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## Findings about design and the economy

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# ETLA

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## **Keskusteluaiheita – Discussion papers**

No. 785

Mathias Calonius

### **FINDINGS ABOUT DESIGN AND THE ECONOMY**

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**ABSTRACT:** Design is a basic business process, which is often poorly understood. There is no established terminology for design. Design is defined here to refer to the work of visual designers, excluding the work of engineering designers. General aspects of design in economy and within a company are described. The study gathers together findings from several previous studies about the relationship between design and company performance. The relationship is complex and hard to study. The studies' results support the belief that design has a positive effect on company performance. Design has economic value. A preliminary industry categorization basing on design attributes is presented. The state of design in Finland is discussed in more detail. Design is actively used in only a narrow base of companies. Finnish design consultancy firms are very small and internationally uncompetitive. The use of design should be practiced in a wider base of companies. The design consultancy firms must also solve their competitiveness problems.

**KEY WORDS:** design, design consultancy firms, company performance

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**TIIVISTELMÄ:** Muotoilu (design) on liiketoimintaprosessi, joka on usein huonosti ymmärretty. Muotoilun ympäriltä puuttuu vakiintunut terminologia. Tämän raportin yhteydessä muotoilu määritellään visuaalisten suunnittelijoiden työksi. Insinöörisuunnittelijoiden työ jää määritelmän ulkopuolelle. Muotoilun yleisiä merkityksiä ja ominaisuuksia taloudessa ja yrityksen sisällä kuvaillaan. Raportti kerää yhteen useamman aikaisemmin toteutetun tutkimuksen tuloksia, jotka käsittelevät muotoilun ja yrityksen tuloksen välistä yhteyttä. Muotoilu näyttää olevan positiivinen vaikutus yrityksen tulokseen. Muotoilulla on taloudellista arvoa. Raportti esittelee myös alustavan muotoiluun pohjautuvan toimialojen kategorisoinnin. Muotoilun tilaa Suomessa käsitellään yksityiskohtaisemmin. Muotoilua käytetään aktiivisesti ainoastaan harvoissa yrityksissä. Lisäksi suomalaiset muotoilupalveluja tarjoavat yritykset ovat hyvin pieniä ja kansainvälisesti kilpailukyvyttömiä. Muotoilun käyttö tulisi viedä nykyistä laajempaan yrityspohjaan. Muotoilutoimistojen tulisi myös saada ratkaistua niiden kilpailukykyongelmat.

**ASIASANAT:** muotoilu, design, muotoilutoimistot, yrityksen tulos



## YHTEENVETO

Raportti pohtii muotoilun (designin) merkitystä taloudessa. Muotoilun ympärillä ei ole vakiintunutta terminologiaa ja varsinkin englanninkielisessä kirjallisuudessa sanalla design on lukemattomia merkityksiä. Muotoilu määritellään raportissa visuaalisten suunnittelijoiden tekemäksi työksi. Ominaista muotoilulle on, että joku sen joka tapauksessa tavalla tai toisella tekee, riippumatta siitä, onko sitä yrityksessä erikseen organisoitu. Tätä usein epätoivottavaa ilmiötä kutsutaan 'hiljaiseksi suunnitteluksi' (silent design). Muotoilu ei kokonaisuudessaan sovi tutkimuksen ja kehityksen (T&K) alle, mutta teollinen muotoilu suurelta osin sisältyy T&K:n käsitteeseen. Muotoilua käytetään usein mainonnan kanssa luomaan viestintää, joten muotoilu sijoittuu siis T&K:n ja mainonnan väliin.

Muotoilua käytetään differoimaan tuotteita. Johtuen muotoilun liittyvien tekijänoikeuksien hankalasta valvonnasta, muotoilun suurin mahdollisuus kilpailuedun tuottamiseen löytyy konseptien luomisesta. Muotoilu vaikuttaa talouteen kahta reittiä: muotoilua toiminnoissaan käyttävien yritysten kautta, sekä muotoilupalveluja tarjoavien yritysten toimintojen kautta. Muotoilupalvelut ovat osa nopeasti kasvavia tietointensiivisiä yrityspalveluita. Taloudellinen toiminta perustuu enenevässä määrin ulkoisiin palveluntuottajiin ja muihin toimittajiin.

Muotoilun status ja paikka organisaation sisällä vaihtelee riippuen yrityksestä. Muotoilua käytetään kulutus- ja investointihyödykkeissä, sekä palveluissa. Tuote ja palvelu määrittelee missä laajuudessa muotoilua voidaan käyttää hyväksi. Muotoilua voidaan käyttää yrityksen strategisena välineenä. Muotoilulla on mahdollisuus myös vähentää tuotanto- ja materiaalikustannuksia. Muotoilu panostuksilla ja teknologisella kehityksellä näyttää olevan yhteys. Muotoilun ja yrityksen tuloksen välisen yhteyden välisessä tutkiminen on hankalaa ja lähestymistapoja on lukuisia. Tehty tutkimus on vähäistä. Raportti esittelee toteutettujen tutkimusten tulokset tiivistettynä. Muotoilulla näyttää olevan positiivinen vaikutus yrityksen tulokseen.

Tarkoituksena oli tutkia muotoilun merkitystä Suomen kansantaloudelle. Johtopäätökset edellä mainituista tutkimuksista yhdessä muotoilun tilaa Suomessa yksityiskohtaisemmin käsittelevän kappaleen kanssa muodostaa pohjan muotoilun kansantaloudellisen merkityksen pohdinnalle. Olemassa oleva informaatio muotoilun taloudellisesta merkityksestä Suomessa on hyvin vähäistä. Raporttia tehdessä tuli vastaan enemmän kysymyksiä kuin vastauksia. Raporttiin sisältyy Tilastokeskuksesta saatua taloudellista informaatiota muotoilupalveluja tarjoavien yritysten ja muotoiluun läheisesti liittyvien alojen yritysten toiminnasta. Muotoilusta on Suomessa tehty lisäksi muutama muu tutkimus. Yritysten sisällä toimivien muotoilijoiden määrästä ei ole kuitenkaan mitään varmaa tietoa. Raportti esittelee myös alustavan muotoiluun pohjautuvan toimialojen kategorisoinnin: kappaletavaratuotanto, perinteiset muotoilualat, muut toimialat.

Muotoilua käytetään aktiivisesti ainoastaan harvoissa suomalaisissa yrityksissä. Lisäksi suomalaiset muotoilupalveluja tarjoavat yritykset ovat hyvin pieniä ja kansainvälisesti kilpailukyvyttömiä. Muotoilua tulisi käyttää nykyistä laajemmassa yrityspohjassa. Muotoilutoimistojen tulisi myös saada ratkaistua niiden kilpailukykyongelmat. Taloudelliset tutkimukset muotoilun merkityksestä eri toimialoilla tukisivat päätöksentekoa.



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# 1 INTRODUCTION

Design is a basic business process, which is often poorly understood. It lacks the managerial framework, which would help us to use and understand it. Because of its characteristics, it has even been questioned whether it has any economic value. There is no commonly accepted definition for design. Without going deeper into the discussion around the definitions at this point, it can be concluded that design lies, as its own entity, somewhere between research and development (R&D), and advertising. It can be used to differentiate products through their features. At a wider level it communicates the values of companies and affects the well-being of people through providing the human elements in products. Good design makes products or services understandable, enjoyable and desirable<sup>1</sup>.

This report gathers together findings from several studies. The findings show that design does indeed have economic value. Empirical evidence on design's effects is largely about the relationship between design and company performance. The purpose was to study the effects and possibilities of design in the Finnish economy as well as map the current state of knowledge and awareness about design in Finland. A lack of information was encountered while the report was written. Some statistical information, some examples and some qualitative information were found. These pieces of information create the part of the report which describes design in Finland in more detail. This combined with the findings from foreign studies on design and company performance help to understand the possibilities of design in Finland and create base for future research. Special attention is given to the situation of Finnish design consultancy firms. Design affects the society at multiple levels. The viewpoint used here is economic, but at the same time it is a reflection of other benefits.

There is not one commonly accepted definition for design. Chapter 2 defines the terms and places design into wider context. Within this wide context the report is able to touch only the surface of the issues, as design is such a complex phenomenon. The general aspects of design and larger empirical researches on the relationship between design and company performance are covered in chapter 3. Design in Finland is covered in more detail in chapter 4 with a preliminary categorization of industries in terms of design. Chapter 5 describes briefly the implications and the need for future work.

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<sup>1</sup> I want to thank Krister Ahlström for all the advice, comments and support that he has given while this report has been under work.

## 2 DESIGN IN A WIDER CONTEXT

This section defines design and creates links to familiar areas of research. The purpose is to help to attach the information to prior knowledge. The terms must be defined at the outset, as there is no established terminology around design. Blaich (1993) remarks that it has become a custom to start a design conference or a design book with a discussion about what design is. The definitions for design vary rather considerably depending on the language (Blaich 1993).

### 2.1 Definitions

In the English literature the term 'design' is used to refer to a wide range of activities (Walsh 1996, Lorenz 1986). The term 'design' relates sometimes to the engineering design and other design tasks such as industrial design in the same sentence (Walsh et al. 1992, Aubert 1985)<sup>2</sup>. In the Finnish cultural context the word 'design' is most often narrowly associated with modern design (Ainamo 1996, Kruskopf 1989), the functional or minimalistic design that had its high from the 1920's to 1950's.<sup>3</sup> In order to avoid greater misunderstandings I will define it as follows: *Design refers to the work of visual designers including the work of industrial, graphic, interior and to some extent other visual designers.* It will not include the work of engineering designers. Engineering designers carry out product development from technical perspective. Visual designers approach the subject from users' and cultural perspective and their activities consist also of other activities besides product development. In product development, the difference between the work of engineering and visual designers is not solely the differences in the activities they carry out, but the different approaches the two disciplines have in their activities. Whereas the technical product development staff is primarily responsible for the operation of the product, the industrial designer is responsible for the usefulness of the product (Pulkkinen 1997).

Design can be separated into three distinct activities: product, communication, and environment design (Blaich 1993, Gorb 1990, Olins 1989). The activities may appear with different names; they may even be separated into more than three categories (Schmitt et al. 1995, Gorb 1990). The above categorization is however the clearest and most widely accepted. Product design means designing products in order to create value to a company or other organization carrying out manufacturing. Environment design consist of designing open spaces, buildings, interiors and other fixed assets. Communication design covers the design of the information delivered to external and internal audiences, as well as the design of the activities that support corporate identity.

Depending on the context, product design may refer to the total creation of product concepts, including the work of engineers, as the work of industrial designers and engineers is interrelated. If not signalled otherwise, in the following text the term product design will be used referring solely to the work of visual designers. The definition of the term 'industrial design' is not clear (Germser and Leenders 2001). In this context the term relates to the tasks traditionally performed by the industrial

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<sup>2</sup> to obtain a picture of the whole design spectrum introduce yourself to Walsh 1996

<sup>3</sup> there are differing opinions about the period of time that is considered to cover modern design

designers<sup>4</sup> (look for example Pulkkinen 1997, Walsh 1996, Ulrich and Eppinger 1995, Lorenz 1986, Moody 1984). It covers ease of manufacture, ease of use, ergonomics<sup>5</sup>, efficient use of material, product performance, product aesthetics, and to some extent aesthetics of the company.

One characteristic of design is that someone always carries it out, even when not specified for the task and sometimes being unaware of the task. The phenomenon is called 'silent design', as described by Gorb and Dumas (1987). The motivation and approach of a silent designer differs from those of a designer. Other areas than those mastered by designers are stressed and there is room for improvements in design elements.

The purpose of the definitions is to grasp the Scandinavian concept 'formgiving'<sup>6</sup> (Walsh 1996), which has evolved over time. Traditionally it has been mostly about giving form to products, but nowadays there are stronger connections to the image and identity of a company and aesthetics of environments as well. It follows to a large extent what Blaich (1993) defines to be the base for corporate identity. There are several related topics when discussing design (Markkanen 1998), the closest being corporate image and identity. In the following text corporate identity stands for the character of a corporation and corporate image for the perception of the character. In marketing literature brand is used as a term for corporate image. There is a little nuance difference between the meanings of the terms. Brand stresses external communication in contrast to corporate image, which includes also the idea of internal communication.

## 2.2 Design, R&D, and Competition

Design as a whole can not be put under the category of R&D, but the definition of R&D<sup>7</sup> (Statistics Finland 2001) applies to most of the industrial design. The studies covering R&D thus embody the effects of industrial design. Design is used jointly with advertising to create internal and external communication. This places design in between these two given activities.

Within one industry there can be companies who compete solely on one product dimension such as technology, advertisement, design or price and others who blend several of these dimensions. Differentiation makes it possible to provide products in different market segments. In addition to R&D and advertisement, design is a means to differentiate. Differentiation requires barriers to imitation in order to be effective; otherwise it does not create competitive advantage (Reed and DeFillippi 1990). Barriers to imitation in the case of design differ from those of R&D and advertising. The design knowledge incorporated in products is often easily learned by competitors when the products are put in the market (Gemser and Wijberg 1998). The intellectual property rights are not as effective as in the case of technological innovations. The main possibility to create competitive advantage with design comes thus from the design activities that pre-indicate customers' future expectations and create concepts

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<sup>4</sup> teollinen muotoilija

<sup>5</sup> the ease of use is sometimes included in ergonomics, especially in the case of designing user interfaces in electronics

<sup>6</sup> muotoilu, giving form

<sup>7</sup> see Appendix 2, R&D

in order to respond to these needs (Tiensuu 1999, Hassi 1998). Sony Walkman is a good example of this. Designers created the product concept for Sony Walkman through combining several available technologies and played a major role in enabling Sony to dominate the industry for a decade (Sanderson and Uzumeri 1997).

### **2.3 Design and the Economy**

Design affects the economy in two ways: 1) through benefits design can give to firms that use it and 2) through economic activities of design consultancy firms. Design activities are largely carried out by external designers, but also by company employees. There are several different kinds of arrangements (see section 3.1.2). Benefits of design are difficult to explicitly define. Several aspects of design activities in companies are discussed in chapter 3, which creates understanding about the possible benefits of design.

Design services are a part of knowledge-intensive business services, a relatively new but rapidly expanding area of knowledge production (Leiponen 2001). The organization of economic activity in general, and innovation in particular, relies increasingly on external suppliers of goods, services – and knowledge (Leiponen 2001).

Walsh et al. (1992) argue that design consultancy firms do not automatically benefit the national economy of the country as they might increase the competitiveness of overseas firms by exporting their services. This comment derives from the fact that UK exports lots of design consultancy services and has an uncompetitive manufacturing industry. The lack of interest from the British industry to use design services has led the consultancy firms to search customers from abroad (Walsh et al. 1992, Sentance and Clarke 1997).

## 3 GENERAL ASPECTS AND EMPIRICAL RESEARCH

The approach to study design is in most cases qualitative, descriptive and not quantitative. The descriptive literature works as a good base for creating understanding about the functioning and the economic effects of design. It touches the issues described in chapter 2, but does not carry out thorough analysis of these issues. The general aspects of design will be covered first before going to the larger scale empirical studies. It describes design's place and organization in the firm, as well as the effects in the firms that use it. The literature covered here consists mostly of foreign literature, but includes also Finnish writings. The larger empirical studies are all foreign, as equivalent studies have not been carried out in Finland.

### 3.1 Design in General

#### 3.1.1 The History of Design

There have been some forms of design for industry ever since the industrial revolution. Industrial design evolved into a distinct separate function in the end of the 19<sup>th</sup> century and during the first decades of the 20<sup>th</sup> century. This period involved several technical product inventions, which were re-designed to increase competitive edge. In the automotive industry the demand for novelty required rapid changes of model in order to sustain the interest of customers. (Heskett 1980.)

Many industrial designers especially in the USA came from a background of advertising and presentation. Partly due to their background, industrial designers adopted the ways of consulting agencies, working for a variety of clients. While Americans primarily stressed appearance to boost sales, Europeans concentrated more on the philosophy that form follows function. In Europe, industrial designers had often functional and artistic ambitions for their designs; they searched 'for true form'. (Heskett 1980.)

In Scandinavia, industrialization came late and the craft tradition was transferred to industrial methods by a succession of 'artist-designers'. The high quality demanded from hand crafted goods was transferred to high quality industrial products. Independent consultant designers were by the 1930s well established in the USA as well as in Sweden and Denmark. This was however not the case in Britain before the 1960s. (Walsh 1996, Heskett 1980.)

In Finland, the strong influence of artistic craft tradition dominated until the 1960s. It was an era of modern design when some marvelous works were created especially in the fields of furniture, ceramics, glass works and textiles. The products were often for the high-end customers and too expensive for ordinary consumers. In the 1960s the industry found use for 'the artists' in new fields of business. The profession came to resemble more the profession of an industrial designer. In the 1970s a new generation of more purely industrial designers sprang up. The professions of different fields of design parted from one another more clearly. (Kruskopf 1989.) The slow development of industrial design is considered to be due to the narrow exported product range (Ainamo 1996).

### 3.1.2 The Place and Status of the Design Function

The place and the status of the design function in the firms is not uniform (Walsh 1996, Ainamo 1996, Lorenz 1994). Its location varies additionally depending on the national cultures and traditions (Walsh 1996, Takala and Valtanen 1990). The design function can be a specialized function inside the firm or performed by design consultants or a combination of these two. Design might be found placed beneath marketing or engineering, but during the recent years its status has risen in many firms to be equal to those of other functions (Lorenz 1994, 1986). This is a result of design emerging as a strategic resource (Lorenz 1994, Fujimoto 1991).

Design is used in all kinds of industries in both industrial and consumer products (Walsh et al. 1992, Lorenz 1986) and in services. Sometimes the field of business might constrain design solely to package, to corporate identity, and to corporate image (Southgate 1995). Ulrich and Eppinger (1995) state that design can be of most benefit in user-driven products, where the benefit is derived mostly from the functionality of its interface and/or its aesthetic appeal. These products may be technically sophisticated, although technology does not differentiate the product.

Design's strength seems to come from its role as an integrator (Lorenz 1994, Walsh 1992, Fujimoto 1991). As more emphasis is put on the total integrity of the product the designer is seen as the connector between: technical and commercial disciplines, the user and the product, and the company and the customer (Walsh et al. 1992, Fujimoto 1991). The education of the designer emphasizes visualization and imagination; abilities, which are often scarce in the organization (Lorenz 1994). Due to 'silent design' (see section 2.1) companies may view that design function has been taken care of, but in fact it has been given a secondary status and it is not carried out professionally.

### 3.1.3 Design as a Strategic Tool

Design can be understood and utilized at multiple levels, from strategic – setting strategies and long-term frames for companies – to product design – giving shape to products (Järvinen and Koskinen 2001). Design can be and has been used as an essential part of business strategy in numerous companies such as AEG, BMW, Deere & Company, Ford, IBM, Olivetti, Philips and Sony (Lorenz 1994, Svengren 1994, Blaich 1993, Olins 1989, Lorenz 1986). Design is based on the creation and utilization of tacit knowledge and differs from the analytical explicit thinking managers consciously use (Ainamo 1996, Lorenz 1994). Changes in the top management may alter the direction of the firm and previously excellent design may degenerate to mediocre (Lorenz 1994, Olins 1989). Lorenz (1994) sees that change in management has led into this kind of development and inhibited the potential power of design for example in companies such as Olivetti, Braun, IBM, and to some extent Deere & Co.

Design plays an important role in forming totally new product concepts, as well as in re-designing or upgrading existing products (Ainamo 1996, Walsh 1996, Lorenz 1994, Walsh et al. 1992). Depending on the technical complexity of the product under development, design can have leading or supporting development role (Lorenz 1994, Walsh et al. 1992). Design gives good possibilities to move the product up-

market, into more expensive market segments (Roy et al. 1998, Roy and Riedel 1997, Svengren 1994, Walsh et al. 1992, Lorenz 1986). Design is often used to differentiate<sup>8</sup> the product through its aesthetics, performance, and ergonomics, but the differentiation can also be done through company image (Ulrich and Eppinger 1995, Lorenz 1994, Walsh et al. 1992, Lorenz 1986). It is sometimes argued that design is the only remaining way to differentiate (Blair 1993).

The differentiation with design works through the customer's emotional responses to the product form. Bloch (1995) and Walsh et al. (1992) have covered studies ranging from psychology to market surveys showing that the form elicits beliefs about product attributes and performance. The form of a product also influences how the product is categorized within and among product classes. The emotional responses consist of cognitive, affective and behavioral elements. Basically the form affects purchase decisions that are often non-price based, but price plays a role as well. Even in industrial products, where the end user does not always see the product, the form may have an impact on the purchase decision (Yamamoto and Lambert 1994).

Millner and Hoffner (1993) show in their study that higher sales growth in automotive industry can be obtained through styling changes – implemented by design – without major technical changes, but the sales growth could also be attained through major technical changes. The consumers may not perceive that changes are only technologically incremental or the consumers' needs are fulfilled with these changes which consist mostly of styling. The nature of the product may change significantly through styling. (Pulkkinen 1997, Millner and Hoffer 1993.)

Design has also straightforward economic impact on manufacturing costs. Product design is typically performed by engineers and industrial designers with inputs from marketing and manufacturing functions. The contribution of engineers and industrial designers depends on the relative importance to the purchaser and user of technical, aesthetic and ergonomic factors. Many have suggested that product design, including the effects of industrial and engineering design, determines 80 % of manufacturing cost (Ulrich and Pearson 1998, Sisodia 1992). Ulrich and Pearson (1998) remark in their study that industrial design quality was not significantly correlated with manufacturing cost. While the design effort itself may consume significant resources, efforts to reduce manufacturing costs by design do not necessarily lead to lower quality products as perceived by consumers. There is thus cost incentive in design.

#### **3.1.4 Technology, Design or Both?**

The development of technology and design investments interact with each other over time (Walsh 1996, Ulrich and Eppinger 1995). The emergence of a dominant design has mostly to do with engineering design, but industrial design gives inputs facilitating the process as well (Walsh 1996, Lorenz 1994, Walsh et al. 1992). The term dominant design relates to technological development. Dominant design covers a range of products with a similar core technical solution which has become dominant in its category or industry. Within a dominant design there are choices between different degrees of technological change.

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<sup>8</sup> see section 2.2 for more about differentiation

Walsh (1996) sees a shift in emphasis from engineering design to industrial design as an industry or technology matures. As possibilities for technological change within a dominant design have depleted, industrial design is stressed more. Ulrich and Eppinger (1995) share the same view, but they stress more differences in technologies. Whenever the competitive advantage given by the underlying technology diminishes, this gives rise to, or rather necessitates, investments in industrial design (Ulrich and Eppinger 1995).

### 3.1.5 Copying and Intellectual Property Rights

“Barriers that restrain or obstruct imitation by competitors may increase the returns that ultimately accrue to the innovating firm”. The barriers consist of intellectual property rights (IPR), causal ambiguity<sup>9</sup>, the nature of the innovation, and reputational sanctions. The nature of innovation seldom helps, because the design knowledge is often easily learned by competitors once the products are put in the market. (Gemser and Wijberg 1998.)

A large-scale study performed in Germany indicated that firms perceived IPR as quite ineffective for appropriating returns from design innovations because some IPR were easily circumvented at a low cost. The costs to obtain, enforce and monitor compliance of IPR have also been perceived to be high. (Gemser and Wijberg 1998.) “... it is becoming increasingly common for a company to “ring-fence” its intentions with a range of intellectual property rights, including not only patents, but also designs, trademarks, and copyright.” Design has had a strong link with manufacturing industries, but this trend towards developing a wider range of protection for a single product has resulted in designs having potentially higher interest to the non-mechanical industries. Many pharmaceutical companies are for example developing distinctive shapes for their pills and capsules, resulting in registrable designs. (Adams 2001.)

Existing literature suggests three characteristics of competencies: tacitness, complexity, and specificity that can be simultaneous sources of competitive advantage and ambiguity. Skill-based competencies include **tacit** knowledge. Such competencies are based on ‘learning by doing’, accumulated through experience and refined by practice. Tacitness generates ambiguity through a skilled performer’s own level of unawareness of the actions that he or she undertakes. “**Complexity** and, thus, ambiguity arise from large numbers of technologies, organization routines, and individual- or team-based experience.” The business actions that result from resource and skill deployment can be highly **specific** and interdependent with the firm’s internal or external transaction partners. This is why skill and resource deployments can remain ambiguous to the competition. “High (low) degrees of tacitness, complexity, or specificity will produce high (low) degrees of ambiguity.” (Reed and DeFillippi 1990.) Design is highly tacit and it involves complexity at least at the level of individual experience. It possibly also embodies complexity in organization routines and at team experience level. Design resource and skill deployment can be highly specific and interdependent with the firm’s internal and external transaction partners.

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<sup>9</sup> basic ambiguity concerning the nature of the causal connections between actions and results



Gemser and Wijberg (1998) showed in their study that reputational sanctions are in some cases effective in restraining imitation, but the functioning of the mechanism is not straightforward. The study focused on Dutch and Italian avant-garde design manufacturers operating in the furniture industry and included 22 firms. The up-market firms with distinct characters avoided imitation in order to not to lose reputation, “reputational capital”. Even the sales of their less innovative products were based on their reputation of being innovative. Imitators of their products were found from among the low market producers, but these were not seen as direct competitors. Copying by a manufacturer competing in the same segment was seen to be problematic, but this kind of behavior was not common. While the firms avoided direct imitation they ‘borrowed’ ideas from one another, but tried to give them their own interpretations. The reputational mechanism is partly based on the close contacts between the firms.

It appears that the nature of design innovation does not create barriers to imitation. Effectiveness of IPR and reputational sanctions seem to be dependent on industry structures. In an industry with few players IPR may be more easily monitored, but the innovations may be circumvented and become a standard of the industry. For example a Japanese PC manufacturer has tried to imitate Apple’s innovations concerning its iMac computer’s shape and colors. The Tokyo District Court however ruled that iMac is highly original in terms of shape and stopped the Japanese manufacturer from selling its imitation (Apple 1999)<sup>10</sup>. Reputational sanctions work if there is an existing culture that supports these kind of sanctions. Low market producers seem not to be affected by these sanctions, as they do not have a reputation they can lose. The most widely applicable barrier to imitation appears to be causal ambiguity. It is not constrained to certain occasions or certain industries. With causal ambiguity a firm can produce design innovations in a sequence and be one step ahead of its competitors in responding to customer needs.

## **3.2 Empirical studies**

### **3.2.1 About the Empirical Studies**

Research on design and the relationship between design and company performance is scarce, but studies have started to accumulate during the past 15 years. The studies about the numerous aspects of design in general have been to some extent covered in the earlier section. The relationship between design and economic performance will be discussed more deeply in the section below, supported by quantitative evidence. These studies can be categorized into those concentrating on the product or project level and those that concentrate on the company level. There are additionally two groups on both levels: one group describes successful companies or projects admired for their design, and the other covers the level generally. The studies described in the following sections are the latter. The former group has been used in describing the design generally (in section 3.1).

Lots of the economic studies have been done by the British especially due to the work of Design Innovation Group (DIG) which has conducted a couple of large surveys and longitudinal researches about the economic consequences of design. Others

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<sup>10</sup> Author unknown

have added their contributions into this base. Distinctive to the research done in the Britain is that the work of visual and engineer designers are not clearly separated from one another. It is hard to distinguish what is the role of engineering design, however there are exceptions to this<sup>11</sup>. The goal has often been to cover all the aspects of design simultaneously, making the interpretations of the results more difficult. This approach has however been able to capture the interrelations between engineering and industrial design.

### 3.2.2 Problems in Quantifying the Phenomenon

There are several measurement problems and obstacles when acquiring quantitative information about the relationship between design and business performance. Numerous variables that affect the outcomes of projects and company performance overall make it hard to distinguish what is the role of design in quantitative terms. In the studies covered in the literature, a wide range of variables are used to measure business performance and design. Business performance has been measured with return on capital, profit, profit margin, profit growth, turnover growth, export sales, and investment payback period.

Design has been measured through a concept of ‘good design’ and design intensity. Good design has been evaluated using design awards, prizes and citations (Roy 1994, Walsh et al. 1992). The problem with design awards is that they are given for individual objects and are mostly based on the subjective opinions of the jury (Hassi 1998), whereas the economic aspects may be forgotten (Mazzarol 1994). When considering the firm performance single or couple products do not necessarily reveal much, and the impact of these products may also not be seen when firm level figures are used (Roy 1994). Gemser and Leenders (2001) have instead evaluated the design intensity of the firms. They measured the intensity by share of new product development projects done using professional design expertise.

The relationship between good design and business performance is complex and interactive. As noted by many, (Gemser 1997, Ainamo 1996, Roy 1994) good design may lead to good performance or good design may be caused by good performance. Well performing businesses have more resources to invest in design than those in financial difficulties (Roy et al. 1998, Gemser 1997).

### 3.2.3 Design at Product and Project Level

The DIG carried out a major study entitled “Commercial Impacts of Design” (CID)<sup>12</sup> in which the main aim was to assess the risks and returns on investment in professional design at a product or project level. “The study involved 221 small and medium-sized UK manufacturers that had received a government subsidy to employ a professional design consultant to help with a specific design or product-development project” (Roy 1994). Design was evaluated separately and together with engineering design (see section 3.2.1). Enough financial data was received from 181 projects to make conclusions about their success.

<sup>11</sup> for example Lorenz 1986, 1994

<sup>12</sup> see Walsh et al. 1992, Roy 1994, Roy and Riedel 1997, Roy et al. 1998

From the projects that implemented design and were put into production, about 90% were commercially successful, the average payback period<sup>13</sup> being about 15 months. A project was considered commercially successful if the payback period was less than 36 months. The external<sup>14</sup> economic conditions were relatively stable during the study period. To check whether the results were due to the use of design consultants, the companies were asked to rate the relative influence of design and other factors. In only 15% of projects were factors other than design such as marketing, pricing and market changes considered to be a major influence on commercial outcomes.

The database created during the CID study was re-used some years later in order to establish how the commercially successful projects differed from the unsuccessful ones. The results are presented in numerous publications (for example Roy et al. 1998, Roy and Riedel 1997). There were no significant differences, but in the successful projects product performance, features and quality were more frequently stressed than in the loss-making projects. The loss-making projects concentrated more on product styling, cost reduction, product range or customization. The multi-dimensional approach seemed to work in technically complex projects such as electronic design projects. In contrast, successful ceramics design projects required consideration of only few dimensions typically styling and product range. This is contradictory to what was the overall impression about successful projects. It suggests that there is no general guideline for design projects.

In two-thirds of the projects the attempted move was to shift the product into a more quality-sensitive market. Mostly this was done by improving its functional or ergonomic features, the styling of the product or its packaging. Commercially successful projects tended to be these up-market moves where genuine improvements in product features as well as style were created, or moves to increase sales of an already high-quality product by reducing its price while improving product performance and features, especially ease of use, and product styling.

Gemser (1997) describes an empirical research carried out by Roerdinkholder in 1995 in the Netherlands about the economic value added by design on the project level. It covered a sample of products that were given the Dutch 'Good industrial design' award in 1991 or 1992. Altogether 38 questionnaires were returned from the 82 sent out. The commercial success was assessed with various indicators. The average short-term score for the commercial success given from the indicators was a bit above the normal; "... in total, 79.3% of the sampled products were commercially more successful than usual." In the long term "67.7% scored better than is customary for these products. ... Although the awarded products scored on most of the commercial success indicators better than usual, the results are not 'overly' significant" (Gemser 1997). The restricted and small sample hinders generalization.

### **3.2.4 Design at Company Level**

#### *Studies in the UK*

The use of design at the company level is usually approached with case studies covering some companies who successfully utilize design (look for example Svengren

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<sup>13</sup> payback period is simple, but not the best measure for financial success

<sup>14</sup> the author possibly refers to economic growth at national level

1994, Lorenz 1986). The stories often tell descriptively how design is taken into wider use, but quantitative data is lacking. They give, however, good insights into how the companies have been able to use industrial design to place themselves better in the markets. Design has been used for example to move product families up-market, to give customers better product quality and to give products a specific character. In companies well known for their product design, design is used as an integral part of corporate aesthetics.

In recent years quantitative studies have also been produced. Black and Baker (1987) did a survey of engineering and design practices in small engineering and textiles companies in Scotland. They found that successful companies, average sales growth being the measure of success, were more aware of the uses of visual and engineering design and also used it more. The biggest differences, compared to the less successful companies, were found in the visual designers' inputs.

The DIG carried out two large consecutive studies in the 80's about the relationship of design and economic performance (Roy 1994, Walsh et al. 1992). The design was defined to include both engineering and other design functions. In the first phase forty-eight UK-based and one world leading Danish plastic product producers were studied. Eight design conscious firms, which had won various design awards and prizes or were evaluated by their competitors to have the best design, performed significantly better on several business indicators than a randomly selected sample of about 30 companies. The differences in turnover growth, capital growth, and return on capital, averaged over seven years, were statistically significant.

In the second phase, three additional sectors were examined: office furniture, domestic heating equipment, and electronic office equipment. Forty-two British companies as well as nine world-leading companies from Denmark, Sweden, Germany, Japan and Canada were involved. There was a significant statistical association (correlation?)<sup>15</sup> between a firm's average profit margin and design performance, measured by design prizes, awards and citations. The six most design conscious UK firms had significantly higher profit margins and return on capital than the remaining UK firms sampled. No statistically significant differences in rates of turnover growth or capital growth were found, indicating that companies' growth has been similar.

The results from the two studies above include also the impact of engineering design and cannot be directly applied to evaluate visual design. Some of the well performing firms as well as others covered in these studies, however, base their businesses largely on design. The financially successful companies were also good in other areas such as marketing and production functions. There were also companies that continuously won design awards but were financially unsuccessful. Good design was thus not enough, but seems to be helpful for company success.

Besides the DIG, others have also recently carried out studies in the UK (Sentance and Clarke 1997, Sentance and Walters 1997). Five categories of design were distinguished: appearance design, technical design, process/systems design, engineering design, and graphic and brand design. The studies follow the methods of the DIG, and information about design is not easily discerned from the rest of the information.

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<sup>15</sup> The author used the word association, not correlation, thus there is no certainty about correlation.

The closest relation to design is the information on appearance and graphics/brand design. Appearance design is however a narrow approach to the concept of industrial design, as some of the industrial design inputs may be included within the term technical design presented in their study. Sentence and Walters also note that there are potentially some significant overlaps between the five areas.

Around 800 SMEs within manufacturing industries filled the questionnaire that created the empirical data in the surveys. The first survey did not produce any statistically significant relationship between design and company performance. For the latter study (Sentence and Walters 1997) the data was used to create two concepts of design: "hard" design and "soft" design. Hard design included technical, process/systems, and engineering design and "soft design", appearance and graphic/brand design. A statistically significant negative relationship was found between internal "soft" design, and the share of sales going to export. A statistically significant positive relationship was found between bought-in "soft" design and the share of sales going to export. The share of exports, however, does not reveal much about the company performance, but it had a statistically significant relation to turnover. There was no statistically significant relationship between "soft design" and turnover or profits. Industries were categorized into three broad sectors of manufacturing industry: engineering and related industries; materials and process industries; and consumer-related industries. The broad categorization might have made some information unobservable.

#### *Studies in the Netherlands*

Gemser and Leenders (2001) carried out a comparative study with 47 firms regarding design and company performance in two Dutch manufacturing industries: home furniture and precision instruments. Design was defined as giving form to objects. The basic assumptions were that the strategy of integrating design in the product development process is rather mature in the first industry and emerging in the second. The results were that positive correlations between design intensity and various business performance indicators were statistically significant in the instruments industry, but not in the furniture industry. In regression analysis there is a statistically significant negative relationship between design intensity and the share of exports from turnover in the furniture industry. The proposed explanation is that the competitive advantages of design have leveled out in the furniture industry and that in the instruments industry design is still a potent way to differentiate and position a company's products. The researchers however do not propose that design was insignificant, but an absolute necessity – a basic tool in competition.

Innovative design was found to have statistically significant positive effects in both industries. This suggests that also in mature industries design can be used to enhance company performance and that a more innovative design strategy is likely to have a higher payoff regardless of industry evolution. Gemser and Leenders (2001) conclude that the changing nature of competition during industry evolution should be considered, while developing strategies that integrate design in new product development.

### *Studies in the United States*

The Strategic Planning Institute (SPI) in the US has a Profit Impact of Market Strategy (PIMS) research program with a database that describes the markets, customers, competitors, operating structure, and economic performance of some 3,000 businesses. PIMS has measured customer-perceived design (CPD) among other variables. CPD eventually determines whether a product is wanted in the market or not. It is a relative measure of performance comparing the offering of the business to the offerings of its competitors. PIMS' large database consistently shows that businesses with better than average CPD have better Return on Investment (ROI). Businesses with better CPD have also larger market shares, but regardless of market share the connection between CPD and ROI remains. CPD commands premium prices, but CPD does not affect the operating costs. (Thompson 1994.)

Hertenstein et al. (2001) made a thorough study about the relationship between business performance and design within four industries: furniture, computer, electronic appliance and automotive, and with several business performance measures in the US. The advisory council of the Design Management Institute served as expert panel to evaluate design. Members of the council were asked to select companies in each industry, which they were familiar with and to select those that were most effective at demonstrating good design and those that were least effective. They were encouraged to use their own definition of good design while considering supportive suggestions. The sample was 51 firms and 12 financial performance measures were used.

This resulted in 48 comparisons. In 25 comparisons, the results were statistically significant at least at a test level<sup>16</sup> considered normally as almost significant showing that the group with good design performed better than the other group. In 20 further cases a difference was observed in the same direction without statistical significance. In only three instances results went to the other direction, and the results were not statistically significant. "Taken as a whole, these results provide strong evidence that effective design is associated with better financial performance. ... Whether these preliminary results apply to other firms and other industries remains to be seen." (Hertenstein et al., p. 14, 19)

### **3.2.5 Conclusion**

As is seen from the researches described above, people have very wide range of approaches to studying design. This creates difficulties in drawing more general conclusions. The studies' results, however, support the belief that design has a positive effect on company performance. As any other company process, design does not always create economic value. It has to be carried out well in order to produce wanted results. As the area of research is complex, it is often mentioned in the studies that the results can not be generalized. The results together however start to be extensive and design's economic significance should not be ambiguous anymore. Design is valuable for companies and thus for the whole economy.

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<sup>16</sup> one tailed T-test, 0.10 level of significance

## 4 DESIGN IN FINLAND

The discussion about design in Finland will be started with the design image of Finland. Statistical and qualitative information, and the lack of it, give insights about the present state of design and its understanding. A preliminary categorization of businesses in terms of design is presented in order to show the different applications for design. Design is not used in the same way in all the businesses and industries.

### 4.1 Design Image of Finland

The following text about the design image of Finland bases on the interview of Anne Stenros, the managing director of Design Forum Finland (DFF). DFF is a public organization, which promotes Finnish design in Finland and abroad, and functions as an information center.

Finnish design has a good image in international comparison, and Finnish design always elicits some response. Image or brand of Finnish design is composed of such concepts as functionality, quality, ecology, and overall esthetics perspective. These create a good basis for the design to be timeless. It is seen that products have a long life span and can be passed on to the next generation. The Finnish design image was created intentionally in the 50's and 60's. Trends bring it out more from time to time. At the moment the minimalistic trend is prevailing and Nordic design is highly valued.

The design image still bases largely on the great successes of those decades in the design intensive industries, which combined artistic craft traditions with industrial glasswork, ceramics and textile design. The line of famous works had however begun already in the 30's with Alvar Aalto's furniture. These are the fields of industrial arts presented in the media as design. The approach is the same in both national as well as in foreign media when describing Finnish design. The traditional design magazines concentrate on these fields and especially on the furniture industry. The task to update the perceptions about design becomes difficult. The reputation has been so strong that it has reflections up to this day.

In the 70's people expected success from this modern design. In the 80's design was not so much emphasized, other fields such as marketing took the lead in exporting industry. When the economy rose after the deep recession in the beginning of the 90's the traditional design industries still seemed to have profited abroad from the old reputation. However, the traditional design fields were not anymore the driving force, but industrial design. Volumes, innovations and emphasis had largely moved from the traditional sectors to industrial design.

The industries outside the design intensive industries benefit from the image created in the traditional design intensive industries. It has created an overall understanding that quality products are produced in Finland. Global companies such as Nokia may not need the argumentation of being from a design country, but the design reputation of Finland does not make the products worse either. Nowadays foreign designers are used to design Finnish products, and young Finnish designers get commissions from abroad. It is harder to distinguish distinctly, what Finnish design is. In the future the design image should be built on the good base deriving from the old reputation. The

basic idea should still be to make utility goods economically with good functionality and ergonomics. At the same time space should be given to experimentation, which develops design further.

## **4.2 Size of the Design Business in Finland**

### **4.2.1 Introduction**

Available statistic information about design in Finland can give only an overall picture about the volume of its use. The gathered information consists of turnover and employment figures in design consultancy business, architecture services and advertising services. The design done in-house by company employees is not included in these figures, neither are the design services bought from abroad.

”Innovation survey 1996”<sup>17</sup> carried out by Statistics Finland<sup>18</sup> (SF) has some connections to the use of design in the firms, but information is not in a proper form in order to make conclusions. The expenses on changes in production processes and industrial design due to innovations are incorporated in the same number. The items are not necessarily related. For some industries it can intuitively be deduced from the industry structure that process changes are a major source of expenses rather than industrial design. For other industries the task is much more complicated. Without firm-specific data the evaluation of the relative shares would be pure guessing. There are also concerns that companies may have not understood the categorizing of expenses, a view, which was presented by a researcher of SF. (see Appendix 4 for proposals concerning the study)

### **4.2.2 Categorization in Statistics Finland**

In the statistic classification available in SF, several categories give information about design. ”Industrial arts and design” category includes firms representing most of the design service professions. Interior design is however excluded from the category probably because the work is related to architecture. It is found within the group ”Other services to businesses” which consists of everything that could not have been categorized. Its categorization might change in the future. Areas connected to design such as architecture and advertising give also insights about the spread of design. Architecture is a part of corporate aesthetics in which advertising also adds its inputs. In Europe during the earlier part of the 20<sup>th</sup> century architects were often involved in product design, the most famous Finn being Alvar Aalto. The word architect had connotations to building architecture as well as product architecture. (Lambert 1993, Kruskopf 1989, Heskett 1980.)

### **4.2.3 Design Consultancy Business**

Turnover in ”Industrial arts and design” has grown an average of 20 % per year during the years 1994-1999. The size of the industry almost tripled from a modest 19.5 million euros to 48.6 millions during these years. The size of interior design business, which should be added on top of the previous figures, can only be estimated, as

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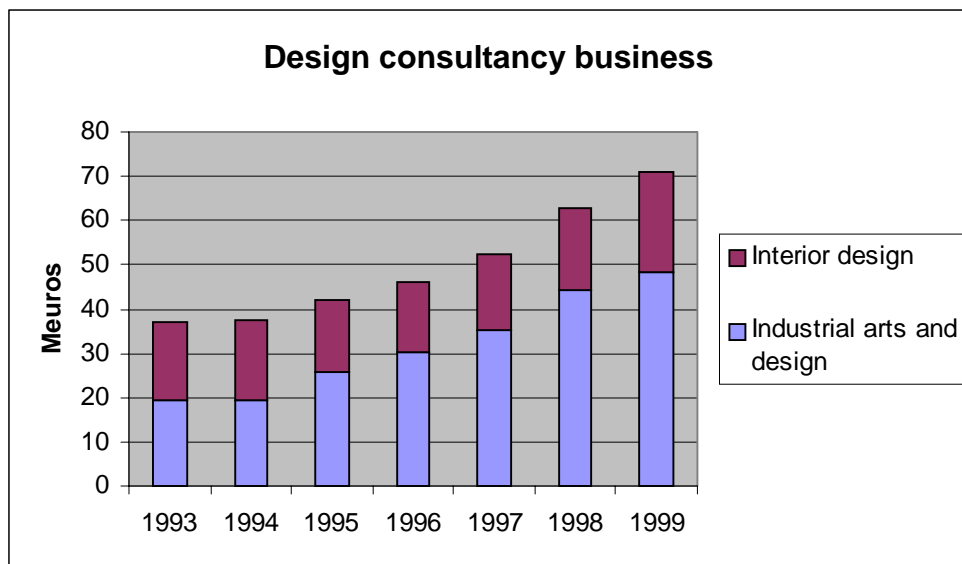
<sup>17</sup> Innovaatiotutkimus 1996

<sup>18</sup> Tilastokeskus



there are no turnover figures available. The number of people employed in the interior design profession has remained stable during the past years. Information about turnover per employee in similar professions and the number of employees in the interior design business can be used to create an estimate of total turnover<sup>19</sup>. Numbers of the architecture business are used for employee turnover, as the development of interior design business follows largely the architecture business. The first half of the 90s saw a drop in the interior design business following the large reductions in the construction industry. The changes in interior design business included fall in company size. During the past years turnover of the industry has grown to over 20 million euros.

In 1999, the turnover of design consultancy business overall stood at about 70 million euros. The number does not include the design done in-house and the services brought from abroad, as this information was not available in SF. How the design services are used between different sectors of industries is not revealed by the SF data.



**Figure 1; the development of turnover in Finnish design consultancy firms during 1993-1999**

Finnish design consultancy firms are very small compared to the size of foreign firms. There are only four firms with over 20 employees and none over 50, and over 90% of the offices have less than 5 employees (Statistics Finland). Foreign firms can have several hundred employees and they normally offer a full range of services leaning also close to advertising. The Finnish Foundation for Research and Development (Sitra) funded a series of studies in 1998 about design in Finland. A survey about design management was done in order to find out the extent of design usage. Of the 58 middle-sized and large companies that answered to a phone survey, 22 had carried out large-scale design management projects and foreign consultancy firms had done 16 of these. Of the 11 smaller scale projects, 9 had been carried out by Finnish design offices. (Sitra 1998.) Finnish designers regard the lack of business skills

<sup>19</sup> see Appendix 1, Interior Design Business

to be a main reason for failure to acquire commissions, other reasons being the lack of networking and poor skills in project management (Taik<sup>20</sup> 2001).

The results of the phone survey were confirmed for the most part with an extensive questionnaire answered to by 14 companies. The share of the Finnish design offices in smaller scale design projects had gone up to 100%. The results from the questionnaire showed that knowledge of the company and its field of business were considered the most important criteria when selecting a design office. In only two cases international references or the fact that the office was international had affected the decision. The surveyed companies were competing in international markets.

The growth rate in the design services in Finland follows the trend also seen in Britain (Design in Britain 2000). The size of the British companies is however a lot larger. The biggest companies have several hundred employees. The British firms can be used as a comparison as the design service industry is well developed in Britain. It is likely that the size of the Finnish design firms is insufficient to carry out full-scale design projects for companies. Finnish designers feel that the development of design offices has been impeded by their unduly small size and low degree of internationalization (Taik<sup>17</sup> 2001). The turnover of the 20 largest business consultancy firms in Finland is 250 million euros, as the turnover of the 20 largest design consultancy firms is a bit over 8 million euros (Artimo 2001). The difference is enormous.

#### 4.2.4 Architecture Services

It is not clear whether architecture should be included in the definition of design or *formgiving* as given in the beginning of section 2.1. Architecture clearly coincides with environment design and has elements of the visual design professions. At the same time it is clearly separated from the other professions, as the education is not taking place in the same institutions in Finland. Architecture enhances the quality of life through creating enjoyable living environments. Companies can use architecture to clarify their internal and external communication. Architecture affects the corporate aesthetics, corporate identity and image, which are important for company performance (Schmitt 1995). Architects are also to some extent involved in other visual design tasks, there are at least some working in media and advertising agencies<sup>21</sup>.

After the growth in the latter half of the 90s, turnover of architecture services was 222 million euros in 1999. Exports stood at 7% of the turnover<sup>22</sup>. About 20% of architects work in public or in private companies outside architecture offices<sup>23</sup>, and this work is not included in the figures. Some of the architects in public service are for example working with city planning and not directly with buildings or with permitting. Unemployment may not have hit architects in public posts as hard as architecture offices during the deep recession in the beginning of 90s, but in the graph 20% is used for all the years. The size of the architecture business was around 280 million euros in 1999.

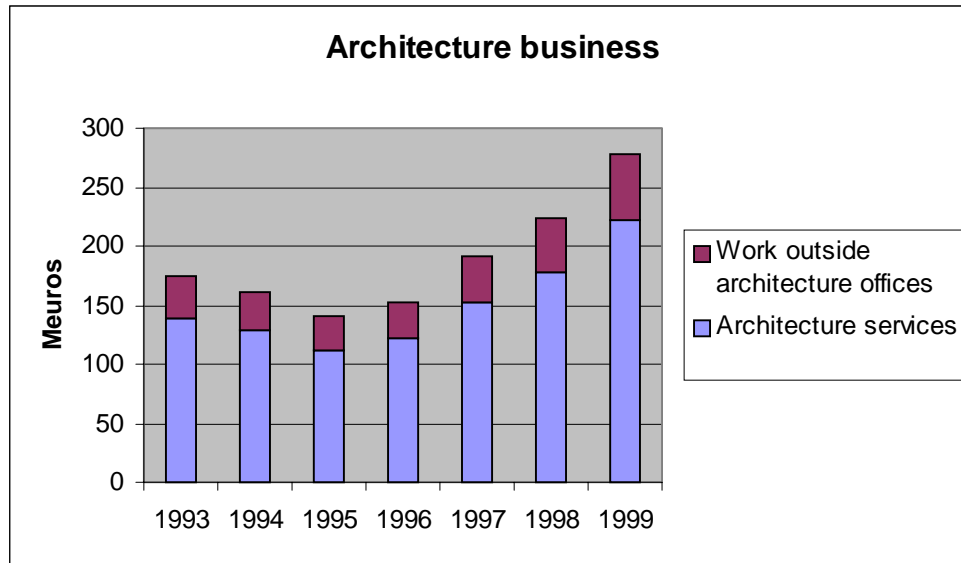
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<sup>20</sup> Taideteollinen korkeakoulu, University of Art and Design Helsinki

<sup>21</sup> an interview with Tuomo Sirkiä Secretary General of The Finnish Association of Architects, SAFA

<sup>22</sup> correspondance with Vesa Juola, Executive director of Association of Finnish Architect's Offices

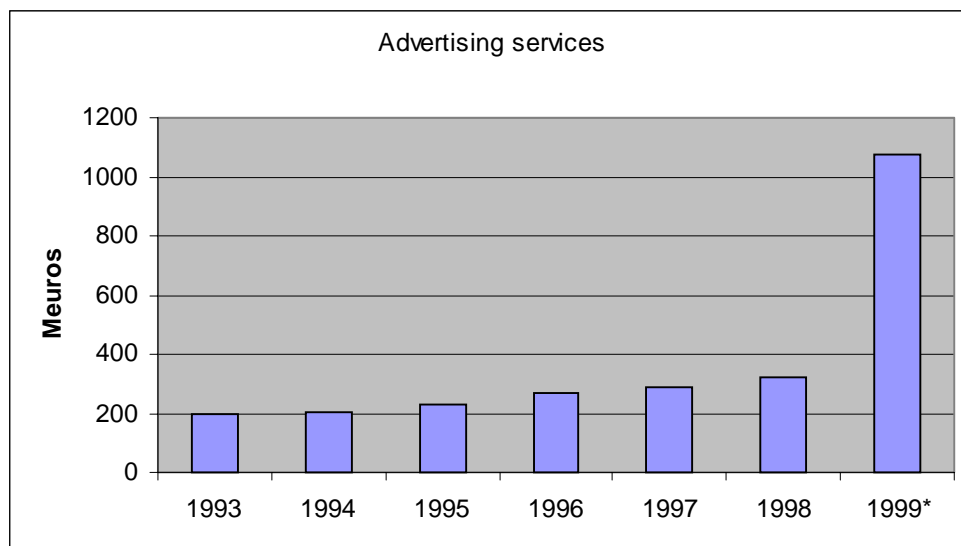
<sup>23</sup> correspondance with Tuomo Sirkiä, Secretary General of The Finnish Association of Architects, SAFA



**Figure 2; the development of turnover in architecture business in Finland during 1993-1999**

#### 4.2.5 Advertising Services

Advertising has never been considered to be truly design. However design is sometimes carried out by advertising agencies. Advertising agencies are responsible for active communication to consumers. This external communication should be coherent with signals presented in other communication forms in order to communicate clear identity and image. Advertising and design are both about communication, but in different forms. The turnover of advertising agencies was 1070 million euros in 1999.



**Figure 3; previously the volume of the advertising business in Finland was counted from the gross income. The year 1999 is the first year when the size of the advertising industry is counted from the turnover.**

#### 4.2.6 In-house Design and the Services Bought from Abroad

No wide-range studies about the scale of in-house design have been carried out in Finland. It is neither clear how much design services are bought from abroad. This kind of information would be needed to create a full picture of the state of design in Finland. The size of the design use remains to a large extent unclear, as the representatives of employer organizations are reluctant to even give guesses due to lack of information. The representatives can only give examples of companies who have used design extensively in their business, as there is no systematically gathered information available.

The study funded by Sitra in 1998 reveals some information. 103 companies answered into a questionnaire. The results of the questionnaire proposed that almost 80% of discrete product manufacturers would use designers. After control calls to companies that had not answered to the sent questionnaire the number was brought down to 50%. The number of originally sent forms is not told, which makes the reliability of the figures unclear. Distribution of the respondent firms based on the firm size does not follow the distribution pattern of Finnish companies. The major part of the Finnish companies are small, but about 65% of the respondents had turnover of over 8,4 million euros<sup>24</sup>, implying that the sample is not representative. From these findings can be concluded that the information presented above is unreliable. The share of companies that use professional designers is in reality probably a lot smaller.

The managing director of 'West Finland Design Centre'<sup>25</sup> states that only a fraction of SMEs use designers. In her view, the number of SMEs who use designers has not gone up substantially during the past years. The above results of the Sitra study may be true for larger production companies, but not for small ones. The results are more valid for traditional design intensive industries, as the share of small companies was larger in that category of respondents.

It is not clear whether the distortion in the firm distribution affects also other results of the questionnaire. The information mostly describes the use of designers in those firms that had used designers. In-house designers and freelancers/independent consultants were used widely in traditional design industries. The use of design offices was rare. In other industries the use of design offices was most common, and both in-house and freelancer were used. About half of the firms used more than one kind of the three design service providers: in-house designers, freelancers/independent consultant, and design offices.

### 4.3 Design in Different Industry Sectors

In Finland the TOL<sup>26</sup> categorization is presently used to categorize businesses. The categorization bases on the raw materials and the technical components of the industry's products. Each industry is associated with a certain level of technical complexity. The design qualities follow somewhat the technical complexity, but the OECD technological intensity categorization for industries presented by Statistics Finland (2001, p. 136) does not reveal direct information about design intensity. The design

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<sup>24</sup> 50 million marks

<sup>25</sup> Muova – Länsi-Suomen muotoilukeskus

<sup>26</sup> toimialaluokittelu, the line of business categorization

may play a major role in a high-tech industry or it may not. This depends on the nature of the industry and the technological cycles within the industry. This was briefly covered in section 3.1.3

A new categorization will be presented here, which tries to group the industries from design's point of view. This categorization has been developed basing on Keinonen's (2000) book about designing the user-interface and from several other writings. The purpose of the categorization is to more easily distinguish the possibilities of design in different industries. The categorization is preliminary and more work will eventually be needed to make it complete. Future work should go deeper into the differences in the characteristics of design in different industries. Design in services is largely left uncovered. The three categories that will be presented here are discrete product manufacturing, traditional design intensive industries, and other industries. Discrete product manufacturing has been further divided into several sub-classes.

Although the categories include several industries, even within an industry not all the firms use design in the same way, as they do not follow the same strategies either. There are however some common features in terms of design in the categories that will be presented. These common features consist of the user-interface, the technical complexity and the interaction between the customer and the product or the service. Detailed description of the functioning of design in different industries will be left for future work.

Of the industries traditionally considered to be design intensive, furniture industry is presented in more detail. The findings from the furniture industry resemble what the research on monopolistic competition - competition basing on differentiation - has found out to be true for industries in terms of advertising (Sutton 1991). Within the same industry there are companies who differentiate their products through high emphasis on advertising and others who compete solely on price (Sutton 1991). The furniture industry shows that the same is true in terms of design.

Several representatives from The Confederation of Finnish Industry and Employers<sup>27</sup> and its member organizations, and others were contacted. For some design issues were familiar, but for the others they were quite new. The representatives of the traditional design intensive industries had the best knowledge about design and its importance for their industries. However, independent of the industry, there were no industry-wide or even other large empirical surveys made about the use of design and its economic importance. In the traditional design intensive industries design might be a prerequisite for the business, but as the furniture industry will later show, this does not necessarily hold true.

#### **4.3.1 Discrete Product Manufacturing**

The purpose of this group is to gather the industries, which manufacture discrete products, excluding the process industries. All of the discussion below concerns the metal, electronics, plastic and rubber industries as they have common features in terms of design. Industrial designers have most to contribute to these manufacturing

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<sup>27</sup> Teollisuus ja Työntajat

industries. Turnover in these businesses was over 30 billion euros in 1999 (Statistics Finland).

In the metal industry the use of design has been taken into the strategic level in only few firms such as Benefon, Fiskars, Hackman, Metso, Nokia and Oras. These companies have incorporated design into the business processes in all of its forms. More often than at the strategic level, design is used as product design, forgetting communication and environment design. This leaves the design function with less importance than other functions such as engineering and marketing. The abilities of design to create value through corporate identity and image, brand, and at the concept level to direct the company to new product concepts are not fully capitalized. Even the use of product design is not common, more common is not to use it at all.

The companies may not see any need for design as they carry out the function as silent design (see sections 2.1 and 3.1.2). Silent design does not however create the results that can be produced with professional design. Especially the SME's with limited resources do not necessarily acknowledge that the problems they are facing might be solved with design. The understanding of design is inadequate. Larger companies are more aware, but nevertheless the use is often limited.

There is much potential in the metal industry to increase the use of design. In the earlier part of this report a list of international companies, who have included design in their business strategies, was given (see section 3.1.3). The companies were all from the metal and electronics industry. The examples were taken from existing literature, which emphasizes these fields of businesses, perhaps due to their volumes. At the same time it shows that design is very much applicable to the metal and electronics industry. Within these industries, however, the design applications are not uniform. The applications vary depending on whether they are industrial or consumer products, another factor being the technical complexity. In the following text design will be discussed under three sub-classes which are based on the design qualities.

### *Mechanical Products*

Using the TOL categorization of Statistics Finland the following industries were found to belong in this group: 'Rubber and plastic product manufacturing (25)', 'Metal product manufacturing (28)', 'Manufacturing of other electrical machines and equipment (31)', and from the category 36 all except furniture manufacturing. These industries cover a wide range of products. The basis for the products is their mechanical functionality. The engineers and industrial designers create these products in co-operation. Depending on product, either the industrial designers or engineers have the leading role in the product development. As described in the section covering the general aspects of design, even though the products may involve lots of engineering know-how, design may be the crucial element for the product's success. Metal product manufacturers are discussed below in more detail.

### *Metal Product Manufacturers*

A majority of metal product manufacturers function as subcontractors. A central problem for the whole metal product industry is the high dependence on the main

clients' business cycles. On average over half of the SME's production consists of subcontracting and the companies usually operate only within their own region. The low cost countries create competition and if higher automation level does not give clearly better quality, competitiveness becomes a problem for the subcontractors. Higher degree of processing would be one solution. This usually means taking responsibility of larger product entities, which requires participation in the client's product development. (KTM 1999, KTM 1997.) Tighter relationships with clients do not, however, fully solve the dependency problem around business cycles.

As KTM report (2000b) observes, the production of own independent products would create the best conditions for long-term planning and successful business. An able subcontractor may have know-how in the production processes that the client does not possess. Arvo Piironen Oy is a good example of a company which has created new businesses from the know-how acquired while functioning as a subcontractor. The missing skills, such as design, have been bought from service providers. The latest line of its three business departments is furniture production, the furniture being designed by several professional designers. Finding a marketing channel may be a problem for former subcontractors. Piironen has circumvented this through selling the products in co-operation with a larger company<sup>28</sup>. Other companies could use design in the same way to create own products and to lessen the dependence of the main clients' business cycles and to avoid the competition from the low cost countries.

The largest manufacturers of independent products (KTM 1997) are Fiskars Consumer Products<sup>29</sup>, with net sales of close to 800 million euros, and Hackman<sup>30</sup>, with net sales of 275 million euros in the year 2000. Both of these companies have very good design reputation and they have won several design prizes. In Fiskars design activities are carried out mostly by internal designers and in Hackman by external designers. Companies have internalized design to become a central part of their strategies. It is impossible to think about their products without the design elements.

### *Vehicles, Machines and Equipment*

Electronics and digital technology are penetrating all the time into new business areas. With electronics comes the task to combine the mechanical and digital functions in comprehensible and usable user-interfaces. The following industries are very much mechanical engineering intensive: 'Machine and equipment manufacturing (29)', 'Automobile and trailer manufacturing (34)', 'Manufacturing of other vehicles (35)'. Depending on the products, digital technology may already be important or there is substantial potential for it in the future.

The technical know-how of Finnish metal product and machine manufacturers is considered very good and the price level moderate (KTM 1998b). The larger producers are also quite aware of design, but to what an extent? A survey carried out by TT<sup>31</sup> (2001) shows that there is a need for know-how in brand management in the

<sup>28</sup> <http://www.piiroinen.com/shock/shock.html> and <http://www.martela.fi/mallisto/index.html>, 4.9.2001

<sup>29</sup> <http://www.kauppalehti.fi/ys/reports/20010216/10.html> and [www.fiskars.fi](http://www.fiskars.fi), 4.9.2001

<sup>30</sup> Hackman Designor and Hackman Metos, <http://www.kauppalehti.fi/ys/reports/20010219/6.html>, 4.9.2001

<sup>31</sup> Teollisuus ja Työnantajat, The Confederation of Finnish Industry and Employers

metal industry. A comparison with prior similar surveys cannot be made, as they have been executed in a slightly different way. Below are a few examples of companies who have implemented design in their business procedures.

An example of a machine supplier with a strong strategic commitment to design is Metso, the world's leading producer of machines and processes for pulp and paper industry.<sup>32</sup> The product design has been used for a long time as a part of their products and now it has been taken to the strategic level in order to get the full benefit of its possibilities. Design is carried out by a few internal and several external designers. Metso's chief designer Risto Vääänen acknowledges that quantitative competitive advantage is hard to measure. According to Vääänen, the savings in the material costs from design are around 5-10 % and two out of ten sales are possibly won due to design. The competitors have also seen the benefits and copied Metso's behaviour, as some imitation has been seen in competitors' products<sup>33</sup>.

The legacy of Metso's design awareness is seen also in such divisions which were previously a part of Metso. Valtra, a producer of tractors and now a part of Partek group, has a strong brand (DFF<sup>34</sup> 2001). Timberjack, a forest machine producer and a division of Metso sold to John Deere in 1999<sup>35</sup>, won the Pro Finnish Design award in 1994 for its forwarder<sup>36</sup>. John Deere has itself been a pioneer in the use of design. Design has been a part of its products ever since the 1930's (Lorenz 1986).

Oras, the largest producer of faucets in the Nordic countries with a turnover of about 112 Meur<sup>37</sup>, offers insights about the effects of design in an industry closer to the consumers. The commitment to design in Oras started already in the 60's. Design is such an essential part of the operations that according to the CEO's opinion new products or visions cannot be thought about without designer's inputs. The objective of Oras is not to make luxury, but quality products. The company sees that they themselves have to identify product concepts that would respond to customers' latent needs, the customers cannot give answers about the future. The questions about values, the experiences and the activities attached to the products are the central questions, not the price.<sup>38</sup> (DFF 2001.)

### *Electronic Products*

Microelectronics has reduced drastically the size and number of product parts. Product functions have simultaneously increased, which has led to continuous refinement of user interfaces. The solving of external integrity problems – fitting everything together – has relied on industrial designers' work. (Pulkinen 1997, Fujimoto 1991.) The following industries have especially been affected by this development: 'Office machine and computer manufacturing (30)', 'Manufacturing of radio, television and telecommunication appliances (32)', 'Manufacturing of medical and fine-mechanical equipment, optical instruments, and watches (33)'. The classification is at quite a

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<sup>32</sup> [www.metso.com](http://www.metso.com)

<sup>33</sup> <http://www.uiah.fi/designium/VaatanenPres.ppt>, 4.9.2001

<sup>34</sup> Design Forum Finland

<sup>35</sup> Metso vuosikertomus 1999

<sup>36</sup> kuormatraktori, [http://www.designforum.fi/palkinnot\\_kilpailut/pro\\_finnish\\_design\\_palkinto/1994/index.html](http://www.designforum.fi/palkinnot_kilpailut/pro_finnish_design_palkinto/1994/index.html)

<sup>37</sup> Annual Report 2000, <http://www.oras.fi>

<sup>38</sup> Kauppalehti Optio, nro 11 / 7. kesäkuuta 2001, Design Forum Finland 2001



rough level, the above given classes include also basic manufacturing of electronics and numerous other things, where the majority of the development is done outside the user-interfaces. I will concentrate here on the industries where the user-interfaces have become important. The clearest differences are seen in these products between consumer and investment products, not between different industries.

### *Electronic Investment Products*

This category includes most of the TOL class 33 with medical equipment and different kinds of measuring equipment and most of the class 30 with office machines and computers. The main objective in the category is to make the products easily understandable and user friendly. The purpose of the products is to carry out their specified functions. The difference in comparison to the consumer products is that the users do not relate themselves so strongly to the products. In 1992 Buscom Oy won Pro Finnish Design competition for its card reader. Medical equipment producers have received honorary mentions in the competition in several occasions.<sup>39</sup>

### *Electronic Consumer Products*

The TOL class 32 includes most of the products that can be considered consumer electronics. From the class 33 one important design company has to be mentioned. Suunto, a manufacturer of compasses and diving computers and a division of the Amer group, has effectively used design to create products with customer approach. The company has implemented design into widely known measurement technology to create products with a totally new identity.<sup>40</sup>

### *Nokia Mobile Phones*

The case of Nokia Mobile Phones (NMP) is used here not only because of the economic importance of the company for Finland, but also because NMP is a good example of the significance of design in consumer electronics. The mobile phone is one of the most personal items that can be carried along. The phone model can be chosen based on the personal needs, lifestyle and personal preferences. (Nokia 2000<sup>41</sup>.)

Pulkkinen (1997) mentions industrial design as one of the important factors affecting the success of Nokia Mobile Phones (NMP). The mobile phones were sold in the 80's to businessmen due to their high price. NMP reinvented the rules of the market by concentrating in the beginning of the 90's first to the businessmen and the self-employed and later to larger masses of consumers. Instead of offering a major technological break-through Nokia interpreted the market and demand in a new way. Other manufacturers followed. The first product to manifest a new consumer oriented design strategy was strong in design features but lacked in terms of technological innovation. It succeeded better than NMP had expected. "The change in market-

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<sup>39</sup> [http://www.designforum.fi/palkinnot\\_kilpailut/pro\\_finnish\\_design\\_palkinto/](http://www.designforum.fi/palkinnot_kilpailut/pro_finnish_design_palkinto/)

<sup>40</sup> Anne Stenros, [http://www.designforum.fi/palkinnot\\_kilpailut/pro\\_finnish\\_design\\_palkinto/](http://www.designforum.fi/palkinnot_kilpailut/pro_finnish_design_palkinto/) and [www.suunto.fi](http://www.suunto.fi)

<sup>41</sup> vuoden 1999 vuosikertomuksen yleisesite

ing focus is closely related to phone design as first-time consumers clearly appreciate usability and personalized features in product aesthetics” (Pulkkinen 1997, p. 120).

As NMP shifted from geographically based segmentation and differentiation to customer group based classification, design became global. The customer groups were thought to have similar needs regardless of geographical location. Using the values of these groups was also a new feature in product development. (Pulkkinen 1997.) The product family thinking started with the successful Nokia 2110 –phone, which became a classic due to clear design and easy user-interface. While the products are made for different customer groups they nevertheless share common features that distinguish them to be Nokia phones. (Nokia 2001<sup>42</sup>.)

Nokia has created a brand, which according to Business Week (2001)<sup>43</sup> is the fifth most valuable in the whole world and the most valuable of European companies. The old rival Ericsson can be found at rank 38 and Motorola at 66. Sony, a consumer electronic giant and the new ally of Ericsson in the mobile phones, does better and has the 20<sup>th</sup> most valuable brand. As the operating systems become more important in the mobile phones and the technological application will start to converge, the future competitor for Nokia may be found from Microsoft. The competition in the mobile phone business will be between standards as well as within the standards. Shapiro and Varian (1998) acknowledge the importance of brand and reputation in the wars between standards. The brand of Microsoft is estimated to be the world’s second most valuable.

### 4.3.2 Traditional Design Intensive Industries

In the University of Arts and Design<sup>44</sup>, the following departments are attached directly to certain manufacturing industries: Fashion and Textile Design, Ceramics and Glass, Interior Architecture and Furniture Design.<sup>45</sup> The corresponding industries in the TOL categorization are: ’Textile manufacturing (17)’, ’Clothes manufacturing, including the processing of furs (18)’, ’Currying; production of bags and purses etc. (19)’, ’Manufacturing of glass items and ceramics (26)’, and ’Furniture manufacturing (36)’. These are also the industries considered to be the fields of industrial arts<sup>46</sup> or the traditional design intensive industries.

These industries produce low-tech consumer products where the form is an essential part of the product. A lot of literature is available about these products and design. The books have often very classic and good appearance and succeed in giving a sense about the emotional pleasure the products with good design are able to deliver. The demand of a product is most probably connected to this emotional pleasure, but price affects also the buying decisions. The literature does not normally reveal information about the connection between design and economic success. Furniture industry will function as an example of these design intensive industries. It will show that sometimes the industry structure might be a hindrance for the use of design. The

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<sup>42</sup> vuoden 2000 vuosikertomuksen yleisesite

<sup>43</sup> see Appendix 3, Brand Values

<sup>44</sup> Taideteollinen korkeakoulu

<sup>45</sup> <http://www.uiah.fi/organisation.shtml>

<sup>46</sup> taideteolliset alat

use of design is not as self-evident as one might expect, but design is still an essential part of the products.

### *Furniture Industry*

Wood is the most important raw material of the furniture industry and clearly the forest industry affects the furniture industry whether or not it is included in the definition of the forest industry. The furniture industry has a long tradition in the use of design in contrast to the forest industry in general. The form creates the product itself, there is no great deal of technology embodied in the products. The furniture industry is not homogeneous in terms of the industry structure and design awareness. When reading the following text a distinction between furnishing public and private spaces has to be made. In the words of Juhani Husu, the head of Suomalainen huonekalu ry, in the furnishing of public places the design has always been strongly present and will always be.

The recession was difficult for the furniture industry in Finland, about one third of the companies went bankrupt. Virtually all of the middle-sized companies that had survived the loss of competitive advantage that had derived from currency rates in the '70s, went bankrupt or were split into smaller companies during the recession in the beginning of the 90's. This left a polarized industry with a few large and numerous small companies. The co-operation is small compared to Italy and Denmark. (Hazley 2000, Tiensuu 1999.)

The home furniture is the largest category with about 50% share of production and consumption, whereas office, kitchen and other products create the other half. Kitchen products are treated apart from the home furniture, because the businesses have different business models. The transportation costs are considerable for furniture products, the farthest sensible transportation limit for upholstered furniture is considered to be 1000 km and without upholstery 1500 km. Countries with low production costs have not taken over the markets, but their share of the markets has been growing, especially the share of Estonia<sup>47</sup>. Exports have also grown, but more slowly than imports.

”The furniture industry is low-tech and supplier dominated – i.e. innovations are mainly process innovations, embodied in capital equipment and intermediate inputs originated by firms whose principal activity is outside the industry.” (Hazley 2000.) Hazley (2000) concentrates on wood furniture industry, but the findings are also valid approximately for the furniture industry as a whole. He concludes that in many cases the competition in the industry is based on specialization and intangible assets such as trust and business culture, not on machinery, R&D or technology. Most of the producers have the same technology in their use.

### *The Home Furniture Industry*

Despite the long traditions in industry, design is not widely professionally implemented and it is not well understood at the strategic level. The deep recession led to

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<sup>47</sup> Juhani Husu

bankruptcies and splitting the companies into smaller entities. The industry lost a part of its know-how says Husu. A low level of education has led the companies to become stagnant. Conservative owners have been a hindrance to changes. (Hazley 2000, Tiensuu 1999.)

Home furniture business generates half of the total turnover in furniture business. The very concentrated retail business, in home furniture business, forces the producers to compete for the same distribution channels. (Tiensuu 1999.) The concentration of the distribution channels limits the possibilities of producers to differentiate their products. SME's do not have resources to create trends. Price competition has become central. More machines have been taken into use to substitute expensive labor. Countries with low labor costs, however, have the possibility to use the same technology. Husu does not see a need for new production facilities. The technical know-how in production is at a good level. It is also peculiar that the highest export ratio per capita in the whole Europe is found in the regions with some of the highest labor costs: parts of Germany, Belgium, Denmark and Northern Italy. (Hazley 2000, Tiensuu 1999.)

The competition has been price competition for about 25 years, which has eliminated resources to compete otherwise. Only few firms have the know-how to compete in the highest price category where design elements are important. Husu sees that the companies which try to bring in new models end up being copied by others. Ideas for new products usually originate from the international fairs in Milan or are copies of the products presented in these fairs. The patent and the copyright protection have not been effective. Copying discourages the firms to differentiate using design and lesser use of design leads to price competition. The price competition has lowered the consumers' expectations regarding price. Of the countries in the European Union only Greek households spend less money on furniture than the Finns do. All this together has reduced the growth opportunities for Finnish furniture. (Tiensuu 1999, KTM<sup>48</sup> 1998a.)

There is a problematic relationship between professional furniture designers and the industry. In general the designers' education is considered to be at a high level in Finland, but the industry has a perception that the designers aim to create non-commercial unique products. Designers may have a lack of understanding of the business principles. Consequently, professional furniture designers are not much used in the industry. On the other hand, the designers see that the management does not understand design or do not know how to co-operate with designers. The result is that especially in SME's product development is done by people whose main tasks are elsewhere. (Tiensuu 1999.)

The biggest weakness of the Finnish home furniture is the functional and technical quality of the products, which is seen to be barely the average quality of foreign products. The image of Finnish design is neither seen to give much support, as there are differing opinions about it. Some do not see that it even exists, others see that it follows the Scandinavian style: form follows function. Pakarinen and Riekkinen have collected data in 1991 in Italy which showed that 4/5 of Italians had a fuzzy idea about Finnish furniture design. There is also a lack of marketing know-how in the

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<sup>48</sup> The Ministry of Trade and Industry, Kauppa- ja teollisuusministeriö

industry. In general it could be said that the customer needs are not studied systematically, if at all. The buyers of the retail chains order from the producers in an unplanned manner without giving advice about their preferences. (Tiensuu 1999, KTM 1996a, 1998a, 2000a.)

The imports have grown steadily, but the transportation costs are a barrier for large imports. Foreign companies enter the domestic market through local manufacture, but hold the value adding functions such as design, marketing, and logistics in their own hands, which is what IKEA does. A few years ago IKEA purchased products worth around 300 million marks from Finland (KTM 1998a). There is no Finnish equivalent for Swedish IKEA. Husu acknowledges that there are a few firms, which are starting to use the approach towards markets resembling that of IKEA. They are however not yet big players.

### *IKEA*

Hassi (1998) argues that the basis for the product assortment of Swedish furniture giant IKEA are that potential customers ranges have been divided into four carefully defined sociological groups. IKEA sells its products in 33 countries and concentrates on product families that respond to the behavior needs of those four customer groups. IKEA's turnover has grown fast from 3,8 billion euros in 1994 to 9,2 billion euros in 2000. New market segments have not been added, only the size of the offered product ranges has grown. Hassi (1998) sees the design and marketing to be the core not the production. Logistics and subcontracting are strategically important functions as well. IKEA's brand value according to BusinessWeek (2001) is 6,01 billion dollars.

### *Office and Kitchen Furniture Industries*

The above describes the situation in the home furniture business, which differs from that of other furniture businesses. In office and kitchen furniture businesses sales are mostly through projects and not retail. The number of the producers is smaller and the companies are larger and have more resources than in the home furniture business. The only company operating in all the fields of industry is Isku, Finland's largest furniture producer. The businesses in the industry can thus be considered quite distinctly separate.

Copying is not considered to be an option in office and kitchen furniture businesses. Design and designers are used more and have an important place in the business. Design is clearly a marketing tool, especially in the office furniture business. Standards limit variation in the kitchen furniture. Frame structures are for the most part the same. The paneling and the doors create the appearance and this is where design can create value. The exports and imports represent only 10% of the volume, in the case of the kitchen furniture even less.

One side of the furniture business not covered previously is the furnishing of ships, which is directly connected to the Finnish ship building industry. There is no statistical information available about these orders, but Husu approximates these to be around 200-300 million marks. The designs for these furniture is specified with the

order and the Finnish producer concentrates on making the products efficiently and with good quality.

### *Conclusion*

Reports clearly show that pure price competition does not lead to a healthy furniture industry. The industry should acquire more information about customer needs and respond to these needs. This is repeatedly observed in the industry reports by KTM. Flexibility, customer perspective and design are stated to be the most important possibilities. Design is the way to implement the customer perspective together with marketing functions. Design is not understood at the strategic level in the home furniture business, but to some extent in office and perhaps also in the kitchen furniture businesses. (Tiensuu 1999, KTM 1996a, 1998a, 2000a.)

### **4.3.3 Other Fields of Businesses**

I have grouped here all the fields of businesses where the applicability of design is constrained to the package and the corporate image and identity or which otherwise differ from the industries previously mentioned. Service industries are all included in here. An example of an industry where design goes deeper to the product, but has a specific characteristic in terms of design, is the construction industry. Architecture can be considered to be for the buildings what industrial design is for the most smaller scale products. A new area where design tries to find its place is the software industry and the digital information production. Programmers try to learn to incorporate usability in their products. For designers, usability and other design aspects in digital products are new as well.

In grocery products or in cosmetics the package of the product has become very important. As the personal service has become more rare, the package is the first presentation of the product. It is a lot easier to communicate the values of the product if the package of the product supports the messages. Coca-Cola and Absolut Vodka are examples of companies who have combined the package of the product and the advertising to create total branding (Southgate 1995). One could ask what the difference is between Absolut and Finlandia Vodka. The contents of the bottles are by far the same. The value of Absolut brand is valued to be worth 1,4 billion dollars<sup>49</sup>. In some cases design can not be used significantly even in the packages. In the pulp and paper industry design can be used only on company image and identity. This is also common in all the service industry. Forest industry is discussed in more detail.

### *Forest Industry*

About 80% of the Finnish forest industry products consist of pulp and paper and the other wood products. Total turnover of the forest industry in 1999 was a bit under 20 billion euros (Statistics Finland). The share of forest cluster from the total industrial production has remained stable for the past four decades.

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<sup>49</sup> Business Week, August 6<sup>th</sup> 2001, p. 55

Applicability of design in pulp and paper companies is limited into company identity and image. It is a process industry with bulk products where there is no space for differentiation through product design. The situation is similar in other industries producing bulk products. Within the companies product design can be seen in the bought investment goods. It is often the case that investment goods are the most tangible that can be seen from companies. The investment goods thus create partly the companies' identity and image. In the mechanical wood industry the possible applications are wider, but the sawnwood industry produces presently mostly standard products.

In the research program "Future Scenarios of Finnish Forest Cluster" carried out by researchers from several institutions, the area of forest business is covered widely. A report "Finland's Forest Cluster at the Crossroads" based mostly on articles of the program describes the present situation of the forest industry and creates scenarios about the future. The following text bases mostly on these finding.

The European Union's report on its forest cluster brings up image as one of the intangible factors with growing importance. In the case of forest industry, image has much to do with companies' environmental image. Forest industry has heavy processes and previously also large emissions. The emissions from the processes have diminished into small quantities and the old image is not consistent with reality. In order to guarantee good employees in the future, work has to be done to deliver the wanted image. (Seppälä R. 2000.)

The image problem is present and perhaps even more evident in mechanical wood industry. It is often set forth that wood is an ecological and environment friendly material. This conception has not produced the wanted competitive advantage. Better ecological images have been created for competing materials without necessarily any fact-based arguments. The believed image advantage has become a weak point for the mechanical wood industry and it has been losing its share in the markets to other materials. (Seppälä R. 2000, Poutanen 2000.)

Sawnwood industry creates about 60% of the mechanical wood industry. Possibilities to large-scale value adding manufacturing are considered low. Local producers in the destination country are thought to have lower raw material costs and to be better aware of the market changes, and they have also shorter delivery times. The higher degree of processing would also increase the logistic costs. Furniture industry, which produces also products with high value added, is neither seen to grow strongly in the basic future scenario. The furniture industry is discussed more in the section of design intensive industries. (Poutanen 2000, Seppälä H. 2000.)

In the future scenarios for the forest cluster, image or product design is present in several occasions. In a scenario where development towards tighter economic blocks is believed to continue, the three forest industry groups will remain in the core of the cluster. Wood product industry would develop on the conditions of the large firms and would not be a major investment area. European wide or even global brands should be created. The corporate image is not directly present in another scenario with previously mentioned economic blocks and new areas of growth. It affects through environmental values and wood product industry, which is considered to grow in importance. The third scenario is a shattered and multi-centered world with

local practices defining the direction and where individuality is important. The scenario would favor small firms in networks and design elements to compete within mosaic like sets of values. In the last scenario the basic elements is green business. The structure of the industry develops towards SME's and the leisure use of forest grows in importance. The image of Finland as a forest country becomes important. (Meristö 2000.)

It seems that larger use of design could have benefits in the forest industry. Design is present in almost all scenarios in some way. The survey carried out by TT<sup>50</sup> (2001) that showed a know-how need in brand management in the metal industry showed the same need in the forest industry. The companies should also become more aware about how the brand management is connected to other business processes. Design could be a valuable link to carry out this task.

### *Construction Industry and Architecture*

The following ideas and opinions are based on the interview of Tuomo Sirkiä, Secretary General of The Finnish Association of Architects (SAFA). It tries to give an idea about the importance of architecture within the construction industry. Architects are in general the people who bring in the user or human perspective into the buildings. Finland has a good reputation in the field of architecture. The buildings are, however, quite often designed basing directly on production requirements.

There are two processes used in the larger scale construction projects: the traditional building process and the property development. In the traditional building process the client, the possessor of the property or the structure orders the designing from architects. When the design of the building and the specification for it are ready, the construction companies present in competitive bidding their offers with what price they are ready to carry out the construction work. At the competitive bidding stage the costs can be affected only as little as 10%. The overall design of the building and architects' work determines the major part of the costs. There are very few architects working in the construction companies due to the structure of the industry.

The other process used in the construction industry is property development, where the uses of the property are defined as the process goes on. The development of a property does not always follow the same pattern. The developer can be for example a consortium of several parties, or it can be a construction company. In the property development the architects have large effect on minimizing the waste space and maximizing the usable space. At the moment these subjects are given more attention, but it is difficult to say whether they are carried out better than previously.

In smaller scale construction projects architects are used to design individual houses, but very little to design ready-made house packages. Sometimes they, however, design new house types. In Sirkiä's point of view, the available assortment of different house types respond to the demand, as people do not know of better. The line between individual house project and ready-made houses is not clear-cut. The packages of ready-made houses could be customized to better respond to the buyer's needs.

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<sup>50</sup> Teollisuus ja Työnantajat, The Confederation of Finnish Industry and Employers



Some firms that sell these ready-made house packages offer the possibility to use architects as a part of the package, but the individual consultancy times with architects often are not at all sufficient to make real changes.

The companies normally have certain buildings that are defined to be important for the company such as the head-office. Architects are used to design these buildings in order to make them give a wanted impression. These buildings differ from the normal production facilities, which do not have same kinds of requirements. The production facilities have to be quite anonymous as they might be sold in the future.

#### **4.3.4 Conclusion**

Design can be applied in various ways depending on the industries, and design's economic values appear in different ways. If the results of the design aware companies could be repeated at the industry level, the impact would be substantial. The share of industrial design from the product development budget is usually small (Ulrich and Eppinger 1995). If this can reduce the manufacturing costs of a paper or other large machine with even 5%, it would pay back handsomely. It is harder to say what would be the quantitative benefits if structural problems of some industries could be solved. The implementation of design elements does not mean large increases in the need of labor, but it demands more coordination between processes and employees. It has to be remembered that design is still just one of the processes companies have to carry out well in order to be successful, but in Finland it seems to be a process to which is often given the least attention.

## 5 IMPLICATIONS AND FUTURE WORK

### 5.1 Implications

Empirical research supports the belief that design has a positive effect on company performance, but is unable to define design's precise impact. Design works in multiple ways, which makes it hard to find an exact connection between inputs and outcomes. As presented earlier, the leverage from design can be substantial. Small inputs can produce large results. Design does not, however, always produce economic results. The other business functions have to be in good order as well. The economic value of design can not be stressed too much, because it often tends to be overlooked. This has to do with its characteristic of not being explicitly analytical (see section 3.1.3) and because it consists in large part of tacit knowledge.

The information in this report implicates that there is space to increase design inputs in the Finnish economy. As Keinonen (2000) acknowledges the problem is not the companies, who already are aware of the possibilities and the necessity of design, but the others. The Finnish industry uses little design services and when they use them, the services are often bought from foreign design consultancy firms. The Finnish design consultancy firms are very small and internationally uncompetitive, in spite of the fact that they have large cost advantages. There are no reliable figures about companies' internal designers. The general perception is that if companies do not buy design services, they usually do not have internal designers either.

As it is hard to show the economic value of design, it is also hard to show the current impact of design in Finland. Turnover in the design consultancy business was 70 Meur in 1999. There were also similar activities in architecture and advertising services. These business activities are thus somewhat known, although the line between design and non-design activities is not very clear. The evaluation of design's impact, within the firms and industries that use design inputs, is a harder task. In the companies where design has been taken into the strategic level such as Benefon, Fiskars, Hackman, Metso, Nokia and Oras, design plays a crucial role in the companies' success, as do all the other strategic functions as well. There are also several smaller companies especially in the traditional design intensive industries, where design plays a central role.

The impact of design could be a lot larger in Finland, but the Finnish industry has to become aware of design's possibilities and start to use it more. A lot of business potential will be wasted if design awareness cannot be taken into a wider base of companies. The Finnish design consultancy firms must also solve their competitiveness problems. Well operating design consultancy industry will ensure that the provided services are of good quality and that the awareness of design remains at a good level.

### 5.2 Future Work

#### 5.2.1 New Surveys

There is a need for future work to gather more information about the state of design in different industries. The surveys could be carried out in collaboration with em-

ployer organizations and research institutes. Support from the employer organizations is needed in order to get information on design within companies, because the information may be confidential in nature. In large surveys the problem of insufficient basic understanding of design will most probably appear. The results of the surveys can not be directly used if the respondents have not really understood what the questions have been about. Thus the designing of surveys and the interpretations of the surveys' results have to be made with care, in order to avoid misinterpretations.

New surveys can produce information about several things. The surveys can create a better picture about different characteristics of design in different industries. Surveys may also reveal how design knowledge, awareness and use is firm or industry-specific, or that it diffuses into other companies and industries and becomes common knowledge in the way that happens often with technological innovations (see Vuori 1994 or 1997). Surveys should also reveal information about the number of internal designers and how they are divided between different industries. This was most probably one of the purposes of the research ordered by the University of Art and Design Helsinki (Taik 2001), but due to an unsuccessful question structure the information was not gotten. The extent of foreign design services' use is still somewhat unclear, although studies funded by Sitra in 1998 revealed some information. Surveys could also produce better understanding about the relationship between design and company performance. A survey about this relationship could follow the pattern used by Hertenstein et al. (2001), but to find conditions for such a survey in a small market like Finland can be impossible. One of the surveys' functions is also that they enhance design awareness while gathering information.

With the information from new surveys, firms and industries could be discovered with little design awareness and design inputs, and lots of potential to use design. The surveys could point out the problem points that hinder the use of design within firms. The firms and industries should then be informed about design and encouraged to use it. Collaboration between design consultancies and the industry should be supported and facilitated, as the present perception is that design is mostly produced by external service providers. Subsidizing directly the use of design would be justified and advisable if it seems that the benefits from design diffuse to the whole industry or wider, leading firms not to use design inputs.

### **5.2.2 Other Proposals**

In order to follow the development around design, a measure would be helpful. This could resemble the measure used for design in the handicrafts business. In handicrafts there is an attitude or sentiment "barometer" regarding the use and usefulness of design. Over time one can perceive how sentiments develop and draw conclusions about design awareness and attitudes towards design. A measure could also reveal whether there are contradictions between the attitudes and the use. This would help to detect obstacles of the design use. Design's unstable position as one of managers' business tools, as presented in the beginning of the section 3.1.3, suggest also to have this kind of a measure.

As noted by both Tuomo Sirkiä and Anne Stenros, the quality of design is directly related to the quality demanded by customers. Demanding customers are often perceived as a competitive advantage in the technology industries (Pulkkinen 1997). This may well be true also in terms of design, but as technology can be leveraged globally, design preferences are somewhat connected to the culture. These limits created by cultural differences do not necessarily restrict the business opportunities, as the Finnish culture stands close to the cultures with large markets. The implications of this to general policies are complex. How can the domestic customers be trained to demand good design quality? The education system may play some part in here.

While carrying out research about the importance of design in different fields of industries or in national perspective, the managerial framework for design should be developed. Well-defined approaches and procedures will help implement design in new companies. Aid should also be given to design consultancy firms in the form of research and other kind of knowledge.

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## Other sources of information

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## APPENDICES

### Appendix 1, Interior Design Business

In The Finnish Association of Architects the number of the members actively in the working life has been about 2500 in the year 2001. The number of people working in the architecture business was 3223 in the year 1999. The number has grown steadily. The ratio of these two numbers, people working in the business and the number of the architects, is 1.3. This will be used as an approximation for the ratio of people in interior design business and interior designers. The number of interior designers in the Finnish Association of Interior Architects is about 340 from which 250 are actively in the working life. The numbers have remained stable during the past years.

The turnover in architecture business has developed as presented below. The numbers have been counted from the information available in Statistics Finland.

	year	Turnover euros/person
Architecture services	1993	54 000
	1994	55 000
	1995	50 000
	1996	48 000
	1997	52 000
	1998	57 000
	1999	69 000

Using this information turnover in interior design business can be approximated.

For example in the year 1993 turnover = 1,3 \* 250 pers. \* 54 000 euros/pers. = 17,6 Meuros

	year	Turnover Meuros
Interior design	1993	17,6
	1994	17,9
	1995	16,3
	1996	15,6
	1997	16,9
	1998	18,5
	1999	22,4

## Appendix 2, R&D

Quotation from Science, Technology and Research 2001:2, Statistics Finland 2001, p. 41

*"Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications. R&D is a term covering three activities: basic research, applied research, and experimental development.*

*Basic research* is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.

*Applied research* is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.

*Experimental development* is systematic work, drawing on existing knowledge gained from research and/or practical experience, that is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed.

One of the problems with statistics describing R&D is that its definition is open to different interpretations in different units: that definition is necessarily rather loose and therefore it is always down to each individual informant how they want to interpret it and what they consider to be included in R&D.

..."

## Appendix 3, Brand Values

Quotation from Business Week, August 6<sup>th</sup>, 2001, p. 46

"The ranking by Interbrand, a unit of Omnicom Group Inc., is based on a rigorous analysis of brand strength. The basic theory is that strong brands have the power to increase sales and earnings. Interbrands tries to figures how much of a boost each brand delivers, how stable that boost is likely to be in the future, and how much those future earnings are worth today. Many of the brand names in our table are also the name of the parent company. The asigned value, however, is strictly for the brand. Coca-Cola's value is based on products carrying the Coke name, not on Sprite or Fanta."

A list of the 100 most valuable brands is available in the Internet in the following address. (October 14<sup>th</sup>, 2001)

[http://www.brandchannel.com/images/home/ranking\\_methodology.pdf](http://www.brandchannel.com/images/home/ranking_methodology.pdf)

## Appendix 4, Innovation Survey in Statistics Finland

Statistics Finland is carrying out large innovation surveys at least every fourth year. The structures for the researches, which do not take well into account design innovations, are decided at the European level. The research going on at the moment covers the innovation activities during the years 1998-2000. The structure has slightly changed from the previous one (see section 4.2.1). A new section has been added to the end of the new questionnaire about strategic and organizational changes. Within this section there is a question whether aesthetic or other subjective changes have been made to the product. This covers to some extent design activities.

In a question about innovation expenses, industrial design expenses are still incorporated in the same number with several other expenses, even more than in the previous questionnaire. Industrial design expenses could be well put into own question or questions, because design activities are often bought from design service providers and thus the expenses are well known. The numbers might be small, but this would reveal the small size of design inputs.

The new question structure should better avoid possibilities for misunderstandings by respondents. The problem of misunderstandings presented in section 4.2.1 may result from another question covering R&D services bought from external service providers. As noted in section 2.2, industrial design can often be considered to be R&D. The most preferable way to solve the problem would be to add a question about expenses in internal design activities and another about external expenses. This, however, might make the amounts very small. It would also be an improvement to the present state to have both design expenses in one question, but it should be mentioned in the question that it covers both internal and external design activities.

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