 32 below. Interestingly the two out of three of the design effective companies operating in banking or general financing sector had a completely opposite trend in the development of MBR during the 2009 financial crisis.



**Figure 32** Development of market-to-book ratios of design effective companies and the respective control groups 2007-2010

One of the explanatory factors favoring the original hypothesis that design effectiveness and high proportion of intangible capital correlate relates to the original selection of the case study

companies. As explained earlier, the selection of design effective companies for the UK Design Council study (Design Council 2004) was primarily based on the number of design awards and nominations. As service design is a fairly new area of interest, it is possible that there were less design awards available for that sector. This could skew the results in favor of the control group, as the companies under analysis could be design effective although it is less acknowledged by the public due to the lack of awards in that specific area. Also relating to this fairly recent upraise of service design, Secomandi & Snelders (2011) suggest that the approach to it has only until recent years shifted from a mere accessorizing activity to a more profound level of design. It is possible that the active users of design in the service subgroup were chosen in the original Design Index for their credentials in powerful brands or communication design awards and less for profounder use service design. Thus not only the composition of the control group, but the original selection of active users of design for this particular subgroup remains dubious.

*Domino's Pizza is a powerful global brand operating in the pizza delivery sector. With operations in over 60 countries worldwide, it has #1 or #2 market share position in most of its top ten markets<sup>3</sup>. In fact, Domino's has been rewarded several awards for different activities in the past ten years, including nominations for best mobile applications<sup>4</sup> and "Pizza, Pasta and Italian Food Association (PAPA) Pizza Delivery / Takeaway Chain Overall Operator of the Year"<sup>5</sup>. The latter was awarded for innovative, commercial approach with developments including refurbishment of 70% of stores and improvements in products and services contributing to the success. Spatial design and product and service development relate closely to these types of activities, suggesting that the retail chain could be renowned as design effective.*



Another factor affecting the results could be the question of the value of service design versus the value of product design. As established through theory, design has a major impact in building the structural capital of the company, including immaterial rights. Services are difficult, if not impossible, areas of knowhow to protect whereas several means are available for design

---

<sup>3</sup> Information on investor relations acquired through Domino's Pizza website 26.3.2012

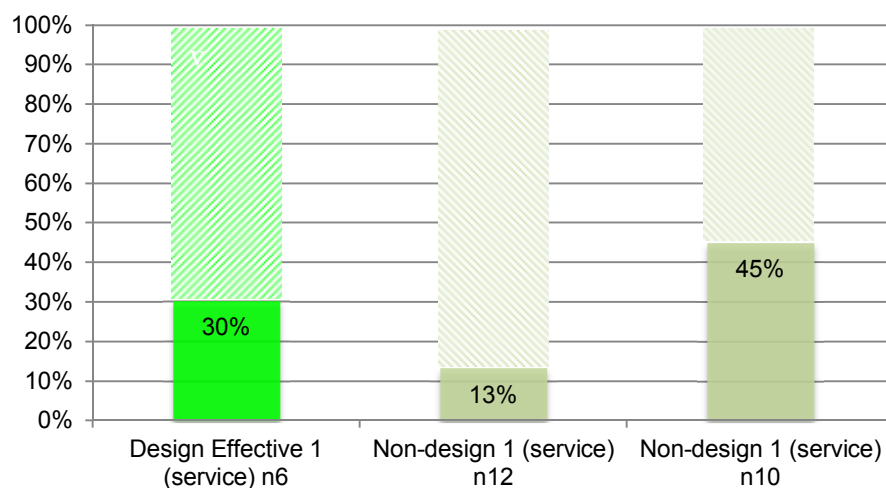
<http://phx.corporate-ir.net/phoenix.zhtml?c=135383&p=irol-whydominos> and  
<http://www.dominosbiz.com/Biz-Public-EN/Site+Content/Secondary/About+Dominos/Fun+Facts/>

<sup>4</sup> Nomination for best mobile application in the food/cooking group in a voting set by Carphone Warehouse retrieved 26.3.2012 <http://www.appys.com/awards/categories/foodcooking/>

<sup>5</sup> Press release retrieved through Domino's Pizza website 26.3.2012  
[http://www.dominos.uk.com/media\\_centre/pdf/REL%20-%20PAPA%20Win.pdf](http://www.dominos.uk.com/media_centre/pdf/REL%20-%20PAPA%20Win.pdf)

protection of products. In other words, the intrinsic value of good product design could be worth more than that of good service design.

All in all, one can see that the results within the service group vary too much in order to make reliable conclusions on the basis of this research. As a summary, in Figure 33 below the book value of the case companies are presented as a percentage of the market value. The average of design effective companies with service offering between 2007 and 2010 shows, that their book value fails to explain 70 % of the total value of the company. This, however, offers no value-added information as the control group varies substantially with the exclusion of two companies deviating most from the mean (Heavitree Brewery and Domino's Pizza).



**Figure 33** Book value of design effective firms offering services fails to explain on average 70% of the market value of the company [second non-design group exc. Heavitree Brewery and Domino's Pizza]

## D. Retail offering subgroup analysis

The retail subgroup analysis shows that design effective companies tend to have higher market-to-book ratios with the exception of the year 2007. The difference between the design effective companies and the control group, however, is quite minor (Figure 34 below).

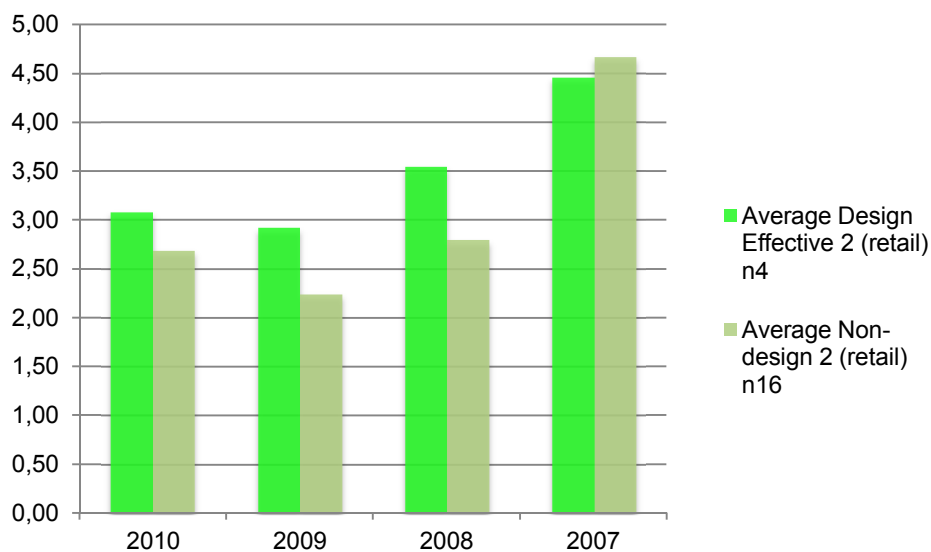


Figure 34 MBR of comparison group 2 (retail)

Again, single companies with considerably greater values than the mean can skew the results as we have seen earlier. Clinton Cards included in both control groups 1 and 2 carries the value of MBR that deviates most from the mean, with the highest score in 2007 (MBR 27,34) shown in the Figure 35 below. Excluding Clinton Cards from the control group brings the results of the analysis of the retail subgroup 2007 to the same outcome as 2008-2010 with the MBR of the control group 2 dropping to 3,28.

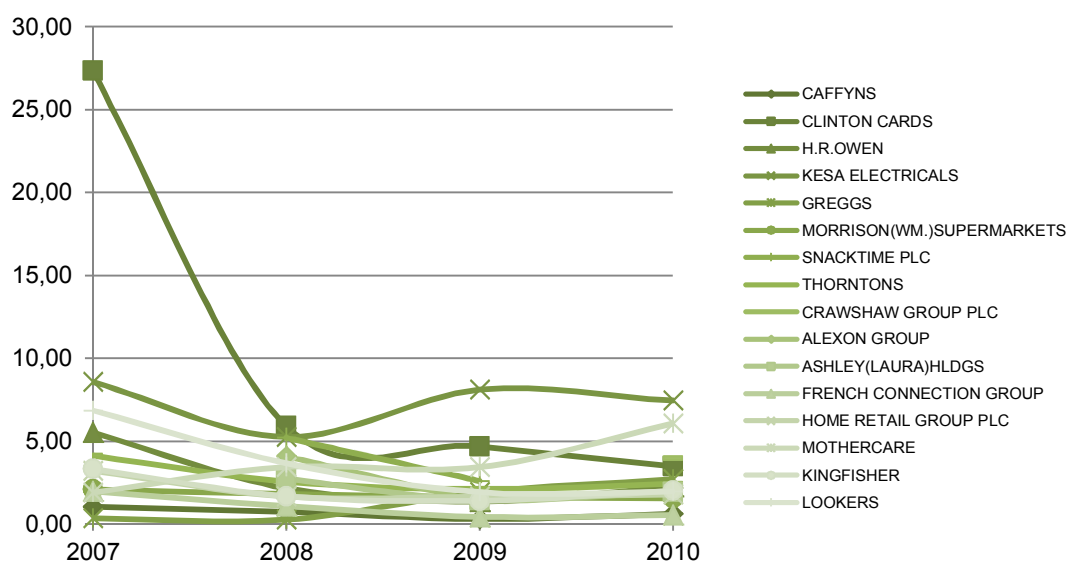
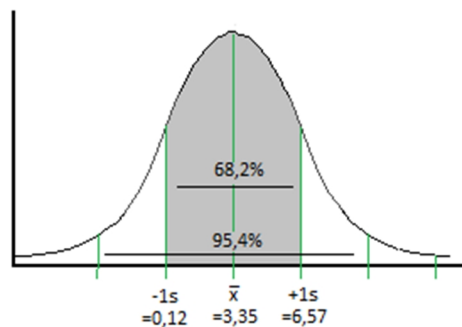


Figure 35 Market-to-book values of the retail companies in control group 2



Whereas the findings in the product subgroup showed a difference in market-to-book ratios between design effective companies and the control group of an average of 64% (Comparison group 2), the corresponding average in the retail subgroup was 17%. Considering that the standard deviation of the retail control group 2 was 3,23 a larger difference would have affirmed the possible deductions from this analysis (illustrated in Figure 36 below).



**Figure 36** Standard deviation chart of retail subgroup's control group 2

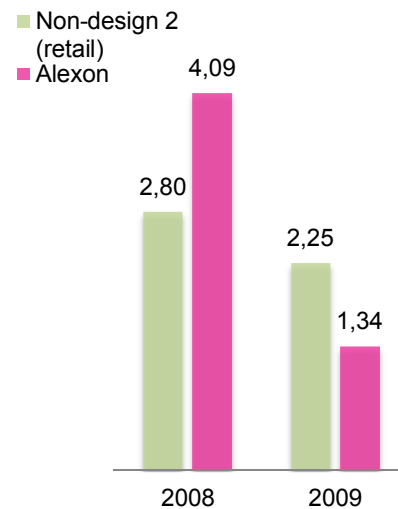
The division of companies into the subgroups products, service and retail is not self-evident, as many operate in the middle ground of these groups. This complication could affect the results particularly in the retail subgroup, which [non-design retail 2 n16] comprises of a set of diverse companies operating in for example the fashion industry (n4), car retailing (n3), supermarkets (n1), butchers (n1) and caf  s (n1). The division of the subgroups was based on a classification of the London Stock Exchange with companies labeled 'General retail' and 'Food and drug retailers' included in the retail subgroup while for example companies in 'Travel and Leisure' were included in the service subgroup. Due to this division restaurant chains such as Domino's Pizza were included in the service subgroup and caf  s such as Greggs in the retail subgroup.

Mentioned in the analysis it was noted, that service offering design effective firms might have relatively lower market-to-book ratios as the possibility to protect a service is lower than that of a product (see page 51). Likewise it is possible, that the mixed set of companies could be affected by this factor as one would suppose that service is a more relevant factor for caf  s while good product design is essential for the success of fashion retail and home appliances. Quantitative analysis on this would be dubious due to the small number of companies under analysis, but qualitative analysis suggests that this could be the case as shown in the analysis of Alexon Group, a fashion retailer.



**Alexon Group** (included in the control group 2) owns six brands and has more than 990 outlets in Europe. Fall of 2011 Alexon Group, was rebranded as Irisa Group and partnered together with Sun Capital Partners, Inc., a private investment firm.

*“The success of the Group is dependent on its ability to provide quality designs and fashions and to anticipate and respond to changing consumer taste and fashion trends. Product design and selection is therefore key to retaining market share and generating revenue, particularly in periods in which consumer confidence is negatively affected.”<sup>6</sup>*



Some interesting results can be obtained from the retail subgroup analysis, such as the high market-to-book ratios of Kesa Electricals in the control group 2 ranging from 8,58 (2007) to 7,45 (2010). A cursory qualitative analysis shows that the high values could be due to investments into design and understanding of its importance regarding customer choice.

<sup>6</sup> Financial Report of Alexon Group 2009, retrieved 27.3.2011 via [http://www.irisagroup.com/assets/files/Annual\\_Financial\\_Report\\_-\\_June\\_1\\_09.pdf](http://www.irisagroup.com/assets/files/Annual_Financial_Report_-_June_1_09.pdf)



*Kesa Electricals is Europe's third largest electrical retailing group which offers products principally in domestic appliances, telecommunications and multimedia, and all visual and audio products such as TV's. Operating in over 10 countries the group sells electrical goods through its four main retail brands: Darty, Datart, Vanden Borre and BCC (Figure 37).*

*Design's presence in Kesa Electrics business is present especially through three means:*

- *Large sized domestic appliances as the company states on their webpage "benefit from improved innovation, design and environmental efficiencies", and customers are driven with a desire or need to buy.<sup>7</sup>*
- *Refurbishments of shops have been found successful leading to further investments into the retail experience, as stated in the annual report 2010/2011. "On an ongoing basis, refurbishment concepts and space allocations will be tested to improve sales densities and profitability."<sup>8</sup>*
- *In the 2010/2011 report the Group stated to have developed a clear service-led business model, and has intentions to keep developing it.<sup>9</sup>*



Figure 37 The four main retail brands of Kesa Electrics plc

All in all, it possible to see a correlation between design effectiveness and higher market-to-book ratio in the case study of the retail subgroup (Figure 38), but the difference by no means is as big as that found in the product subgroup. Whereas book value failed to explain 71 % of the market value of the company, the corresponding value in the control group was 68 %. Although

<sup>7</sup> <http://kesaelectricals.com/products-and-services> retrieved 1.4.2012

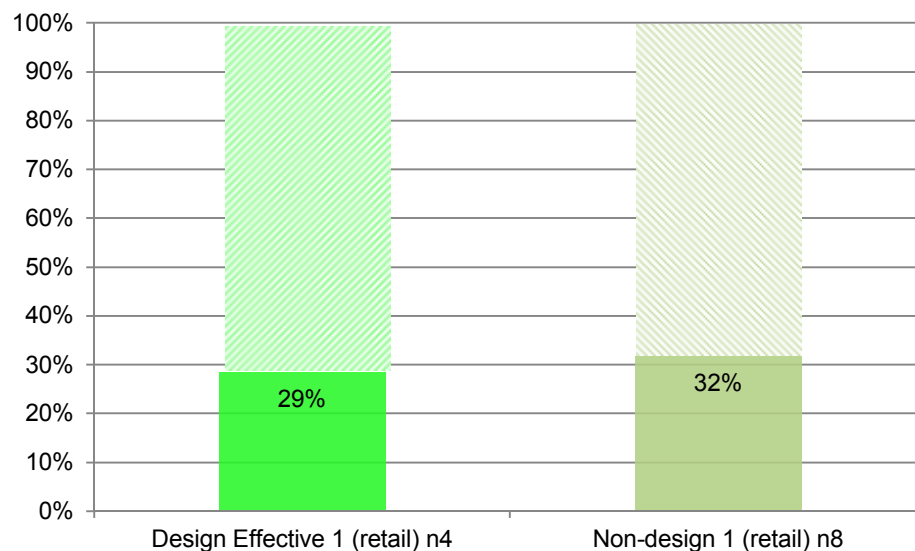
<sup>8</sup> Annual report 2010/2011 p. 6

[http://kesaelectricals.com/cache/downloads/1atay9hasadc8kk8w404ggsg0/kesa-ar-2009\\_10.pdf](http://kesaelectricals.com/cache/downloads/1atay9hasadc8kk8w404ggsg0/kesa-ar-2009_10.pdf) retrieved 1.4.2012

<sup>9</sup> Annual report 2010/2011 p. 6

[http://kesaelectricals.com/cache/downloads/1atay9hasadc8kk8w404ggsg0/kesa-ar-2009\\_10.pdf](http://kesaelectricals.com/cache/downloads/1atay9hasadc8kk8w404ggsg0/kesa-ar-2009_10.pdf) retrieved 1.4.2012

the exact same value for the non-design companies is acquired with the bigger control group 2 (n16), the difference between the design effective and non-design companies is not relevant enough to make plausible conclusions.



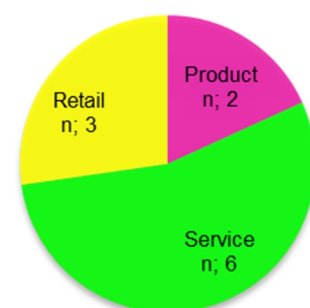
**Figure 38** Design effective case companies book value in the retail subgroup fails to explain 71% of the market value the corresponding value of control group being 68%

## E. External factors and further discussion

The factors analyzing the results can be divided into those which are inherent to the composition of the study and to the external factors the study does not take into account. Among the first is the inclusion of Emerging Index companies in the analysis and the original awarding of points for design effectiveness, whilst the latter includes the economic trends and events of the world affecting the whole stock market or specific sectors within it.

### Emerging Index companies

Eleven companies in the control group for the second comparison (Non-design group 2) were listed in the original Emerging Index 2004, set of companies which were considered to be somewhat design effective but not enough to be included in the Design Index. This, however, did not have a significant impact on the results of the study. Whereas one would think that the Emerging Index companies would generally tend to have higher market-to-



**Figure 39** Companies in Non-design group 2 listed in the original Emerging Index (n:11)

book ratios, the trend was, should one try and find any at all, at the most - quite the opposite. The figure below shows the differences between the MBR ratios of companies listed in the Emerging Index and the average value of the respective control group in 2008.

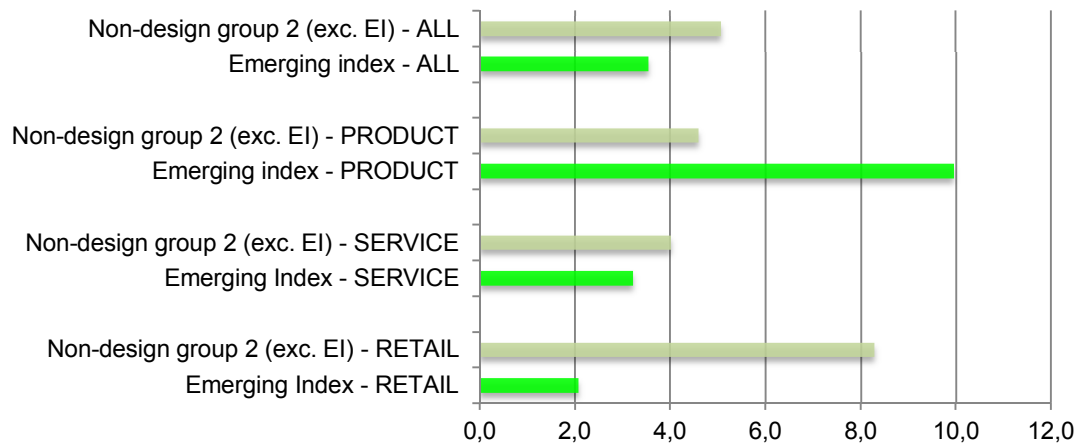


Figure 40 MBR of Emerging Index companies 2008 (n11) against non-design group 2 (n66)

### Scores for active use of design

For the use of this research the original scores on design awards and nominations could not be acquired. It is possible that the number of points awarded on the number of nominations and design awards could have been an explanatory factor in cases which contradicting results were obtained, as the range of points within the Design Index companies varied between 7 and 175.

### Economic environment

The economic trends naturally affect the market value of companies, as the stock market is sensitive to the prevailing atmosphere. The changes in the environment may affect companies in different magnitude depending on the sector and markets they operate in. To diminish the effect of the external factors, the first comparison group was formed so that for each design effective company two companies operating in the same sector and subsector were chosen for the control group (explained earlier in IVE).

## REVIEW OF CERTAIN GLOBAL EVENTS BETWEEN 2007-2010

### 2007

- The growth of the world economy was exceptionally high from 2003 until 2007  
→ AFFECTING ALL
- The origins of the latest financial crisis start in the US → AFFECTING ALL

### 2008

- *The financial crisis culminated in September 2008, taking the existing financial institutions near their breaking point. Actions undertaken by governments and central banks eased the risks of worldwide recession, but the chain of events which originated in the USA led Europe as well to a slight recession. → AFFECTING ALL*

#### 2009

- *Economic recession continues in Europe, especially Spain and Greece → AFFECTING ALL*
- *Swine flu (A H1N1) epidemic spreads worldwide and the threat of a major pandemic lasts until August 2010 → AFFECTING ESPECIALLY HEALTHCARE SECTOR*

#### 2010

- *Volcanic eruptions of Eyjafjallajökull situated in Iceland led to temporary shut downs of the airspace in most European in April – affecting air travel sector heavily → AFFECTING ESPECIALLY TRAVEL & TOURISM*

As we see from the graph below (Figure 41 excluding Senior 2009 & Heavitree Brewery 2007), Design Effective companies in general took a greater slump same time as the start of the financial crisis in 2008. This, however, was temporary and in 2010 the MBR had rose back to nearly the same level as 2007.

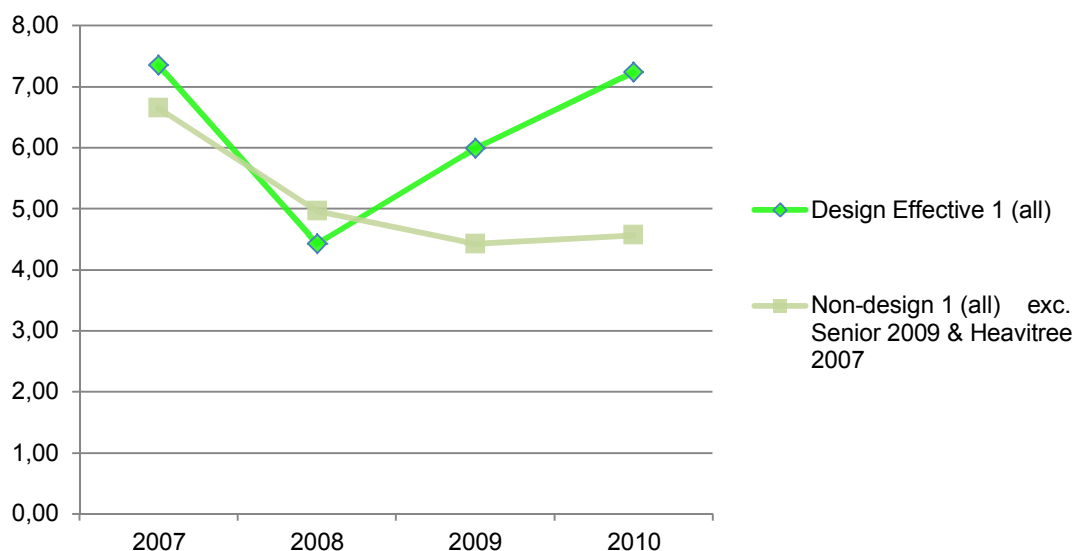


Figure 41 Design Effective companies MBR retained on a higher level all other years except 2008

A more detailed analysis shows, that the 2008 slump could be a reflection of the effect of the service subgroup, as design effective product and retail subgroups held higher MBR's than the control groups in 2008 (Figure 42). Although the down turn of 2009 seemed to be steeper for design effective companies in product subgroup and respectfully rise to 2010 likewise with a bigger gradient, similar trends were not supported in the other subgroups. This could also reflect the impact of swine flu epidemic on the health care sector included in the products subgroup. Although this cursory analysis cannot explain all external factors affecting the results, it raises ideas for further research.

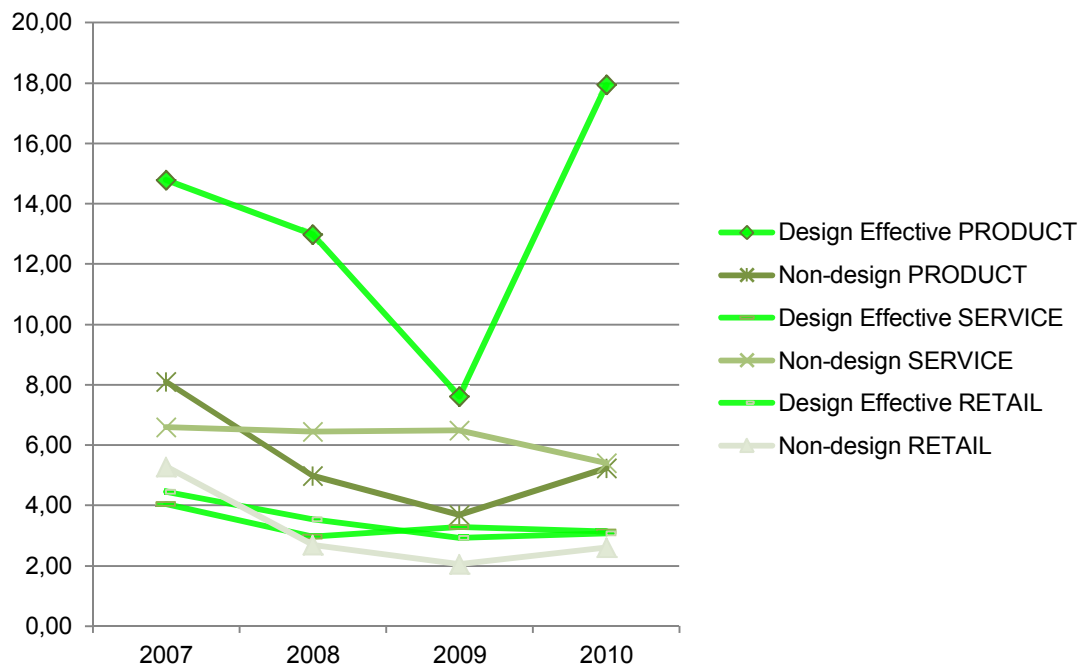


Figure 42 Development on MBR's between 2007-2010 in Comparison group 1

## F. Summary of key findings

Although subject to limitations, the findings of the case studies suggest that if the market-to-book ratio is used as an indicator of the share of intangible capital, active use of design may contribute to the accumulation of intangible capital in product offering companies and to some extent in retail companies as well. However, looking at service offering companies, no correlation between higher share of intangible capital within a company and active use of design could be found. As service design companies covered over half of the case study set of 19 active users was, the results of all companies as a whole also failed to follow the trend. The implications of the findings are interesting, as the empirical analysis did support to a certain extent that active use of design may be an explanatory resource accumulating the intangible capital of a company. These implications are discussed further in the final chapter.

## VII. CONCLUSIONS

Nowadays design is considered a source of competitive advantage in the business world (e.g. Nyberg & al., 2005; Gemser & al., 2011) and its impact on financial performance has been demonstrated (e.g. Design Council, 2004; Teknikföretagen, 2011). Yet, the underlying connection between the use of design and financial performance remains relatively unknown (Hertenstein & al., 2005).

One way to understand this connection is through the reinforcing effect of design on the return on investment in other tangible or intangible capital. The relevance of intangible capital is particularly high in the knowledge-intensive economy (Daum, 2004, pp. vii-viii), though few (e.g. Borja de Mozota & Kim, 2009) have studied or demonstrated the impact of design on them. In addition to the conceptual shortage of design as a resource accumulating intangible capital, the empirical demonstration of its effect has received nearly in-existent attention.

The purpose of this study was to understand the relevance of design as a resource driving the intangible capital of a company. The wide range of studies offered possibilities to combine two traditionally separate fields of study – accounting and design management – to address this research gap. The most important contribution of this study was the opening of discussion about design as a resource, and also the introduction of one possible methodology for analyzing design's effect. In particular this research addressed three questions to understand design's relevance in driving intangible capital.

### *1. Does design build the intangible capital of a company?*

Regarding the means through which design builds the intangible capital of a company, the theoretical research showed that a large number of studies have been made on design's contribution to human, structural and relational capital. The relevance of design as a company resource according to this literature review seems to be the highest for structural capital, in which design's presence through innovation capital and brand equity is dominant. In addition to these, design positively affects the processes of a company, in particular the production and product development processes. According to some studies, design acts as a knowledge integrator in organizations and builds customer loyalty – and thus accumulates human and structural capital as well. The conceptual framework presented in Chapter IIIF (Figure 43 below) shows areas of intangible capital identified within this study design has an impact on.



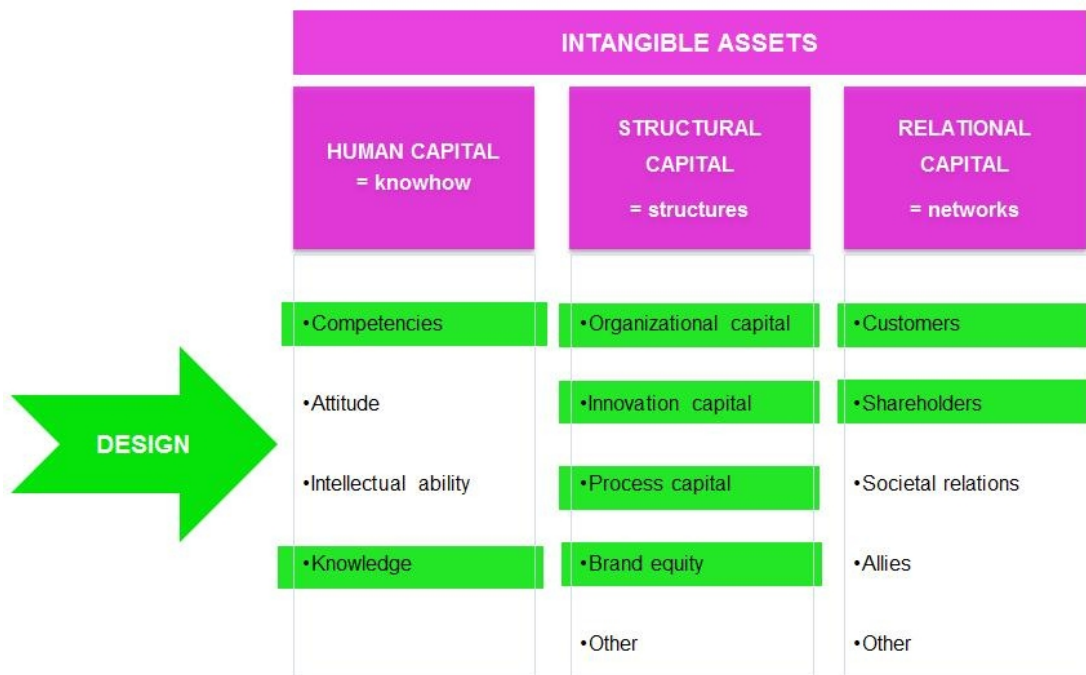


Figure 43 Framework on areas of intangible capital design may impact

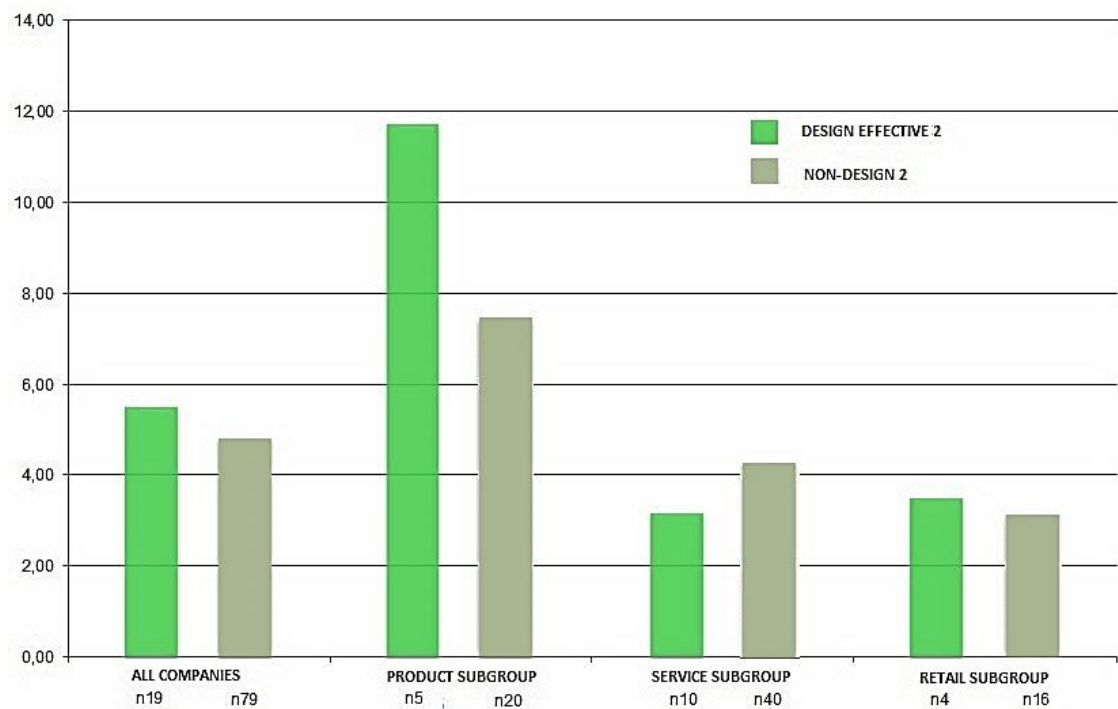
2. *How can the effect of design on building intangible capital of a company be empirically tested?*

Based on prior research, market-to-book ratio was identified as a possible indicator of the effect of design in accumulating intangible capital. Although the relationship between market-to-book ratio and intangible capital can be ambiguous, the methodology presented was considered as a good starting point in understanding the impact of design on corporate intangibles. The choice of an external metric enabled further empirical analysis on chosen case study companies. A case study analysis on active users of design was conducted in order to empirically demonstrate the relationship between design effectiveness and the intangible capital of an organization.

3. *Based on a set of case study companies chosen from prior research by the UK Design Council (2004), do active users of design have relatively bigger share of intangible capital?*

Finally quantitative results based on a case study of Design Index companies were obtained on whether active users of design tend to have a higher portion of intangible capital. The Design Index companies were chosen from a prior study on active users of design by the UK Design Council and compared 19 design effective companies against a group of 76 other companies. Data was obtained through the London Stock Exchange for the years 2007-2011. The case

study observations on design effective companies showed that active users of design have higher market-to-book ratios in the product and service subgroups as illustrated in Figure 44. Although the reliability of the study is questionable due to the high standard deviation of the control group and the low number of companies under analysis, the results open further discussion of the relevance of design resources.



**Figure 44** Average Market-to-book ratios of comparison group 2 (2007-2010)

Whereas the market-to-book ratio, which indicates a larger share of intangible capital, was significantly higher in firms with product offerings and actively using design, the retail and service subgroups showed more contradictory results. In the retail subgroup, design effective firms outperformed the control group, but the difference between the two was not significant enough to make plausible deductions. One explanatory factor could be the original division of companies into subgroups - some rely more on service while other on product design. On the other hand, the service subgroup offered inconclusive results, as the exclusion of two companies from the control group skewed the results. The inconsistent results for the service offering firms could be explained with changes in the service sector and design of services in recent years. While the lack of service design awards can skew the results by affecting the

control group, the original selection of active users of design might have relied heavily on awards for communications design instead of profound use of service design.

As both the theory and case analysis covered in this research underline design's relevance in building company value, managers should consider design as an important asset in which to invest. Likewise, investors evaluating possible investments or acquisitions might wish to consider the level of active use of design when evaluating the level of intangible capital of a company. Tying these two stakeholders together, managers could also consider reporting of design in annual reports to enhance the symmetry of information. When disclosing separate reports on intangible capital, the framework identifying areas of intangible capital design may affect could be used as a base to illustrate the wide-ranging effect of design in an organization. Naturally, these implications are subject to the validity and reliability of this research and further procedures for corroboration of the results of this study should be made.

The limitations of this research include the structure of the case study that relied heavily on the prior study of the UK Design Council. One presumption influencing this study's empirical analysis is that the companies regarded as active users of design by the Design Council 2004 study do indeed actively use design. These companies were originally chosen based on an analysis of the London Stock Market between the years 2000 – 2004 (Design Council 2004), whereas the empirical part of this study analyzed performance with a time lag of several years (2007-2010). Nevertheless, even if the companies under analysis would represent design effective companies, the number of companies under analysis was small and thus statistical deductions on the relationship between active use of design and market-to-book ratio cannot be made. Additionally, it must be noted that the original selection of companies with active use of design relied heavily on design awards, which are mainly based on the commercial success of products. This is likely to be reflected in the overall stock valuation that fundamentally reflects the overall commercial success of a company (Aspara 2009, p.27).

The limitations in using market-to-book ratio as an indicator of the level of intangible capital were covered in Chapter IVE (p.36). The most relevant of these can be considered to be the exogenous factors (IFAC 1998) affecting stock market valuation, which is why the analysis of the results included a cursory listing of relevant global events possibly affecting different sectors of activity. Also the valuation of tangible assets (IFAC 1998) in the financial statements and the found correlation between intellectual capital disclosure and market capitalization (Abdolmohammadi, 2005) are further limitations set forth by the use of market-to-book ratio as an indicator of intangible capital.

Regarding further research, it would be interesting to replicate the method of research on a larger group of companies for additional analysis. Choosing the active users of design on the basis of design investments would eliminate the circular reasoning of commercial success of products and company valuation. It would also be advisable to analyze the companies in subgroups based on their sectors of activity, as the use of market-to-book ratio as an indicator would then also be more valid. The same subject could also be approached the other way around by choosing companies for analysis on the basis of high share of intangible capital and analyzing the use of design within these companies.

In addition, further development of the framework presented on the effect of design on intangible capital both through theory and through a qualitative study could be made. This then could be validated by performing a quantitative correlation analysis on the active use of design overall, the sections of intangible capital through corresponding indicators, and the overall value of intangible capital through the market-to-book ratio. Finally, tying design into financial accounting and particularly the breakdown of goodwill components would be an interesting area for further research.

## VIII. BIBLIOGRAPHY

### Literature

- Abdolmohammadi, M. (2005). Intellectual Capital Disclosure and Market Capitalization. *Journal of Intellectual Capital*, 6 (3), pp. 397-416.
- Aspara, J. (2009). *Where product design meets investor behavior*. University of Art and Design, Helsinki.
- Alexis, J. (2006). From Lock-in to Lock-out: Using Design to Create Fiercely Loyal Customers. *Design Management Review*, 17 (1), pp. 28-34
- Barney, J. B., & Clark, D. N. (2007). *Resource-Based Theory. Creating and Sustaining Competitive Advantage*. New York: Oxford University Press Inc.
- Bertola, P. & Texeira, J.C. (2003). Design as a knowledge agent. How design as a knowledge process is embedded into organizations to foster innovation. *Design Studies*, 23. pp. 181-194
- Best, K. (2006). *Design Management - Managing Design Strategy, Process and Implementation*. Lausanne, Switzerland: AVA Publishing SA.
- Best, K. (2010). *The Fundamentals of Design Management*. Lausanne, Switzerland: AVA Publishing SA.
- Bontis, N., Dragonetti, N., Jacobsen, K., & Roos, G. (1999). The Knowledge Toolbox: A Review of the Tools Available to Measure and Manage Intangible Resources. *European Management Journal* , 17 (4).
- Borja de Mozota, B. (2002). Design and the Competitive Edge: A Model for Design Management Excellence in European SME's. *Design Management Journal* (2), 88-104.
- Borja De Mozota, B. (2003). *Design Management - Using Design to Build Brand Value*. New York: Allworth Press.
- Borja de Mozota, B. (2006, Spring). The Four Powers of Design. *Design Management Review* , 44-53.
- Borja de Mozota, B., & Kim, B. Y. (2009). Managing Design as a Core Competency: Lessons from Korea. *Design Management Review* , 20 (2), 67-76.
- Brennan, N. (2001). Reporting intellectual capital in annual reports: evidence from Ireland. *Accounting, Auditing & Accountability Journal* , 14 (4), 423-436.

- Buchanan, R. (1998). Wicked Problems in Design Thinking. In Margolin, V. & Buchanan, R. *The Idea of Design*. The MIT Press. Cambridge, Massachusetts. 3-20
- Chen, M., Cheng, S., & Hwang, Y. (2005). An empirical Investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital*, 6 (2), 159-176.
- Chiva, R., & Alegre, J. (2009). Investment in Design and Firm Performance: The Mediating Role of Design Management. *Journal of Product Innovation Management* , 26, 424-440.
- Cohen, J. (2006). Law Meets Design: Transforming Valuable Designs into Powerful Assets. *Design Management Review* , 17 (2), 87-92.
- Daum, J. H. (2003). *Intangible Assets and Value Creation*. Chichester, England: John Wiley & Sons Ltd.
- Del Canto, J. G., & Gonzales, I. S. (1999). A Resource-based analysis of the Factors Determining a Firm's R&D Activities. *Research Policy* , 28 (8), 891-905.
- Edvinsson, L., & Malone, M. S. (1997). *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*. New York: HarperBusiness.
- Eisenhart, K. (1989). Building Theories from Case Study Research. *Academy of Management Review*, 523-550.
- Gemser G., Candi M. & van den Ende J., How Design Can Improve Firm Performance, *Design Management Review*, 2011, Vol. 22 Issue 2, 72-77
- Gemser, G. & Leenders, M. (2001). How integrating industrial design in the product development process impacts on company performance. *Journal of Product Innovation Management*, Vol. 18, pp. 28-38
- Hertenstein, J., Platt, M., & Veryzer, R. (2005). The Impact of Industrial Design Effectiveness on Corporate Financial Performance. *The Journal of Product Innovation Management* (22), 3-21.
- Horngren, C. T.;Bhimani, A.;Datar, S. M.;& Foster, G. (1999). *Management and Cost Accounting*. Essex, England: Prentice Hall.
- IFAC. (1998). *Measurement and Management of Intellectual Capital: an Introduction*. International Federation of Accountants, New York, NY.
- Kaplan, R., & Norton, D. (1992). The Balanced Scorecard - Measures That Drive Performance. *Harvard Business Review*, Jan-Feb , 71-79.
- Keating, P. (1995). A Framework for Classifying and Evaluating the Theoretical Contributions of Case Research in Management Accounting. *Journal of Management Accounting Research*, Vol.7, 66-86

- Kerin, R. and Sethuraman, R. (1998). Exploring the Brand Value-Shareholder Value Nexus for Consumer Goods Companies. *Journal of the Academy of Marketing Science*, 26 (4), 260-273.
- Koostra, Gert & Vink, Jos. (2007). Measuring the Future Brand Effect of Graphic Design. *Design Management Review Vol. 18 No. 4*
- Lev, B. (2001). *Intangibles: Management, Measurement, and Reporting*. Washington DC: The Brookings Institution.
- Lev, B. (2002). *Intangibles: Management, Measurement and Reporting*. Brookings Institution Press, Washington, DC.
- Lockwood Thomas, Design Value: A Framework for Measurement, *Design Management Review*, Vol. 18 No. 4, 2007, 90-97
- Lönnqvist, A. (2004). *Measurement of Intangible Success Factors: Case studies on the Design, Implementation and Use of Measures*. Tampere: Tampereen Teknillinen Yliopisto, Publication 475.
- Marr, B., Schiuma, G., & Neely, A. (2004). Intellectual capital – defining key performance indicators for organizational knowledge assets. *Business Process Management Journal*, 10 (5), 551-569.
- Moultrie, J., & Livesey, F. (2010). Design Scoreboard: Development of an Approach to Comparing International Design Capabilities. In T. Inn's, *Designing for the 21st Century*. England: Gower Publishing Ltd.
- Nyberg, M., & Lindström, M. (2005). Muotoilun taloudelliset vaikutukset. Helsinki: Elinkeinoelämän tutkimuslaitos.
- Ordoñez de Pablos, P. (2002). Evidence of Intellectual Capital Measurement from Asia, Europe and Middle East. *Journal of Intellectual Capital*, 3 (3), 287-302.
- Pauwels, K. & al. (2004). New Products, Sales Promotions, and Firm Value: The Case of the Automobile Industry. *Journal of Marketing*, 68, 142-156
- Person, O. & Schoormans, J. (2010). Cultivating Creative Equity in Scandinavian Design Brands. *The Design Management Institute*.
- Roos, G., Fernström, L., Pionius, L., & Rastas, T. (2006). *Aineeton Pääoma - Johdon Käsikirja*. Helsinki: Edita Prima Oy.
- Sáenz, J. (2005). Human capital indicators, business performance and market-to-book ratio. *Journal of Intellectual Capital*, 6 (3), 374-384.

Secomandi, F. & Snelders, D. (2011). The Object of Service Design. *Design Issues*, 27 (3), 20-34

Srivastava, Rajendra K., Shervani, Tasadduq A., & Fahey, Liam. 1999. Marketing, business processes, and shareholder value: An organizationally embedded view of marketing activities and the discipline of marketing. *Journal of Marketing*, 63: 168-179.

Ståhle, P., Ståhle, S., & Aho, S. (2011). Value added intellectual coefficient (VAIC): a critical analysis. *Journal of Intellectual Capital* 12 (4), 531-551.

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

Valencia, A., Person, O., & Snelders, D. (2011). How do managers from a business-to-business company look to industrial design? 18th International Product Development Management Conference, June 2011, Delft, June 2011.

Verganti, R. (2009). *Design-Driven Innovation - Changing the Rules of Competition by Radically Innovating What Things Mean*. Massachusetts, Boston, USA: Harvard Business School Publishing Corporation.

Wang, Jui-Chi (2008), Investigating market value and intellectual capital for S&P 500, *Journal of Intellectual Capital* Vol. 9 No. 4

Whicher, A., Raulik-Murphy, G., & Cawood, G. (2011). *Evaluating Design - Understanding the Return on Investment*. Cardiff: Design Management Institute.

Williams, M. (2000). Is a company's intellectual capital performance and intellectual capital disclosure practices related? Evidence from publicly listed companies from the FTSE 100. *McMasters Intellectual Capital* 2001. Hamilton, Ontario.

Zec, P., & Jacob, B. (2010). *Design Value- A Strategy for Business Success*. Essen, Germany: Red Dot Edition.

### **Internet sources**

Design Council. (2004). The Impact of Design on Stock Market Performance – An Analysis of UK Quoted Companies 1994-2003. Retrieved 7.2.2011  
[http://www.idsa.org/sites/default/files/The\\_Impact\\_of\\_Design\\_on\\_Stock\\_Market\\_Performance.pdf](http://www.idsa.org/sites/default/files/The_Impact_of_Design_on_Stock_Market_Performance.pdf)

Design Council. (2005). Design Index: The Impact of Design on Stock Market Performance, Report to December 2004. Retrieved 7.2.2012



[http://www.designcouncil.org.uk/Documents/Documents/Publications/Design%20Index%202005\\_Design\\_Council.pdf](http://www.designcouncil.org.uk/Documents/Documents/Publications/Design%20Index%202005_Design_Council.pdf)

Design Council. (2007). Value of Design Factfinder report 2007. Retrieved 7.2.2012  
[http://www.designcouncil.org.uk/Documents/Documents/Publications/Research/TheValueOfDesignFactfinder\\_Design\\_Council.pdf](http://www.designcouncil.org.uk/Documents/Documents/Publications/Research/TheValueOfDesignFactfinder_Design_Council.pdf)

IFRS (2012). Retrieved 5.4.2012 [www.ifrs.org](http://www.ifrs.org)

Interbrand (2011). Retrieved 12.3.2012. <http://www.interbrand.com/en/best-global-brands/best-global-brands-2008/best-global-brands-2011.aspx>

London Stock Exchange (2012a). Retrieved 1.3.2012  
<http://www.londonstockexchange.com/exchange/prices-and-markets/stocks/tools-and-services/company-profile/company-profile.html>

London Stock Exchange (2012b). Retrieved 1.3.2012  
<http://www.londonstockexchange.com/prices-and-markets/stocks/tools-and-services/company-profile/help-profile/help.htm>

Pörssisäätiö (2011). Retrieved 22.11.2011 <http://www.porssisaatio.fi/artikkelit/ifrs-opas-miten-tilinpaatos-muuttuu>

Teknikföretagen (2011). Företag som satsar på design är mer lönsamma. Retrieved 30th of March 2012. Available at: [http://www.teknikforetagen.se/Documents/Industridesign/Design%20\\_lonsamhet\\_2006\\_2011.pdf](http://www.teknikforetagen.se/Documents/Industridesign/Design%20_lonsamhet_2006_2011.pdf)

World Gaap Info (2012a) <http://www.worldgaapinfo.com/pdf/IAS/IAS38.pdf> retrieved 5.4.2012

World Gaap Info (2012b) <http://www.worldgaapinfo.com/pdf/IFRS/IFRS3.pdf> retrieved 5.4.2012

## **Presentations**

Rehbinder, Maria (11.11.2011). Seminar: Luovan työn immateriaalioikeudet - muotoilun kilpailukyvyyn turvaaminen, 11.11.2011 at Aalto University School of Arts and Design, Finland. Presentation by Maria Rehbinder, Aalto yliopiston tekijänoikeusasiamies.

Suomalaisen Työn Liitto (2012). Tutkimus suomalaisesta designista - Mitä design merkitsee yrityksille. Presentation by Sami Tuurna at Design Factory, Aalto University 18.1.2012.

## APPENDIX I: Selection of case companies

"Design Index" companies 2004			Status as of February 13th 2012				
COMPANY	POTENTIAL FOR ANALYSIS		EXPLANATION	Sector	Subsector	Subgroup in analysis	Analysis groups
	YES	NO					
1 3i Group plc	1			General Financial	Speciality Finance	Service	Group 1 & 2
2 AEA Technology plc		1	NET ASSETS NEGATIVE (2007-2010)				
3 Allied Domecq plc		1	DE-LISTED/ACQUIRED				
4 Amersham plc		1	DE-LISTED/ACQUIRED				
5 [Arcadia plc (delisted December 2002)]		1	DE-LISTED				
6 AstraZeneca plc		1	NET ASSETS NEGATIVE (2007-2009)				
7 BAA plc		1	DE-LISTED/ACQUIRED				
8 BAE Systems plc		1	NET ASSETS NEGATIVE (2007-2010)				
9 Barclays plc	1			Banks	Banks	Service	Group 2
10 Barr (AG) plc	1			Beverages	Soft Drinks	Product	Group 2
11 The Body Shop International plc		1	DE-LISTED/ACQUIRED				
12 Boots Group plc		1	DE-LISTED/ACQUIRED				
13 BP plc	1			Oil & Gas Producers	Integrated Oil & Gas	Service	Group 2
14 British Airways plc		1	DE-LISTED/MERGER				
15 British Sky Broadcasting Group plc		1	NET ASSETS NEGATIVE (2007-2010)				
16 BT Group plc		1	NET ASSETS NEGATIVE (2009-2011)				
17 Cadbury Schweppes plc		1	DE-LISTED/DE-MERGER				
18 Cambridge Antibody Technology Group plc		1	DE-LISTED/ACQUIRED				
19 Centrica plc	1			Water, Gas & Mult utilities	Gas Distribution	Service	Group 2
20 [Debenhams plc (delisted December 2003)]		1	DELISTED				
21 Diageo plc		1	NET ASSETS NEGATIVE (2007-2010)				
22 Easyjet plc	1			Travel & Leisure	Airlines	Service	Group 1 & 2
23 Egg plc		1	DE-LISTED/ACQUIRED				
24 Eidos plc		1	DE-LISTED/ACQUIRED				
25 EMAP plc		1	DE-LISTED/ACQUIRED				
26 EMI Group plc		1	DE-LISTED/ACQUIRED				
27 Gallaher Group plc		1	DE-LISTED/ACQUIRED				
28 GKN plc		1	NO COMPARISON GROUP				
29 GlaxoSmithKline plc		1	NET ASSETS NEGATIVE (2009-2011)				
30 GUS plc		1	DE-LISTED/DEMERGER, RENAMED				
31 Hilton Group plc		1	DE-LISTED/DEMERGER, RENAMED				
32 HSBC Holdings plc	1			Banks	Banks	Service	Group 2
33 Imperial Chemical Industries plc Invenys plc		1	REORGANIZED				
34 J Sainsbury plc	1			Food & Drug Retailers	Food Retailers & Wholesalers	Retail	Group 1 & 2
35 Manchester United plc		1	DE-LISTED/ACQUIRED				
36 Marks & Spencer Group plc	1			General Retail	Broadline Retailers	Retail	Group 1 & 2
37 Matalan plc		1	DE-LISTED/ACQUIRED				
38 MFI Furniture Group plc		1	RESTRUCTURED, RENAMED				
39 Oxford Instruments plc	1			Electronic & Electrical Equipment	Electronic equipment	Product	Group 1 & 2
40 Pearson plc		1	NET ASSETS NEGATIVE (2009-2008)				
41 Psion plc	1			Technology Hardware & Equipment	Computer hardware	Product	Group 1 & 2
42 Reckitt Benckiser plc		1	NET ASSETS NEGATIVE (2007-2010)				
43 Rentokil Initial plc		1	NET ASSETS NEGATIVE (2007-2010)				
44 Reuters Group plc		1	DE-LISTED/ACQUIRED				
45 RM plc	1			Software & Computer Services	Software	Service	Group 1 & 2
46 Rolls-Royce Group plc	1			Aerospace & Defence	Aerospace	Product	Group 1 & 2
47 The Royal Bank Of Scotland Group plc		1	INSUFFICIENT FINANCIAL INFO.				
48 Safeway plc		1	DE-LISTED/ACQUIRED				
49 Scottish & Newcastle plc		1	DE-LISTED/ACQUIRED				
50 Scottish & Southern Energy plc	1		NAME CHANGE; SSE plc	Electricity	Electricity	Service	Group 1 & 2
51 [Selfridges plc (delisted July 2003)]		1	DE-LISTED				
52 Shell Transport and Trading Co plc		1	DE-LISTED				
53 WH Smith plc	1			General Retail	Speciality Retailers	Retail	Group 1 & 2
54 Smith & Nephew plc	1			Healthcare Equipment	Medical equipment	Product	Group 1 & 2
55 SSL International plc		1	DE-LISTED/ACQUIRED				
56 Tesco plc	1			Food & Drug Retailers	Food Retailers & Wholesalers	Retail	Group 1 & 2
57 Tomkins plc		1	DE-LISTED/ACQUIRED				
58 Ultra Electronics Holdings plc		1	NET ASSETS NEGATIVE (2007-2010)				
59 Unilever plc		1	NET ASSETS NEGATIVE (2007-2010)				
60 Vodafone Group plc		1	NO COMPARISON GROUP				
61 Wetherspoon J D plc	1			Travel & Leisure	Restaurants & bars	Service	Group 1 & 2
62 Whitbread plc	1			Travel & Leisure	Restaurants & bars	Service	Group 1 & 2
63 Woolworths Group plc		1	DE-LISTED/BANKRUPTCY				
64 WPP Group plc		1	NET ASSETS NEGATIVE (2007-2010)				
TOTAL (64)	19	45					

## APPENDIX II: Complete results of case study

COMPARISON GROUP 1				
	2010	2009	2008	2007
Difference all (%)	61 %	-34 %	21 %	-18 %
Average Design Effective (all)	7,36	4,42	5,99	7,23
Average Group 1 (all)	4,56	6,71	4,96	8,82
Difference product (%)	243 %	-35 %	160 %	82 %
Average Design Effective (product)	17,96	7,62	12,98	14,79
Average Group 1 (product)	5,24	11,69	4,99	8,11
Difference service (%)	-42 %	-49 %	-54 %	-65 %
Average Design Effective (service)	3,14	3,29	2,96	4,04
Average Group 1 (service)	5,42	6,50	6,44	11,66
Difference retail (%)	18 %	43 %	31 %	-15 %
Average Design Effective (retail)	3,08	2,93	3,55	4,46
Average Group 1 (retail)	2,60	2,05	2,70	5,28
COMPARISON GROUP 2				
	2010	2009	2008	2007
Difference all (%)	27 %	4 %	29 %	-1 %
Average Design Effective (all)	6,01	4,69	5,26	6,02
Average Group 1 (all)	4,73	4,50	4,09	6,05
Difference product (%)	58 %	0 %	124 %	75 %
Average Design Effective (product)	14,37	8,63	11,76	12,13
Average Group 1 (product)	9,09	8,59	5,25	6,92
Difference service (%)	-11 %	2 %	-33 %	-42 %
Average Design Effective (service)	3,00	3,43	2,69	3,58
Average Group 1 (service)	3,36	3,35	4,03	6,17
Difference retail (%)	15 %	30 %	27 %	-4 %
Average Design Effective (retail)	3,08	2,93	3,55	4,46
Average Group 1 (retail)	2,69	2,25	2,80	4,67

### APPENDIX III: Differences between the comparison groups

DIFFERENCES BETWEEN THE TWO COMPARISON GROUPS				
	2010	2009	2008	2007
Average Design Effective 1 (all)	7,36	4,42	5,99	7,23
Average Design Effective 2 (all)	6,01	4,69	5,26	6,02
Difference all (%)	22 %	-6 %	14 %	20 %
Average Non-design 1 (all)	4,56	6,71	4,96	8,82
Average Non-design 2 (all)	4,73	4,50	4,09	6,05
Difference all (%)	-3 %	49 %	21 %	46 %
Average Design Effective 1 (product)	17,96	7,62	12,98	14,79
Average Design Effective 2 (product)	14,37	8,63	11,76	12,13
Difference all (%)	25 %	-12 %	10 %	22 %
Average Non-design 1 (product)	5,24	11,69	4,99	8,11
Average Non-design 2 (product)	9,09	8,59	5,25	6,92
Difference all (%)	-42 %	36 %	-5 %	17 %
Average Design Effective (service)	3,14	3,29	2,96	4,04
Average Design Effective 2 (service)	3,00	3,43	2,69	3,58
Difference all (%)	5 %	-4 %	10 %	13 %
Average Non-design 1 (service)	5,42	6,50	6,44	11,66
Average Non-design 2 (service)	3,36	3,35	4,03	6,17
Difference all (%)	61 %	94 %	60 %	89 %
Average Design Effective 1 (retail)	3,08	2,93	3,55	4,46
Average Design Effective 2 (retail)	3,08	2,93	3,55	4,46
Difference all (%)	0 %	0 %	0 %	0 %
Average Non-design 1 (retail)	2,60	2,05	2,70	5,28
Average Non-design 2 (retail)	2,69	2,25	2,80	4,67
Difference all (%)	-3 %	-9 %	-4 %	13 %

#### **APPENDIX IV:** List of Emerging Index companies in the control group(s)

The following companies listed in the original Emerging Index were included in the control group(s) of this study:

- Halma plc
- Renishaw plc
- William Morrison Supermarkets plc
- Mothercare plc
- Restaurant Group plc
- Stagecoach
- BG Group
- Kingfisher
- Paragon
- National Grid
- International Power