

Measuring the Value Created by Design: A Qualitative Study Generating a Comprehensive Overview

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Abstract

This paper studies the parameters that capture the value added by design. Design is a form of innovation recognized as a driver for innovation within businesses, which enables them to create a competitive advantage. Current literature mainly focuses on financial value and is mostly limited to one type of design. It is therefore unclear to which other quantitative as well as qualitative aspects of value, design can contribute. We opted for the following mixed method qualitative research approach: an extensive literature review was followed by focus groups and brainstorm sessions and multi-case research. In this way we develop a comprehensive overview of the parameters capturing the added value of design in an organizational context at the firm level. We pay attention to various types of design and focus on design outcome as well as the design process. Our study contributes to the literature not only by revealing the financial, but also other quantitative and qualitative benefits of design efforts. We find that the added value of design is mainly visible in financial value, brand value and user value. The influence of design in other qualitative parameters such as human capital, environmental contribution, intellectual property, process and strategy seems to depend on the type and size of the company and on the owner's vision on design. In addition, our framework offers a significant contribution to practice, since expressing the value of design in an organizational context can help managers to better understand and therefore manage the process of value creation through design, which is becoming an ever more important success-factor in today's competitive markets.

Keywords: design, design management, value management, company performance, intangibles, design value, value added by design, qualitative research, multi-case research, mix method approach.

Introduction

In this paper, we study the parameters and underlying indicators¹ that capture the value added by design (VAD). We refer to design as those activities involving “the creative visualization of concepts, plans and ideas and the representation of those ideas so as to provide the instructions for making something that did not exist before, or not in quite that form” (Walsh 1996, p. 513), hereby incorporating a broad view of design. Design within this study includes both the process of design as the outcome generated by design. Today most companies are convinced that design is crucial to create or maintain a competitive advantage. Many realize that design can yield an important added value and recognize that design is a driver for innovative performance, differentiation and growth (Czarnitzki & Thorwarth, 2012; British Design Council, 2007 and Design Flanders, 2007). Nevertheless, in a competitive environment design raises a number of important issues. The main reason is that the added value that design can deliver to a business is hard to measure. The consequence is that it appears often difficult to convince customers and other stakeholders of the added value that design can generate. Gauging the added value created through design for the company as well as for its stakeholders is therefore a major challenge.

Several studies have demonstrated a positive relationship between investments in design and business performance (e.g. Hertenstein et al., 2005, Gemser & Leenders, 2001 and Chiva & Alegre, 2009). These studies are fragmented and focus on one issue of value added by design. In addition, they tend to be limited to one type of design and due to this one-dimensional focus, articles concentrating on the same type of design tend to pay attention to the same type of parameter of VAD (Vijfeyken et al., 2012). In the same way, literature reviews on VAD focus on only one type of design (e.g. Luchs & Swan, 2011; Ravasi & Stigliani, 2012), with the exception of Vijfeyken et al. (2012) reviewing studies on a wide range of design types. The present study is not limited to one type of design or one indicator of VAD. Through qualitative research we want to identify as many indicators as possible of the value added by design, revealing a more complete image of the added value that design can deliver to a company. We gather our data through a mixed method approach combining an extensive literature review, focus group meetings, brainstorm sessions and multi-case research involving seven theoretically sampled organizations. Our study results in an encompassing set of parameters and underlying indicators covering the fields in which design generates added value. All eight parameters suggested by the literature turn out to be relevant in the cases, and where possible our study sheds light on the interaction between the most relevant parameters in which design generates added value. The case

¹ We use the term ‘parameter’ for the broad concept referring to a certain aspect of the added value by design. We use the term ‘indicator’ for the way in which the parameters have been expressed and measured concretely. For example design can contribute to brand value which can be expressed in terms of increased brand image or recognition.

studies also reveal that the added value generated in the parameters depends on the type of activity (service or manufacturing companies) and size of the company, as well as on the conviction of the founder, who can inspire employees to be design-minded.

The structure of the paper is as follows. First, we review the extant literature to identify the relevant parameters of the VAD. Second, we describe our qualitative research approach. Third, our findings from the different steps in the mixed method approach are discussed. The last section provides our conclusions, the limitations of our study, as well as our suggestions for future research and management implications

Literature review

Studies and literature reviews on VAD are generally limited to one type of design and even tend to pay attention to one type of parameter (Vijfeyken et al., 2012). Recent examples of literature reviews focusing on one type of design are Luchs and Swan (2011) and Ravasi and Stigliani (2012), who focus on product design, and Candi and Gemser (2010) who focus on Industrial design. Vijfeyken et al. (2012), on the other hand, brings together insights related to a variety of design types. This section focuses on the existing literature, studying the link between design and business performance. Our first literature paragraph focuses on the impact of design on financial firm performance and the second one on the impact of design on non-financial parameters/indicators.

Impact of design on financial firm performance

Several studies of academic and more practical nature analyze the impact of design on financial company performances. The British Design Council indicates, in a study of 2004 with 166 design-driven companies, the positive connection between investing in design and turnover growth and financial market value of the company. The Danish National Agency for Enterprise and Housing demonstrates via a survey, carried out through telephone interviews with 1000 private Danish companies in 2003, the positive effect of design on turnover, profit, productivity and export share of turnover. Candi et al. (2010) conclude in their research report for the Association of Dutch Designers (known as BNO) via 163 telephone interviews with Dutch companies that financial performances of new products, involving substantial attention for both experience design (concerned with message, symbols, culture, meaning and emotional and sociological aspect) and functional design (concerned with utility and performance) are on average 20% better than the financial performances of new products with limited attention to both design aspects.

Gemser and Leenders (2001) use a multiple linear regression analysis with 47 semi structured questionnaires. They conclude that integrating design in a new product development project has a significant and positive influence on company performance, both measured by subjective data from managers on profit, profit growth and turnover growth and measured by objective data on

turnover, profit and export sales. In particular, they find that when investing in design is new for the industry, company performances for the investing company are higher. In fact, design innovations have significant positive effects regardless the industry involved. While Gemser and Leenders (2001) compare industries, Hertenstein et al. (2005) compare firms having high design effectiveness with firms judged as low in design effectiveness on the basis of their financial performance. Design effective companies are those companies most effective at demonstrating “good design”. Design effectiveness is evaluated by independent industrial design experts in terms of the following factors: quality of firm’s design program, excellence of design evidenced in the firm’s products, marketing material and importance placed on the firm’s design program. Financial performance measures include ratios related to sales, ratios related to total assets, growth rates and market return. Firms rated as having high design effectiveness or “good design” show a stronger performance on all measures except growth rates.

Unlike Gemser and Leenders (2001) and Hertenstein et al. (2005), Guo (2010) believes measuring design investments on a subjective basis is problematic because it is difficult for managers and experts to determine exact design inputs. Furthermore, he believes design investments do not provide a reliable measure for design effectiveness, because investing in design does not necessarily generate profitable new products. He therefore uses the number of design awards as a proxy for design effectiveness. Guo (2010) performs a latent class regression analysis for 577 companies from 34 countries and 46 industries and concludes that design contributes to financial performance. This impact varies with countries and industries. In Europe, North America, Asia-Pacific and emerging countries design has an important impact on financial performance. The impact for design is higher in low-design industries than in high-design industries, where the use of design is necessary to keep up with the rest of the industry (Gemser & Leenders, 2001 and Guo 2010). The positive effect for low-design industries is less pronounced in European and North-American countries than in Asian-Pacific and emerging countries (Guo, 2010).

Besides its potential impact on sales, design can also lead to cost reductions. Cost savings as a result of design are identified by a variety of studies (Ahire & Dreyfus, 2000; Guo, 2010; Hsu, 2009; Larsen et al., 2007; Lockwood, 2007; Veryzer & Borja de Mozota, 2005). Guo (2010) finds a clear positive and significant effect of design on cost reduction. Ahire and Dreyfus (2000) studied specific cost reductions such as reduction in scrap rate, rework rate, defect rate and warranty work. All are positively and significantly influenced by design. Additionally Candi and Gemser (2010) mention that design allows firms to set premium prices, while Larsen et al. (2007) find that design can reduce selling prices, though only a limited number (10%) of their respondents indicate this as a benefit of design.

Overall, this literature mainly focuses on financial performance. However, apart from financial performance, design also creates value that is not directly

expressed in financial terms, such as usability, customer satisfaction, employee satisfaction or brand image. This will be the focus in the following section.

Impact of design on other non-financial indicators/parameters

In contrast to the attention paid to the effect of design efforts on financial performance, the link between design and non-financials remains underexamined. The focus of most of the papers studying non-financial parameters lays on customer behavior and operational performance (Luchs & Swan, 2011; Ravasi & Stigliani, 2012; Vijfeyken et al., 2012). Our extensive literature review revealed which other variables are influenced by design efforts. The identified indicators and parameters are clustered into eight groups: Financial value as discussed above, Brand value, Human capital, User value, Social responsibility, Intellectual property, Process and Strategy. Most of these studies do not study the direct link between design activities and such variables. Literature reviews and research articles providing summary statistics mainly led to the list of indicators identified in Table 1.

The first non-financial parameter found in the literature is Brand value. Within this parameter, five groups of indicators can be identified: building up the brand and company image (Candi, 2010; Candi et al., 2010; Candi & Gemser, 2010; Creusen & Schoormans, 2005; Hietamäki et al., 2005; Hsu, 2009; Kootstra, 2009; Larsen et al., 2007; Lockwood, 2007), generating public relations opportunities (Hietamäki et al., 2005, Hsu, 2009; Kootstra, 2009; MacMillan, 2005), building up brand personality (Luchs & Swan, 2011), generating brand recognition (Karjalainen & Snelders, 2010; MacMillan, 2005) and lastly reinforcing marketing information gathering (Hsu, 2009). Only company image and brand recognition are statistically tested and are significantly positively influenced by design (Candi, 2010; Candi et al., 2010; Hsu, 2009; Karjalainen & Snelders, 2010).

Most of the studies, analyzing the link between design effort and Human capital are published by governmental design agencies. Two of them find a positive and significant influence from design on employment on firm level (Danish National Agency for Enterprise and Housing, 2003; Design Flanders, 2007). Other indicators of which companies believe design influences them in a positive way, are employee satisfaction (MacMillan, 2005), employee motivation (Kootstra, 2009; Larsen et al., 2007; MacMillan, 2005), corporate culture (Kootstra, 2009), teamwork (MacMillan, 2005), productivity (Hietamäki et al., 2005; Kootstra, 2009; MacMillan, 2005), stress reduction (Lockwood, 2007), mood or attitude of employees (Lockwood, 2007), employee morale (Lockwood, 2007), employee way finding (Lockwood, 2007) and the work environment (Lockwood, 2007). Hietamäki et al. (2005) additionally identify indicators that represent the organizational design competence and employment of the organization. These are very interesting because they suggest considering the competence of the designers or employees involved in design, their strategic involvement and not only the number of designers or their share in employment.

For the third non-financial parameter User value a variety of indicators are identified. A large part of the indicators are positively and significantly influenced by design. These are customer satisfaction (Candi et al., 2010; Chitturi et al., 2008; Sulek et al., 1995), customer loyalty (Chitturi et al., 2008), word of mouth (Chitturi et al., 2008), repurchase intention (Chitturi et al., 2008), delight (Chitturi et al., 2008), market share (Chiva & Alegre, 2009), product liking (Page & Herr, 2002) and reduction of the number of customers complaints (Ahire & Dreyfus, 2000). Other indicators of User value are improved usability (Hietamäki et al., 2005; Kootstra, 2009; lockwood, 2007; Hsu, 2009), customer base (Candi, 2010), development of communities of customers (Lockwood, 2007), deeper consumer connections (Larsen et al., 2007; Noble & Kumar, 2008 and 2010), perceived preference (Luchs & Swan, 2011), willingness to pay (Luchs & Swan, 2011), purchase intention (Luchs & Swan, 2011), products more in tune with the customers (Hietamäki et al., 2005; Veryzer & Borja de Mozota, 2005), quality (Ahire & Dreyfus, 2000; Hoegg et al., 2010; Kim & Chhajer, 2000; Larsen et al., 2007; Page & Herr, 2002; Petersen et al., 2005; Roy & Riedel, 1997; Swink, 2000; Tien et al., 2005), cue for product use (Kreuzbauer & Malter, 2005), cue for features/functionalities/quality (Creusen & Schoormans, 2005; Hoegg & Alba, 2011), categorization (Bloch, 1995; Creusen & Schoormans, 2005; Kreuzbauer & Malter, 2005), safety (Roy & Riedel, 1997; Tien et al., 2005) and bolder consumer expectations (Verganti, 2006).

Limited studies identify Social Responsibility aspects that are influenced by design and none of them test whether these influences are significant. However, some studies suggest possible indicators of Social Responsibility that could be positively influenced by design, namely: sustainability (Kootstra, 2009; Lockwood, 2007), post-consumer choice through sustainable design (Luchs & Swan, 2011), environmental impact (MacMillan, 2006), whole life value (MacMillan, 2006), ecological foot print (MacMillan, 2006), social and cultural performances (Hsu, 2009) and considering environmental design (Hsu, 2009). Just like for Social Responsibility, the relationship between design and Intellectual Property (IP) is not statistically tested. Two studies however state that design generates design patents (Lockwood, 2007), trademarks (Lockwood, 2007; Peter & Burkhard, 2010) and copyrights (Peter & Burkhard, 2010), all of which are of value to the company.

Design positively influences the manufacturing productivity (Ahire & Dreyfus, 2000) and the development duration (Marion & Meyer, 2011), both indicators of the parameter Process. Hsu (2009) finds a positive and significant effect on technique upgrade for design investments associated by R&D activity and fails to find this when the company only focuses on design or company identity investments (Hsu, 2009). Speed to market is positively and significantly influenced by design when design activities focus on quality outcomes but not when design incorporates functional or aesthetic capabilities (Swan et al., 2005). It seems that the influence of design on indicators of the parameter Process is highly dependent on the type of design (Hsu, 2009; Swan et al., 2005). Other

indicators of Process are payback time (Bruce et al., 1995), time to market (Candi & Gemser, 2010; Hietamäki et al., 2005; Lockwood; Luchs & Swan, 2011), speed of introducing new products (Swan et al., 2005), efficiency (Kootstra, 2009), coordinated supply chain (Luchs & Swan, 2011), development duration (Marion & Meyer, 2011), shortening the length of the NPD process (Veryzer & Borja de Mozota, 2005), improving design and development procedures (Hsu, 2009; Lockwood, 2007), reinforcing technical cooperation (Hsu, 2009), ease of manufacturing and maintenance (Hsu, 2009), meeting safety requirements and regulations (Hsu, 2009), closeness to suppliers (Hoetker et al., 2007; Larsen et al., 2007), extending shelf life (Larsen et al., 2007) and timeliness of after sales service (Bush et al., 2010) and upgrading product quality level (Hietamäki et al., 2005; Hsu, 2009).

Hietamäki et al. (2005) additionally identify indicators for organizing the design process, co-operation with users and positioning the design department, which are not design outputs but rather design efforts. Examples of these indicators are the share of designers working in cross-divisional teams, designers' relationships with other departments, the degree of customer and user involvement in processes or separate design department versus design positioned inside other functional departments.

Design was further found to help achieve the strategic goals of the company. Design investments generate a positive and significant effect on entry into new markets (Candi, 2010; Candi & Saemundsson, 2011) and resistance to imitation (Candi & Saemundsson, 2011). Moreover Candi and Saemundsson (2011) find that design generates a competitive advantage when the pressure to reduce prices in the industry is high. Marsili and Salter (2006) investigate the relation between innovation performance and newly designed products or redesigned products. Only newly designed products generate a higher innovation performance for the company. Furthermore design enables product and service innovation (Gemser & leenders, 2001; Hietamäki et al., 2005; Kootstra, 2009; Lockwood, 2007; Marsili & Salter, 2006; Talke et al., 2009), competitiveness (British Design Council, 2007; Kootstra, 2009), development of new markets (British Design Council, 2007; Hsu, 2009; Kootstra, 2009; Larsen et al. 2007), development of new products/services (British Design Council, 2007), development of joint ventures (Larsen et al., 2007), extension of the product range (Roy & Riedel, 1997) and allows a flexible response to uncertain environments (Sanchez & Mahoney, 1996) and differentiation to the offerings of competitors (Verganti, 2008).

To conclude our literature review, Table 1 provides an overview of the eight parameters described with their respective indicators and references. Since earlier studies indicate that each of these parameters generate a positive influence or are positively influenced by design investments, we expect that design will generate added value for the organization in these eight elements.

Parameters of VAD	Indicators of added value by design	Sources
Financial value	Sales, Sales of new and existing customers, Share price, Cost reductions in general, of warranty, repairing, production and services, Growth rates, Profit, Profitability, Export, Turnover, ROS, ROI, ROE, Liquidity, Solvability, Market return, Premium pricing, More competitive selling price,	Ahire & Dreyfus, 2000; Auger, 2005; Bruce et al., 1995; Candi, 2010; Candi et al., 2010; Candi & Gemser, 2010; Candi & Saemundsson, 2011; Chiva & Alegre, 2009; Czarnitzki & Thorwarth, 2009; Danish National Agency for enterprise and housing, 2003; British Design Council, 2004, 2007; Design Flanders, 2007; Gemser & Leenders, 2001; Guo, 2010; Hertenstein et al., 2005; Hietamäki et al., 2005; Hsu, 2009; Kootstra, 2009; Larsen et al., 2007; Lockwood, 2007; Luchs & Swan, 2011; MacPherson, 2000; Macmillan, 2006; Marsili & Salter, 2006; Sounder & Song, 1997; Sulek et al., 1995; Swan et al., 2005; Talke et al., 2009; Tien et al., 2005; Veryzer & Borja de Mozota, 2005; Wallace, 2001;
Brand value	Brand image, Corporate reputation / Firm image , Innovative image of the firm, Improving product image and popularity, Upgrading company product design image, Publicity regarding the company, Public Relations opportunities, Reinforcing promotion effectiveness, Recognition of the brand , Brand development, Brand personality, Brand awareness and prestige, 'Wow' factor, Reinforcing marketing information gathering and adaptability	Candi, 2010; Candi et al., 2010; Candi and Gemser, 2010; Creusen & Schoormans, 2005; Hietamäki et al., 2005; Hsu, 2009; Karjalainen & Snelders, 2010; Kootstra, 2009; Larsen et al., 2007; Lockwood, 2007; Luchs & Swan, 2011; Macmillan, 2006;
Human Capital	Employee satisfaction, Employee motivation, Corporate culture, Employment , Teamwork, Productivity, Stress reduction, Improve mood or attitude, Improve morale, Improve way finding, Improve the work environment	Danish National Agency for enterprise and housing, 2003; Design Flanders, 2007; Hietamäki et al., 2005; Kootstra, 2009; Larsen et al., 2007; Lockwood, 2007; Macmillan, 2006;

Social Responsibility	Improve sustainability, Post consumer choice through sustainable design, Environmental impact, Whole life value, Ecological foot print, Stressing social and cultural performances, Considering environmental design	Hsu, 2009; Kootstra, 2009; Lockwood, 2007; Luchs & Swan, 2011; Macmillan, 2006;
Parameters of VAD User value	Indicators of added value by design Market share, Customer satisfaction , Improve usability, Reduction of customer complaints , Customer base, Customer loyalty, Word of mouth, Repurchase intention, Delight , Usability, Forges closer relationships with customers, Develop communities of customers, Perceived preference, Willingness to pay, Purchase intention, Deeper consumer connections, Product liking , Products more in tune with the customers, Designing a good human-machine interface, Bolder consumer expectations, Quality, Categorization, Safety, Cue for product use, Cue for features / functionalities / quality	Sources Ahire & Dreyfus, 2000; Bloch, 1995; Candi, 2010; Candi et al., 2010; Chitturi et al., 2008; Chiva & Alegre, 2009; Creusen & Schoormans, 2005; British Design Council, 2007; Hoegg & Alba, 2011; Hoegg et al., 2010; Hietamäki et al., 2005; Hsu, 2009; ; Kim & Chhajed, 2000; Kootstra, 2009; Kreuzbauer & Malter, 2005; Larsen et al., 2007; Lockwood, 2007; Luchs & Swan, 2011; Noble & Kumar, 2008 and 2010; Page & Herr, 2002; Petersen et al., 2005; Roy & Riedel, 1997; Sulek et al., 1995; Swink, 2000; Tien et al., 2005; Veryzer & Borja de Mozota, 2005; Verganti, 2006
Intellectual Property Process	Design patents, Trademarks, Copyrights Productivity , Payback time, Time to market , Speed to market, Technique upgrade , Efficiency, Coordinated supply chain, Development duration, Speed of introducing new products , Shortening the length of the NPD process, Ease of manufacturing and maintenance, Meeting safety requirements and regulations, Upgrading product quality level, Improving design and development procedures, Reinforcing technical cooperation, Forges closer relations with suppliers, Extends shelf life, Timeliness of after sales service	Lockwood, 2007; Peter & Burkhard, 2010; Ahire & Dreyfus, 2000; Bush et al., 2010; Bruce et al., 1995; Candi & Gemser, 2010; Hietamäki et al., 2005; Hoetker et al., 2007; Hsu, 2009; Kootstra, 2009; Larsen et al., 2007; Lockwood, 2007; Luchs & Swan, 2011; Marion & Meyer, 2011; Swan et al., 2005; Veryzer & Borja de Mozota, 2005;
Strategy	Enable product and service innovation , Competitiveness, Development of new markets, Development of new products/services, Entry into new markets, Resistance to imitation ,	British Design Council, 2007; Candi, 2010; Candi & Gemser, 2010; Candi & Saemundsson, 2011; Gemser & Leenders, 2001; Hietamäki et al., 2005; Hsu, 2009; Kootstra, 2009; Lockwood, 2007; Marsili & Salter,

Encourages development of joint ventures, Be different to the offerings of competitors, Extends the product range, Allows a flexible response to uncertain environments. 2006; Roy & Riedel, 1997; Sanchez & Mahoney, 1996; Talke et al., 2009; Verganti, 2008;

Note: Indicators in bold are found to be positively and significantly influenced by design.

Table 1: Summary of design parameters and indicators

Research Method

Our unique mixed method approach allows us to gather very rich material for gaining the most complete possible overview of VAD generated within an organization. To test the potential role and importance of the eight parameters summarized in Table 1, we started organizing various focus group meetings bringing together experts from private design agencies, government organizations and academia. Our focus groups discussed and evaluated all indicators and parameters already found in the literature. These experts were also involved in brainstorm sessions to come up with undocumented parameters and / or indicators of VAD. Brainstorm sessions resulted in a large wall with more than 200 Post-it notes. Each Post-it note was discussed by our experts and categorized in groups of similar parameters of VAD. The collected knowledge and inputs of the different experts had an important surplus value, helping us to ensure a complete overview. Table 2 summarizes the number of meetings, their duration and the people involved. All eight parameters suggested by the literature turned out to be relevant in the focus group meetings and came up during the brainstorm sessions.

	Duration	People involved
Focus group 9-2010	4 hours	6 academics, 3 designers, 3 people from design organizations
Focus group 10-2010	4 hours	2 academics, 2 designers, 1 innovation consultant, 1 person from the collective center of the Belgian technology industry
Brainstorm session 10-2010	4 hours	3 academics, 3 designers, 1 innovation consultant, 1 person from the collective center of the Belgian technology industry,
Online mind map	Online from 25-10-2010 until 20-11-2010	2 academics, 1 designer, 1 design organization
Focus group 11-2010	2 hours	2 academics, 1 designer, 1 person from the collective center of the Belgian technology industry
Focus group 12-2010	4 hours	4 academics, 1 designer, 1 innovation consultant, 2 people from design organizations
Focus group 4-2011	3 hours	2 academics, 1 designer, 1 innovation consultant, 1 person from the collective center of the Belgian technology industry, 1 person from a design organization
Focus group	2 hours	2 academics, 2 designers

6-2011		
Focus group	3 hours	3 academics, 3 designers, 1 innovation consultant, 2 people from design organizations
7-2011		
Focus group	3 hours	5 academics, 3 designers, 1 innovation consultant, 2 people from design organizations, 1 person from the collective center of the Belgian technology industry
10-2011		

Table 2: Overview focus group meetings and brainstorm sessions

For the second testing phase, we chose a qualitative research approach to study the parameters of VAD in a business context. Since the area is rather new and it is hard to find practical data on the added value by design, we opted for a multiple-case study approach (Eisenhardt, 1989). Our objective is to obtain an overall understanding of VAD for organizations. Semi-structured interviews were used. These types of interviews provide freedom and flexibility during each interview, but still keep the focus on relevant central issues (Eisenhardt, 1989; Yin, 2003). A series of interviews were conducted with senior , technical or design managers in different types of firms, ranging from large to small and from manufacturing to service companies. All cases are organizations conscious of the added value design can generate. The focus group meetings were used to select the companies involved: the design experts judged whether or not the cases were suitable to be incorporated in our study. The oral transcripts of each interview, company descriptions, e-mails, website information, memos, leaflets and articles about the organizations involved were gathered and analyzed. The use of multiple data sources allowed us to triangulate our findings, and in this way to enhance the validity of our analysis (Yin, 1994, 2003). Table 3 gives a brief overview of the interview data for each case company. Our analysis was supported by NVivo in order to improve the reliability of the research process (Miles & Huberman, 1994; Silverman 2005). We used a theoretically informed coding scheme to guide the analysis of our data (Saunders et al, 2008; Strauss & Corbin, 1998), which helped us to set up thematic matrices (Miles & Huberman, 1994). We cross-validated the documents and oral transcripts by comparing the observations based on the documents with the observations provided by the interviewees to ensure data triangulation and construct validity (Miles & Huberman, 1994 and Yin, 2003).

Case Company	Position respondent(s)	Hours of interview data	Number of documents per case
1 Decorative furniture fittings	Owner	1.5	6
2 Functional and emergency lighting	Director Development Lighting	1.5	3
3 Wireless monitoring	Design coordinator	2.5	5
	Co-owner	2.5	
	Web developer	0.5	
	Management assistant	0.5	

4 Radiators	Designer	1	8
	Communication- and marketing manager	1	
5 Translation agency	Owner	1	1
	Chief Innovation Officer 1	1	
	Chief Innovation Officer 2	1	
	Founder	2	
6 Law firm	Founder	2	2
7 Fast moving consumer goods retailer	Vice-president	1	4
	Procurement		
	Design coordinator	2	
Total	13	19	31

Table 3: Summary of interview data used for analysis

Research results and discussion

The following section discusses the results from the focus group sessions, the brainstorm sessions and the case study interviews.

Focus group sessions and brainstorm sessions

All eight parameters suggested by the literature turned out to be relevant in the focus group meetings and came up during the brainstorm sessions. Additionally the brainstorm sessions provided a number of novel indicators for the following parameters: Human capital, User value, Social responsibility and Process. First, in terms of Human capital, public design organizations have witnessed from their own experience that design clearly favors Human capital. They indicate that design use decreases labor turnover, increases retention of personnel and reduces absence rate. For the parameter User value, our participants suggested the following additional indicators: increase in the number of new products / market penetration, usefulness, price perception, affordability, timeless style and continuity in style. Moreover, the designers involved stressed that their design is more effective when the values communicated are confirmed by the customers using them. The designers mentioned they incorporate Social responsibility aspects like transport reduction, recyclability of materials and lowering of the CO2 emission when presenting their project to the customer. Concerning the parameter Process, all respondents were convinced of the fact that design can simplify the production and/or service process. As a result of the brainstorm sessions, these new, relevant indicators were included to our list of indicators used further for our interview questionnaire. Apart from these new indicators, the focus group sessions and brainstorm sessions did not add new parameters to our classification of eight parameters (Table 1) identified in the literature. During our further research process we therefore retain this classification.

Within-case analysis

We undertook seven case studies, analyzing in-depth interviews and related

company documents. Each of the interviewed companies is aware of the added value that can be generated by design; during the interviews, all seven parameters were questioned. Since our case material is confidential, we describe the case companies as follows (1) a manufacturer of decorative furniture fittings; (2) a producer of functional lighting for offices and industry, lighting control systems and emergency lighting; (3) a manufacturer of hardware and software for wireless registration and monitoring of crucial control parameters, such as temperature; (4) a manufacturer of heating solutions and design radiators; (5) a translation agency; (6) a law firm focusing on public law and (7) an international food and fast moving consumer goods retailer. Table 4 shows the characteristics of each case.

Case Company	Founded	Number of employees	Turnover (€)	Service/ manufacturing	International	Internal or / and external designers
1. Decorative furniture fittings	1954	38	5.9 million	Manufacturing	Yes	External
2. Functional and emergency lighting	1949	410	45.8 million	Manufacturing	Yes	External and internal
3. Wireless monitoring	2005	10	n.a.	Manufacturing and Service	Yes	External
4. Radiators	1962	650	75 million	Manufacturing	Yes	External and internal
5. Translation agency	1990	30	6.1 million	Service	Yes	External and internal
6. Law firm	2007	11	n.a.	Service	No	External and internal
7. Fast moving consumer goods retailer	1967	13 000	4.4 billion	Manufacturing	Yes	External and internal

Table 4: Characteristics case companies

For each case company, we will now first introduce the company, second, explain how it uses design focusing on the design input of the company, and third, discuss the important elements of VAD. These elements are brought together in a summarizing table (Table 5-11) for each company, providing a short overview of the design input and output for each VAD parameter.

Company 1: Decorative furniture fittings

This company was founded in 1954, moving from rustic furniture handles to modern and timeless creations. The philosophy of the firm is to deliver excellent quality at competitive prices. Exports represent 95% of the turnover, with main exports to Germany, France, England, Spain and upcoming markets such as Russia, White Russia and Ukraine. Design is of high importance, while the technical aspect is negligible. There is no design department: the owner has

chosen to involve only external designers, because he believes internal designers will lose focus after a while. He prefers to work with international designers since export ads up to 95%. Several employees from purchasing, production and commercial departments are involved to follow up trends and set up the design brief. Designs are double checked with clients and sporadically the end user is involved by customer panels. The owner explains “We now have a program where half a dozen of personnel over a period of three months need to visit a number of fairs, afterwards everyone has to sum up five things that inspired them or were remarkable.” This procedure is used to eventually write the design brief that is sent out.

“In theory, with good design, you can ask more money” (owner company 1). Besides this direct price effect, design is mainly used to differentiate, catch attention and create a company image. Employees are found to be more proud when they contributed to a design that turns out to be successful. User value is created by delivering a mix of furniture fittings that are either timeless in style or attract attention. The owner also mentioned that the company always needs to design new products in order to keep its clients satisfied. The design brief does not include Social Responsibility aspects, even though designers are free to take this into account and it is considered as important for the production process. The process is not influenced by design. Interesting designs of which management thinks they will be successful are protected. The strategy is not directly affected by designers, though the specific product demands a specific design mindset of the company.

Financial	Brand	Human capital	User
Input: No budget, designers paid on commission. Output: Premium pricing possible.	Input: Design to attract attention. Output: Influence on the company image.	Input: Only external designers, employees attend design fairs to keep up with design trends. Output: Proud employees when they contributed to a design that is successful.	Input: Opinion asked about proposals, just before production, minimal adjustments are made. Output: Timeliness style and new samples on a regular basis keep clients satisfied.
Social responsibility Output: Less influence from designers, more technological	Intellectual property Output: IP in the form of design shoots.	Process Output: Not affected, design must follow.	Strategy Output: Design based sector, designers have no influence.

Table 5: Parameters of VAD in company 1 and their respective design input and output

Company 2: Functional and emergency lighting

Company 2 is a large business to business (B2B) company, active in the lighting industry, with sales departments in seven countries. The biggest markets are Belgium, The Netherlands and France. Design is kept in mind, but the focus lies

on technology. Mainly Belgian external designers are selected because of their global style and the styling of the lighting armature is guarded by a design coordinator inside the company. Designers are brought in at the beginning of the process after the specification phase. The service of the company is commercially driven and does not include user centered design. So while user information gathered through consumer research or the sales department is passed on to the designers, users are not actively involved.

Design is believed to come at a cost but is perceived as allowing charging premium prices. Though our interviewees believe design will have a significant impact on the image of the company, they are just starting to give importance to continuity in style and using design eye catchers at fairs to attract customers. Design integration enhanced the motivation and pride of the workers, especially after winning a few design contests motivation increased. Design does not influence the process. The lighting producer gives high importance to social responsibility, but does not include it in the design brief. The designers are free to keep Social Responsibility in mind. IP is of less importance. The Director Development Lighting explained that “we want to innovate and if you’re the first or with the first, you have a head start of half a year to two years.” With regards to the strategy, the Director Development Lighting explained that “design is written in smaller letters than functionality, but it becomes more important.” So still the technology of the product is more important than the design of the product.

Financial	Brand	Human capital	User
Input: Design budget is part of development budget, designers paid for every design pitch or hours worked. Output: Premium pricing. Social responsibility Output: Less influence from designers, more technological	Input: Design eye catchers used on fairs. Consequent image of the product line and communication is important. Output: Design to differentiate Intellectual property Output: Limited IP, being the first is more important	Input: Only external designers and a responsible to guard the style. Output: Increase in motivation. Process Input: Design is integrated at the beginning of the process. Output: Not affected.	Input: User is not directly involved. Big internal source of client information. Strategy Output: No influence from designers, focus on technology

Table 6: Parameters of VAD in company 2 and their respective design input and output

Company 3: Wireless registration

Company 3 is a small business with 10 employees, established in 2005 by two brothers-in-law, both civil engineers. Today they are active in the Benelux and France and have several spot orders from EU countries. They operate in the food, pharmaceutical, farming and health industry, where their activity of monitoring temperature and other control parameters is highly important. The

company involved an external design agency to improve their company image and products. This agency had a drastic impact on the owners' view on design. They even engage in design thinking now, which refers to applying design methods and processes such as customer journeys within the organization.

When implementing design, one of the co-owners clearly saw the effect on Financial value, Brand value, User value, Social Responsibility, and on the development process. He noticed that on the one hand, his sales grew due to design adjustments, while on the other hand his costs also dropped. "Initially there is a bigger upfront investment for the product casing but later production will cost half as much when buying a standard casing" (Co-owner company 3). The original product looked very simple, so simple that there was apparently an image problem: customers did not consider it as very professional. With the help of the design agency, adaptations were made to the logo, brochures and the look and feel of the product. As a result, the company started to get a more professional image, gained new customers and experienced it could even ask for premium prices in certain industries (especially in the pharmaceutical industry). Employees slowly started to get more motivated after seeing the results of design adjustments. "At first, our engineers found the new logo and the mood book a bit overrated, but after seeing the finished brochure and units they got really excited. It was more concrete for them than the logo and mood book" (Co-owner company 3).

Company 3 experienced a large impact using design tools integrating the customer. Growing pains of new products and services could be avoided and products became more quickly in tune with customer needs. "At first we were not interested in sustainability, but through talking with customers who find it of great importance we are trying to find solutions for the batteries that are now being used" (Co-owner company 3). The wireless monitoring company experienced significant changes in the process: customer journeys resulted in more effective installation procedures, while website interfaces providing an overview of their control parameters, were adjusted to the type of industry. IP is believed to be difficult to measure. Although the company's stakeholders put value on it, the owners did not find the time to protect their products, services or even their logo. "Investors think not protecting their products is a risk and believe it adds value to the company."

Financial	Brand	Human capital	User
Input: Design budget on project basis. Output: Notable increase in sales. Installation/development costs are brought down. Exports not affected. Social responsibility	Output: Design gave them a consequent image, a professional image. Intellectual property	Input: External design agency. Output: Slight increase in motivation. Process	Input: User is involved through interviews and customer journeys. Output: Products more in tune with customer needs. Strategy

Output: Beginning importance for SR.	Output: No IP due to time trouble.	Output: Affected their services and installation process.	Input: Design is new, but owner is convinced of VAD
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Table 7: Parameters of VAD in company 3 and their respective design input and output

Company 4: Radiators

The radiator company has been designing, developing and selling radiators and heating systems since 1962. Today they have branches in Belgium, France, The Netherlands, England and Germany. Besides, they export to Australia, United States, China and Japan. Design is a culture in this company: it is positioned in the Marketing Research and Design (MRD) department, where research and marketing work closely together with design. The whole company is highly design-minded and motivated through the inspiration passed on by the founder. The Radiators company employs four internal designers and several external designers on a project basis, coming from all over the world. Because of the very specific technology, external designers have to work closely with the company. Users are not directly consulted, but information about end users is gathered through open days and free studies on heating habits and needs for end users.

Design is believed to affect turnover and exports, though the interviewees indicate this effect is not measured. In addition, production and repairing costs are lowered because people in different positions are working so closely together in one department, the MRD department. Designers have to keep marketing aspects in mind during product development. “Marketing actually is driven by the product development vision and not by a purely commercial vision” (Marketing manager company 4). They did experience the influence of design on company image when launching their first design radiator. The owner is found to be a real motivator and inspiration for his employees, insisting they become more creative. In their development process, Social Responsibility aspects are taken into account. Products and designs are protected but this is not of high importance. “Basically, we have always said, as long as we are the first to launch the product or design, it is OK” (Designer company 4). He believes the product development process is in place and design and all other aspect must follow this procedure. Design is part of the vision and influences the strategy of the company.

Financial	Brand	Human capital	User
Input: Creative design budget for the whole MRD department.	Input: Marketing is driven by design; designers always keep the marketing aspect in mind.	Input: Internal and external designers. Designers have room to experiment and get career opportunities.	Input: End user is not directly involved.
Output: Effect on turnover and exports. Reduced production and repairing costs	Output: Continuity in branding is important.	Output: Proud workers, motivated by their owner.	Output: User value is very important, especially simplicity of the product.
Social responsibility	Intellectual Property	Process	Strategy

Input: Checklist designers include SR topics.	Output: Limited IP, being the first on the market is more important than IP	Input: Departments and external designers work closely together due to their specific technology.	Input: MRD department. Owner source of design inspiration. Output: Design is part of the vision and influences strategy
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Table 8: Parameters of VAD in company 4 and their respective design input and output

Company 5: Translation agency

This company founded in 1990 offers three services on B2B level, language courses, translations and interpreters. The agency is part of a larger group with branches in China, Russia and France. Design implementation is an initiative of the management team and is passed on through Chief Innovation Officers (CIO) officially working in Marketing and Translation. These CIOs took their first steps into service design only recently, introducing new services and adjusting the company's image.

The effect on Financial value and Brand value can therefore not yet be evaluated. Design is now used to create a consequent image and improve visibility. The main aim of design is to differentiate the company from its competitors and not to ask premium prices. The interviewee finds User value of high importance for the company, especially usability. For every product or service Social Responsibility is kept in mind. For now, all employees print on 40 gram paper instead of on 60 gram paper and they have a new car policy, restricting them to only use CO2 friendly cars. There is an annually estimated innovation budget for all design investments. Every new innovation is protected when possible. At the same time, our interviewee does not believe the process will become easier when involving the user. The translation agency believes in open innovation involving everyone in the company: every idea is welcome and discussed together with upper management. This on the other hand also influences employee satisfaction. Design clearly has an effect on the company's strategy.

Financial	Brand	Human capital	User
Input: Part of the innovation budget. Output: No premium pricing. Effect not yet recorded. Social responsibility	Output: Design important to create a consequent image and improve visibility. Design to differentiate. Intellectual property	Input: 2 CIOs. All employees involved. Output: Increase in motivation. Process	Input: Users are directly involved Output: User value creation is very important. Strategy
Input: SR is kept in mind Output: Small environmental contributions where	Output: Every innovation is protected.	Input: Open innovation; Output: adjustments to the process are possible and already	Input: Design and being user centered is supported on corporate level.

possible.

influenced by
design.

Table 9: Parameters of VAD in company 5 and their respective design input and output

Company 6: Law firm

Company 6 is a law firm active in public law, founded in 2007 with 11 employees and three offices in Belgium. In contrast to other law firms our interviewee, the founder and one of the owners of the company, strongly believes in the image of the company. Instead of communicating in the name of the individual lawyers they communicate in the name of the company. Design is inspired by the founder. He believes that design is an essential differentiator. One of his employees is appointed to guard all design investments and the style of the company.

The interviewee emphasizes the importance of distinguishing between manufacturing versus service companies and small versus big companies. “Design is always supportive, unless for its differentiating effect where design can have its individual importance.” “The Image is of high importance for service companies, since they only have an image to sell, while the others can sell products” (Founder company 6). The interviewee admits that this image also affects the financial values of the company in a good way. Therefore this law firm places high importance on continuity in style through all means of communication. Thanks to the positive effect of design on its image, the law firm attracts interesting profiles. He believes social responsibility and IP are of less importance in the service industry while the product is of high importance. Designers have less influence on Social Responsibility, though the law firm does sponsor charity. Protecting their services with IP is impossible within this sector, although the owner wants to protect his ideas. “User value will generate added value for the client and the Process is crucial when delivering a service.” He believes design improves productivity; functional software and databases adjusted to their service are examples. The interviewee concluded by stressing that “if you have a corporate strategy then design helps to realize this strategy.”

Financial	Brand	Human capital	User
Input: No fixed design budget. Project based design budget. Output: Turnover increase.	Output: Continuity in branding and lay-out of their communication is very important. Design to differentiate.	Input: One external design agency and an internal design responsible. Output: No motivation increase. Attract good young potential.	Output: Functionality in their way of working is more important than the user value.
Social responsibility	Intellectual property	Process	Strategy

Output: Less influence from designers. Sponsor charity.	Output: No IP, difficult in the law sector.	Input: Design vision of the owner influences the service delivery process. Output: Tries to make the procedure more functional.	Input: Design mindset preceded by the owner.
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Table 10: Parameters of VAD in company 6 and their respective design input and output

Company 7: Fast moving consumer goods and food retailer

This Belgium food distributor, founded in 1967, is active in six countries and has 2732 stores worldwide. Design is external, but there is an annual design budget and a design coordinating department looking for the best designers per project and integrating them with all other necessary departments. Design is linked to the strategic department, though restructuring of the design management strategy is still in progress. Upper management is motivated to engage in design by attending design committees.

This retailing company tries to measure the effect of design on turnover but finds it difficult to disentangle design from other inputs such as marketing. Design works together with marketing, whereby the design coordinator finds it crucial to position the design right in relation to the price of the product and the image they want to create. Employees do not feel more motivated by the design of one particular product, because of the high number of products and because they are not involved with the production of the products. The company uses a lot of methods to engage with the end users, because “design is giving attention” (Design coordinator company 7). Our interviewee finds Social Responsibility very important, because of its role for waste management, recyclability, etc. As other retailers, this company deals less with IP, but rather protects specific designs, icons, brands, etc. The interaction between the design department and other departments does not influence the process: “the process is there, regardless of what the design will be” (Design coordinator company 7). Design is not yet fully comprehended as a competitive advantage or a strategy to differentiate from competitors: “The design department is consulted by the strategic board, but for now design has not reached its distinguishing value for this company.” (Design coordinator company 7)

Financial	Brand	Human capital	User
Input: Annual design budget. Output: Turnover increase, though difficult to isolate the effect of design. Cost reductions.	Input: Design and marketing work together. Crucial to position the design right in relation to the price of the product and the	Input: External design agencies and a design coordinating department. Design committees organized on	Input: Several methods to engage with end users. Output: Design is giving attention, in terms of usability, consistent image,

Premium pricing depending on the product.	image they want to create.	strategic level. Output: Motivation seems not affected.	etc.
Social responsibility Input/Output: Very important, take into account waste management, recyclability, etc.	Intellectual property Output: IP less important, though specific design, icons, brands are copy right protected.	Process Input: Design works together with all departments. Output: Design will not influence the process.	Strategy Input: Design department consulted by strategic board Output: Design is not yet a company value.

Table 11: Parameters of VAD in company 7 and their respective design input and output

Cross-case analysis on design efforts, parameters and underlying indicators of VAD

In this section we undertake a cross-case analysis in order to evaluate the role and impact of the various design investments and efforts, VAD parameters and underlying indicators in the companies. First, we split up the global design efforts made by the companies into the purely financial investments in design and the ‘design force’ or manpower working on design. The case companies seem to differ clearly in the presence or amount of investments and efforts they put into design. We distinguish between companies without design budgets (company 1 and 6), companies with a design budget estimated on a project basis (company 3) and companies with a fixed design budget as a part of the Research and Development (R&D) (company 2) or marketing budgets (company 4) or an independent budget item (company 5 and 7). Design spending or investments are in general not measured. In the rest of this paper we will consider the budget and specific investments in various design disciplines as Design spending.

Most of the companies (2, 4, 5, 6 and 7) make use of external designers and make one employee internally responsible for the implementation of design. This is not always a designer. The furniture fittings company intentionally chooses only to make use of external designers because the company believes internal designers will “lose focus” after a while (Owner company 1). Other design efforts relate to our parameters Brand value, Human capital, User value, Social responsibility, Process and Strategy. To create Brand value case companies make sure a consequent image is created (company 3, 5 and 6), there is a close cooperation with the design department (company 4 and 7) and they use eye catchers to attract attention (company 1 and 2) and increase visibility (company 5). Employees are generally involved in the design process by participating in design fairs (company 1), committees (company 7) and open innovation activities (company 4). This can be described as the Design force of the company. User value is created by actively involving customers through different methods (e.g. customer interviews, customer journeys) (company 1, 3, 5 and 7) or by taking into account already collected customer information from marketing research (company 2). Social responsibility aspects are kept in mind

when setting up a design brief (company 4, 5 and 7). The radiator company 4 created a checklist for every new product idea and includes Social responsibility aspects in this checklist. In order to guarantee an efficient process, case companies 4, 5 and 7 believe there needs to be a close cooperation between all departments and the designers. If design wants to contribute to strategic goals, design should be included in the vision and supported by the owner (company 3, 4 and 6) or designers need to be heard by the strategic board (company 7) and receive support on corporate level (company 5).

Next, we identify a number of similarities and differences between the case companies in terms of the VAD parameters. To start with financial value, several of the case companies experience a positive influence of design on sales (company 3), turnover (company 4, 6 and 7) and even exports (company 4). Nevertheless, they do not measure this explicitly: they believe it is too difficult to separate the effect of design efforts from other actions or efforts such as marketing campaigns. Moreover our interviewees mention specific examples in which they were able to cut costs (company 7), such as installation costs (company 3), production costs (company 3 and 4) and costs of repair (company 4), as a result of design efforts made.

“We defined the ‘happy flow’ of our customers and that showed us the installation didn’t happen smoothly ... I am convinced that, if we can simplify the installation work or get customers to do it themselves, and we can just tell the customer “Here is a box with the instructions, just push this button and look if that lamp lights up.”, this would be a major step forward. We will do much more business than before” (Co-owner company 3).

“Yes, for the first time we can proudly say we have an extensive administrative procedure, an extensive development procedure, where all those things are included, such as the production costs and even minimizing costs of repair” (Designer company 4).

For others, design efforts enabled them to charge premium prices for their designed products (company 1, 2 and 7). *“In theory, when you include design, you can ask more money”* (Owner company 1).

Related to brand value, almost all case companies use design to build a consistent image and attach high importance to continuity in style (company 1, 2, 3, 4, 5 and 6). They perceive design as a way of differentiating themselves from their main competitors (company 2, 5 and 6) and improving their visibility (company 5). Within company 4 and 7, marketing is even driven by design.

“Design is always supportive, unless for its differentiating effect where design can have its individual importance.” “The image is of high importance for service companies, since they only have image to sell, the others can sell products” (Founder

company 6).

“You already notice that our customers who see our new 3D model say “Wow, that is definitely a professional business”. While we are still the same club of 10 people with the same four partners, but our image has risen immensely” (Co-owner company 3).

In terms of Human capital, employees appeared to be more motivated when they are closely involved in the design or innovation activities (company 1, 2, 3, 4 and 5). An additional advantage of a consistent company image through design is that it will attract interesting profiles (company 6). Remarkable in the case companies 4 and 5 is the important influence of the owners’ vision on design, which motivates employees to do the same.

“... open innovation ... we have set up a forum, so that each employee can post his ideas and each idea is then looked at by us in detail. They get the opportunity to work out their ideas, when it is conform to our vision and budget. ...There are a lot of enthusiastic reactions from unexpected people and everyone is very motivated through this system. ... It is a very committed group and we keep this alive for example through the forum and by involving them when we launch new products by showing them demo’s etc” (Chief Innovation officer 1 company 5).

“At this moment, we attract very interesting profiles. And that is purely because of our image and because young people are very sensitive to websites. We know that” (Founder company 6).

“I think the owner is a real motivator and source of inspiration, it is a real leader, who can win over people with his own vision and meaning about design” (Marketing manager company 4).

In our cases, we are dealing with two different aspects of Human capital. On the one hand there is ‘Human capital’ itself such as attracting interesting profiles and corporate image (company 6) and on the other hand we have ‘Employee attitude’ such as motivation, passion, commitment and involvement of personnel (company 1, 2, 3, 4 and 5).

Next, User value appears an issue, to which a large part of the case companies (company 3, 4, 5 and 7) attach a lot of importance. They try to discover their consumer needs through interviews and customer journeys (company 1, 3, 5 and 7). Unfortunately not every company seems eager to consult its customers. They believe in the designer who develops innovative ideas on its own (company 4 and 6). Simplicity (company 1, 4 and 5) and user-friendliness (company 3 and 5) are frequently mentioned as important when talking about user value.

“User value that is simplicity, simplifying services and making manuals needless. That is also a very important design aspect” (Designer company 4).

“Design is giving attention” (Design coordinator company 7).

There are major differences between the case companies in terms of Social responsibility. Some companies (company 3, 5 and 6) consider it less important, others (company 1, 2) recognize its importance but only in a technological sense and finally, some companies (company 4 and 7) force their designers to take this into account when they elaborate their projects. Most case companies (1, 2, 3, 4, 5 and 7) discuss much more specific environmental issues instead of social aspects. Since Environmental contribution appears to be the most important, often only relevant aspect of Social responsibility, we decided to replace the parameter Social responsibility by Environmental contribution in our final framework. Remarkably, case companies (1, 2 and 3) take it into account, mainly because their customers ask for it and not because of their own conviction.

“At first we were not interested in sustainability, but by talking with our customers who found this very important, we are now looking for solutions for the batteries we use in our wireless systems” (Co-owner company 3).

The use of Intellectual property protection is often limited, mainly because IP protection is too costly and too time consuming (company 3). Therefore, most companies deliberately choose and try to be the first on the market, by being innovative again and again before others imitate their ideas (company 2 and 4). Additionally, the use of IP protection is also often limited or impossible when companies offer pure services (company 5 and 6).

“We don’t have patents or trademarks for our name or logo. It is a risk, if someone wants to acquire our company these patents give value to a company. ... But this is one of those things that you always put off for later and postpone” (Co-owner company 3).

“We are not so concerned about it. We don’t have a lot of active patents. We try to, certainly when we develop an important new line we create one or two patents for it, just to be sure and protect us a little. We want to innovate and if we are one of the first or with the firsts, you have a head start of six months to two years” (Director Development Lighting company 2).

“We always say; as long as we are the first to launch the product it is OK” (Designer company 4).

Process is another important parameter of VAD. Several companies (company 1, 2, 4 and 7) claim their process is not influenced by design. Design has to follow.

But at the same time company 2, 4 and 7 integrate design in the beginning of the process and designers work closely together with other departments in the company. Some practical case examples of the effect of design on the process refer to efficient services (company 3 and 6) and installation procedures (company 3).

“Designers are involved from the beginning of the process after specification of the product, but they cannot influence the process. ... They can actually follow the whole process and guard their own design” (Design coordinator company 2).

“The process is there regardless of what the design will be” (Design coordinator company 7).

A final issue is Strategy. We observe how the role and vision of the owner or CEO is indicated as an important source of inspiration in terms of design by our interviewees. When the owner/CEO is convinced of the importance of design, design will become a crucial element in the vision and strategy of the company (company 3, 4, 5 and 6). When this is not the case, the influence of design on the strategy seems limited or inexistent (company 1, 2 and 7). Organizations with internal designers or a coordinating design department (Company 2, 4, 5 and 7) are mostly involved in the development of the strategy, while for organizations with external designers (company 1, 3 and 6) it is mainly the owner who influences the strategy.

“I think our biggest advantage is our owner, he gives us the opportunity to invest a lot in design because he really believes in it. For example, our marketing department is not part of the sales department but is part of the product development department. This is not so self-evident for other companies” (Marketing manager company 4).

This quote also shows how the strategy and vision on design will strongly influence the investments made in design.

As identified above, the case companies confirmed the importance of every parameter, previously identified in our literature review and brainstorm sessions. Especially for Financial value, Brand value, and User value, all interviewees recognized the influence of design. A number of cases also recognized the influence on Human Capital, Environmental Contribution, Intellectual Property, Process and Strategy. This information gives us a clear indication of the positive effects design can create. Our findings are summarized in the framework in Figure 1.

The cross-case analysis revealed also a number of interesting differences between our cases in terms of the type, size or owner of the company. First, in terms of the size of the companies we notice a difference in design efforts. Small companies such as the furniture fittings company, wireless monitoring company and law firm plan their spending on a project basis. Instead, for large companies the budget is part of the R&D budget or a separate annual budget for design.

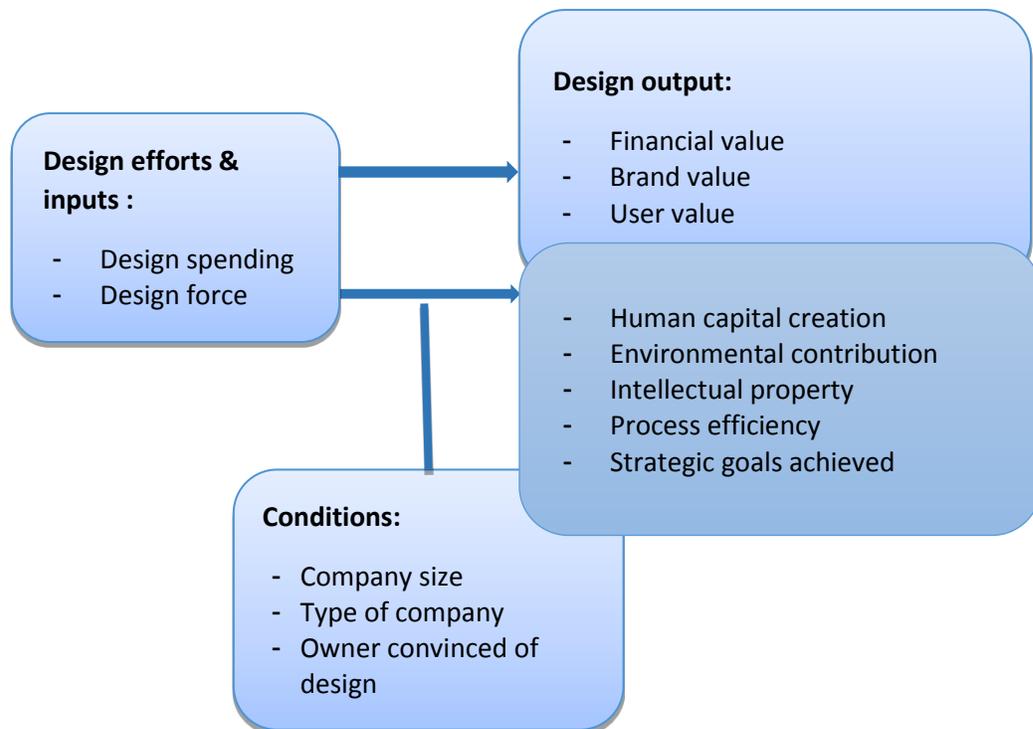


Figure 1: Global framework of value added by design

In terms of design input made, within all large companies (2, 4 and 7) design works closely with marketing. Both large and small companies experienced a positive influence of design on Financial value, Brand value, User value and Strategy. Human Capital seems to be more influenced by design in small companies. Employees in small companies (1, 3, 5 and 6) might possibly be more motivated because they are closely involved with the design implementation. Large companies such as the retailer believe the motivation is not affected, since employees are not involved in the production, and there is a very high number of products. Large case companies (2, 4 and 7) give more importance to Environmental contribution in their designs than small companies and oblige designers to take environmental issues into account. Both large and small companies do not identify an effect on IP generation, since small companies have no time nor resources to file IP requests and large companies rather prefer to be the first on the market than investing resources in IP protection. In large companies (2, 4 and 7) the process is present and design has to follow, while in small companies (3, 5 and 6) the process is easily adapted.

Second, we distinguish two types of companies, service (5 and 6) and manufacturing companies. The main difference between both is that design is more deliberately used by service companies to differentiate themselves from competitors. This can be in terms of brand image, but also for environmental and social aspects. Logically, IP generation is a more difficult issue for service companies although they believe it is important to protect their innovations. For

all other VAD parameters, both types of companies confirm they experienced a positive influence by design.

Last, companies having an owner who is convinced of VAD, appear to generate a few extra values. These companies benefit from more motivated employees and attract more interesting profiles. The founder also has an influence on the way design is integrated in the process. Design-minded founders (company 3, 5 and 6) are more open for process changes. Within these companies (3, 4, 5 and 6) design will influence the strategy and the owner will ensure design plays an important role in it.

Conclusions and limitations

The main purpose of this study was to identify the parameters and underlying indicators that capture the value added by design. Through qualitative research we identified the parameters of VAD, providing a complete image of the added value design can deliver to a company.

We started our study with an extensive analysis of the literature, followed by a unique qualitative mixed method approach involving focus group meetings, brainstorm sessions and case-study research. Focus group meetings and brainstorm sessions brought together experts from private design agencies, government organizations and academia. Focus groups discussed and evaluated the identified VAD parameters and underlying indicators and identified previously undocumented parameters and / or indicators of VAD. We undertook case studies in seven different types of firms, to study the VAD parameters in a business context. We theoretically sampled the firms to make sure they had different characteristics (like ranging from large to small and from manufacturing to service companies). Apart from conducting face-to-face interviews with senior, technical or design managers, we collected various types of company-related documents which were jointly analyzed, allowing data triangulation with our interview material.

The parameters finally identified are: Financial value, Brand value, Human capital, User value, Environmental contribution, Intellectual property, Process and Strategy. The major findings of our case study research are that the added value of design is mainly visible in Financial value, Brand value and User value. While design seems mainly manifest within these three areas, previous research mostly focussed on financial value, consumer behaviour and process efficiency (Ravasi & Stigliani, 2012). Given that all respondents in our various cases confirmed that design creates value in all our first mentioned areas, future research should also include Brand value as one of the main areas of added value of design, next to Financial value. Furthermore, design is found to influence qualitative parameters labelled as Human capital, Environmental contribution, Intellectual property, Process and Strategy of the organisation. The impact of these last five parameters was found to depend on the type of company, the size of the company and/or the owners' belief in design.

In the smaller companies the influence of design turned out to be higher for

the parameters Human capital and Process, since employees are more involved in the design process. At the same time, their design efforts had a lower environmental impact and less influence on Intellectual property, due to a lack of resources or time. Larger companies, on the other hand, experienced more influence of design on Environmental contribution and less on Human capital because the employees were less directly involved with the product. Furthermore, they experienced less influence on Process, because they believed the process is already determined and design must follow. Intellectual property was not important in our case studies, given the fact that the larger companies preferred to be ahead of the competition and launch their products earlier, rather than to protect their designs by IP protection methods. When comparing service to manufacturing companies, we conclude that the service companies consider design the ideal differentiator and mainly exploit it for branding and environmental aspects. In companies where the founder is inspiring employees to be design-minded, the influence of design is higher on Human capital, Process and Strategy of the company. The owners' management style seemed to motivate employees and to adapt its process to the use of design.

While this approach provided novel insights to construe a VAD framework, a number of research limitations can be identified. First, the empirical analysis in this paper is based on seven cases. The number of cases is insufficient to statistically validate the relationships in the framework. In the future it will be interesting to test the framework with a large set of companies, which enables testing the connections between the different parameters. Another interesting validation test would be to compare the results of the framework with a group of companies having no design activities at all. Another alternative is to study the effects of design between companies with 'good design' and 'bad design', as defined by Hertenstein et al. (2005).

For now, our framework is not sector specific: some indicators are more relevant to one sector than others. For example IP is not always of importance, especially in the service sector where protecting services is very difficult if not impossible. Moreover, the parameters Process and 'Financial value generated through design' are not always valid for the service companies. Further refinement of the framework based on sector differences is therefore needed. Gemser & Leenders (2001) find a positive significant effect of design on firm performance regardless the industry, though the influence is higher in industries where investing in design is rather new.

Another useful extension would be to go beyond the one-time measurement for each company and to follow-up long term measurements of the framework, allowing us to reveal the effects of the respective design efforts on the various added values on the longer term. In our literature review we summarize all possible (positive) influences from industrial to aesthetic design, but studies such as Swan et al. (2005) indicate these advantages generated through design differ with the type of design. Additionally, the way design is integrated will influence the effect. The results of Hsu (2009) suggest incorporating design and

R&D to be more effective and Chiva and Alegre (2009) find design investments should be supported by design management in order to be more effective.

Our study provides an important contribution to the existing literature, since the resulting framework does not only visualize the financial, but also the other quantitative and qualitative benefits of design efforts. It offers a comprehensive overview of the VAD at the firm level. In addition, the framework can offer a significant contribution to practice, since expressing the value of design in an organizational context can help managers to better understand and therefore manage the process of value creation through design. With the help of the model, companies can gain insights in the different indicators of VAD. It will allow companies to better understand the weak and strong contributions of their design efforts and indicate possibilities to improve their VAD. In the larger sense, our study will raise awareness on the role of design and convince customers and other stakeholders of the important added value that can be created through design.

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