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The use of design in Finnish manufacturing firms

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Keskusteluaiheita – Discussion papers

No. 1017

Maarit Lindström – Mika Pajarinen

THE USE OF DESIGN IN FINNISH MANUFACTURING FIRMS

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ABSTRACT: This study analyzes the use of design and the position of the design function in Finnish manufacturing firms. We also study the impact of design on companies' business performance. The paper is based on a survey directed to the member companies of the Confederation of Finnish Industries (EK) in November-December 2005. According to the results, design use in manufacturing companies is still on a relatively low level. Design use varies clearly among analyzed companies, though. Results show that the nature of design use and the position of the design function explain the influence of design on business notably. The impact of design on business through most studied effect channels, such as increase in sales, is statistically significantly higher in those companies in which design is an integrated part of the company's core functions and strategy, and in which design is used continuously. Results also indicate that the use of design in manufacturing firms in Finland will increase in the forthcoming years (2005-2010).

KEYWORDS: Design, firm performance, manufacturing, economic performance, design management.

JEL: L20, L25, L60, M21.

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TIIVISTELMÄ: Tutkimuksessa tarkastellaan suomalaisten teollisuusyritysten muotoilun käyttöä ja asemaa. Lisäksi selvitetään muotoilun vaikuttavuutta yritysten liiketoimintaan. Tutkimus perustuu Elinkeinoelämän keskusliiton EK:n jäsenyrityksille marras-joulukuussa 2005 suunnattuun kyselyyn. Tutkimustulosten mukaan muotoilun käyttö teollisuudessa on edelleen verrattain vähäistä. Muotoilun käyttö kuitenkin poikkeaa selvästi tarkasteltujen yritysten keskuudessa. Tulosten mukaan muotoilun käytön luonne ja asema määrittävät muotoilun vaikuttavuutta selvästi. Sellaiset yritykset, joissa muotoilu on integroitu osa yrityksen muita toimintoja ja strategiaa ja joissa muotoilun käyttö on luonteeltaan jatkuvaa, muotoilun positiivinen vaikutus on havaittavissa useimpien tutkittujen vaikutuskanavien, kuten tuotteiden ja palvelujen myynnin kasvun kohdalla. Seuraavien viiden vuoden aikana (2005-2010) teollisuusyritysten muotoilun käyttö on kasvussa.

AVAINSANAT: Muotoilu, kilpailukyky, teollisuus, liiketoiminta, muotoilujohtaminen.

JEL: L20, L25, L60, M21.

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1. INTRODUCTION

1.1. BACKGROUND

There is a substantial international consensus that design is beneficial to company performance. Design as a structured creative process is considered to offer significant potential as a competitive tool for companies, especially as it still is, in many ways, an underutilized asset in several industries.

In Finland it has been an explicit aim of policy makers to increase the use of design expertise in corporate product development and business strategy in recent years.¹ In an environment of internationalization, industrial design is seen as a potential tool to give Finnish industry the competitive advantages which complement companies' technology-based research and development (R&D) work. In this context, industrial design is seen to add value to the product development process especially by recognizing the end user's current and future needs and expectations, and by generating innovations related to them.

In addition to strengthening the corporate product development process, design potentially allows the more effective use of materials and manufacturing technology, and enhances corporate and brand communications in the marketing efforts. Thus, by applying the multifunctional aspects of design, companies can have an efficient tool to respond to the latest global challenges where there is an increasing quest for innovations, and launching new up-market products and services. There are also more requirements than ever for companies to justify and explain their products' higher price in relation to products of new emerging markets such as Asia and Eastern Europe.

1.2. REVIEW OF EARLIER EMPIRICAL STUDIES

Even if the relationship between design, competitive advantage and new product development is relatively clear, empirical research on design in general, and the impact of design on business performance in particular is quite light in the field of business economics. This is partly due to lack of uniformity in the definition of design itself. Both academics and practitioners emphasize the fact that design concerns not only aesthetics, but also elements such as ergonomics, ease of manufacturing and product performance. Management literature emphasizes design as a 'strategic tool' (e.g. Kotler & Rath, 1984) and the managerial value of design is often classified in three categories: (1) design as a facilitator and differentiator (2) design as a coordinator and integrator and (3) design as a communicator. This implies, as Gemser and Leenders (2001) argue, a tendency to define design in a normative way, i.e., what it should be, instead of what it is.

Despite these definitional weaknesses and the ambiguous nature of the term, there are several empirical studies done which try to show that strategic and operative design management are related to increased company success. According to the results, 'design-intensive' companies achieve better scores in many company performance indicators compared to non-users or less intensive users (Gemser & Leenders

¹ E.g. Industrial Design 2005 – The Industrial Design Technology Program 2002-2005 by Finnish Funding Agency for Technology and Innovation (TEKES).

2001; Roy 1990, Walsh et. al. 1992, Press 1995, Hertenstein, Platt & Brown 2001). In addition, companies that have invested in design seem to position themselves more often to up-market products, or higher value added product segments and markets when compared to less design intensive companies (Walsh et. al. 1992, Riedel 1996).

Hart & Service (1988) have identified a relationship between companies' business performance and those company management attitudes in which both design and marketing are understood to constitute competitive advantage.² Typically, in such companies, design management is realized by the designation of a position in upper management responsible for the design function, and the appointment therein of a person with a thorough and broad understanding of the possibilities of design.

Many studies and surveys on the contribution of design to a firm's competitive advantage have been released in Great Britain, especially by the Design Innovation Group (DIG) and the UK Design Council.³ For example, in a study concerning stock market companies' performance⁴, the Design Council built a design portfolio whose development was compared to that of the quoted companies in general. Results indicated that those companies which used design effectively outperformed their peers both during economic decline, as well as in an uptrend.

The studies from Denmark and Sweden similarly demonstrate that companies with intensive investments in design have succeeded on average better than less intensive and non-user companies.⁵ The studies assessed design utilization levels and used a 'design ladder' approach. At the lowest level, design is not used at all, at the second level it is used mostly for aesthetic purposes, and at the third level it is included at the very onset of the new product development process. Finally, at the forth and highest level, design use is incorporated in a company's strategy. According to the results, the effect of design use is not unconditional, i.e. design use as such is not an automatic means to success, but companies positioned at upper levels of the design ladder do better on average than their competitors. The studies conclude that it is more important how companies use design, rather than if they use it at all.

In Finland there have been several studies focusing on the role of design as a competitive asset in companies operating in the design industry itself. Studies, which concentrate on firms operating in other industrial sectors and which investigate the role of design as an asset, investment or input to their business processes are much rarer (see however Hietamäki et al. 2005). Also, management studies concentrating on organizational approaches have brought new insights to the role and position of design and designers in organizations (see e.g. Hasu et al. 2004; Järvinen & Koskinen, 2001).

In addition, the various forms of design use have been mapped in some empirical surveys in Finland (Teollisen muotoilun toimialakartoitus, 2002 and Hytönen, 2004). The studies have identified the major bottlenecks in the supply of services by design consultancies, resulting in hindered design use in businesses, but they have also sought to single out the major reasons for the relatively modest demand of design services by companies in various industries.

Studies and discussions about the potential profits or benefits of design on companies' performance in Finland have typically employed qualitative methods (see e.g.

² Survey to 369 British companies' management.

³ <http://www.design-council.org.uk/webdav/servlet/XRM?Page/@id=6000>. From studies conducted in DIG, see, e.g., Gemser (1997).

⁴ The impact of design on stock market performance (2004), An analysis of UK Quoted Companies 1994-2003.

⁵ The economic effects of design (2003) and *Svenska företag om design. Attityder, lönsambet och designmognad* (2004).

Ainamo 2002, Piirainen 2001). The utilization of proper quantitative methods, on the other hand, seems to be lacking.

The present study seeks to fill some of this gap by examining the use of design in Finnish manufacturing companies, and analyzing its effects on their performance. We utilize both univariate and multivariate methods and we aim to control for the effects of company characteristics other than the use of design, which seems to have been taken into account only rather lightly in many previous studies.

1.3. AIMS OF THE STUDY

The aim of this study is to analyze the use of design and the nature of that use based on new survey data on Finnish manufacturing firms. We also look at the position of design in corporate organizations and estimate the impact of design on companies' business performance. The research questions are set as follows:

- How much manufacturing companies invest in design?
- What is the nature of design use?
- What is the organizational position of the design function in companies?
- What is the impact of design use on business performance?
- How is design use in manufacturing going to evolve in the future?

2. SURVEY

2.1. IMPLEMENTATION OF THE SURVEY

The survey was conducted by the Research Institute of the Finnish Economy (ETLA) together with the Confederation of Finnish Industries (EK) and directed to EK's member companies. The questionnaire included both quantitative and qualitative questions and statements about the use and position of design, and design's impact on a company's business performance.⁶

In the questionnaire *design* was defined as any professional design activity carried out in the field of industrial production and services. The designer's profession is typically concerned with the functionality, usability, form and aesthetics of products and services. The study covers the following design areas: industrial design, graphic design, interior design and furniture design, digital media design, arts and crafts, and design management.

The survey was carried out from November 2005 to December 2005, and it was sent to 656 companies. The target group consisted of manufacturing companies; their financial managers and other upper management were selected to be the survey respondents.⁷ A total of 222 (34%) companies responded to our inquiry. In a comparison by industry, the highest response rate came from the mechanical engineering (43%) followed by the manufacturing of basic metals and metal products (39%). In contrast, the lowest response rate came, a bit surprisingly, from the manufacturers of textiles, clothing, leather, footwear, and furniture (20%).⁸ As for overall size, the companies that responded to the survey were larger in terms of sales volume and the number of personnel, compared to non-responding companies. The turnover of respondent firms was in 2005, on average, 176 million euros (median 23 million euros) while the mean turnover in the non-responding firms' group was 72 million euros (median 14 million euros). The mean number of employees in the respondent firms' group was 654 and the median 159, whereas in the non-responding firms' group the values were 308 and 86, respectively. The respondent firms represent over half of the target firms' total net sales and employment. In the following analysis, we focus only on the results from respondent firms, i.e., we do not use any weighting, or other statistical methods to take into account the possible bias due to non-response.

Table 1 depicts the main variables and firm characteristics used in our analysis.⁹ Variables related to design include the frequency of design use, design management orientation, the strategic importance of design, and design's influence on sales, on the ability to differentiate firm's products compared to competitor products and on the ability to strengthen the company image or brand/trademark. Company background characteristics include R&D-intensity, size, international orientation and industry.

⁶ Appendix 1 includes the original questionnaire in Finnish and Appendix 2 abbreviated form in English.

⁷ The target group did not include service sector or energy sector member companies.

⁸ See Appendix 3 for details of response rates by industry.

⁹ Summary statistics of all questions are presented in Appendix 4.

Table 1. Description of firm characteristics used in the analysis

Variable	Scale	Description
Continuous user	0,1	1 = Utilizes design continuously (Q1)
Design integrator	0,1	1 = At least partly agrees with each statement in Q6b-Q6e
Strategic user	1-4	Score to Q6c, higher score indicates more strategic use
Sales increase	0-3	Score to Q7a, higher score indicates higher sales increase
Differentiate	0-3	Score to Q7e, higher score indicates higher ability to differentiate firm's products from the competitors' products
Image	0-3	Score to Q7g, higher score indicates higher ability to strengthen brand/trademark or firm image
R&D intensive	0,1	1 = R&D expenditure to sales over the sample average (1.8%)
International	0,1	1 = Has employees abroad
SME	0,1	1 = Less than 250 employees and turnover less than 50 mill. euros
Industry:		
1) Wood, pulp and paper; publishing	0,1	1 = SIC classes 20-22
2) Chemicals	0,1	1 = SIC classes 23-25
3) Basic metals and metal products	0,1	1 = SIC classes 27-28
4) Mechanical engineering	0,1	1 = SIC classes 29, 34-35
5) Electronics and electrical engineering	0,1	1 = SIC classes 30-33
6) Textiles, clothes, leather, footwear, furniture	0,1	1 = SIC classes 17-19, 36
7) Other manufacturing	0,1	1 = SIC classes 15-16, 26, 37 (Omitted group in estimations)

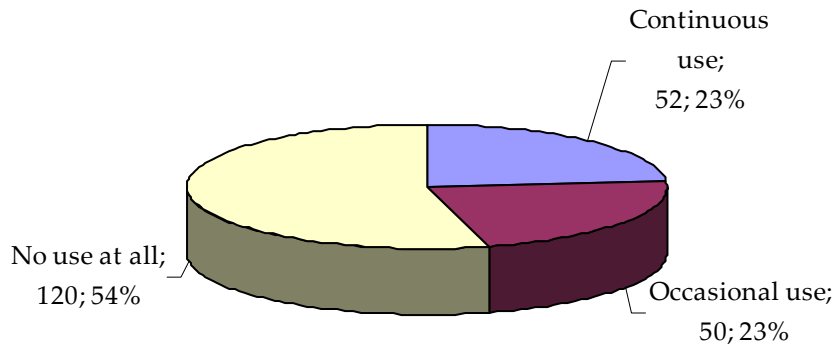
Notes: Q1, Q6b-e and Q7a-Q7g refer to question numbers; Appendices 1 and 2 include the questionnaires. SIC classes refer to Statistics Finland's industry classification (TOL-2002).

2.2. USE OF DESIGN

Among those who responded to our survey, there are 52 companies using design continuously and 50 companies using it occasionally (Figure 1). Over half of the companies (120) do not use design at all. This indicates that the application of design in business is still on a relatively low level in manufacturing industries. Compared to non-users, the companies applying design at least occasionally are on average larger, in terms of sales volume, number of personnel, and R&D expenditure. The likelihood that a company employs design also correlates with the industry it operates in, namely, companies in

the manufacturing of textiles, clothes, leather, footwear and furniture clearly use design more often than companies in other industries. The firms in the sample apply design primarily in product design, and secondarily in marketing communications. Design is least applied to company business services.

Figure 1. Design use in the respondent companies (N=222)



Data source: Etila, Survey to Finnish manufacturing companies (EK), November–December 2005.

Design costs

The average design costs in the respondent firms who apply design in their business seem to be quite low: in 2005 the mean costs were 599 thousand euros and the median only 30 thousand euros. On average, the costs accounted for barely 0.3% of net sales and 12% of R&D expenditure.¹⁰ The medians were even lower, 0.1% of net sales and 6% of R&D expenditure. In comparison, the proportion of R&D expenditure of net sales was in these firms 2%, on average. In the observed period (2003-2005) there were no dramatic changes in design costs when normalized by net sales, or R&D expenditure.

As one can expect, the average expenditure on design is statistically significantly higher in the firms using design regularly compared to firms using it only occasionally. It is however a bit surprising that even in the firms which apply design regularly, the mean costs constituted only 0.5% of net sales, and 16% of R&D expenditure in 2005.

By industry, in electronics and electrical engineering firms design costs are below the sample average measured both as a share of net sales and R&D expenditure. In the manufacturing of wood, pulp and paper, and publishing the expenditure on design measured as a share of net sales is below the sample average, but not when normalized by R&D expenditure. In the manufacturing of textiles and furniture the costs relative to turnover are, instead, statistically higher than average but not when normalized by R&D expenditure. By size, expenditure on design is higher than average in small and medium sized (SME) companies when normalized by R&D expenditure but no statistically significant difference can be found when normalized by net sales.

Almost all firms in the sample (92%) acquire design services from the markets, i.e., from external design consultancies, subcontractors and the like. The average share

¹⁰ Comparison in relation to R&D expenditure applies only to firms utilizing design and reporting R&D expenditure.

of the external services in total design costs was 76% in the firms reporting these costs and applying design in 2005. By frequency of design use, there are no differences in the likelihood of acquiring design services outside the firm; 92% in both continuous and occasional user groups have bought external design services. By other firm characteristics, the probability to buy design services outside the firm is higher for international, R&D intensive, and large firms than for their counterparts.

Design employment

The likelihood of hiring in-house designers in the present sample of firms is fairly low: only 28 firms employed designers in Finland in 2005 accounting for 27% of the firms applying design. The internationalization of the in-house design function is almost non-existent: only two firms employed in-house designers abroad. This can be compared with the fact that 37% of the firms applying design had at least some employees abroad and 10% had R&D personnel abroad. The average number of in-house designers in the firms applying design and having designers was 6 and the median 2. On average, only 0.5% of the total personnel were designers in these firms in 2005. In total, the sample firms employed in Finland 169 in-house designers in the last year. We find no dramatic changes in these figures in 2003-2005: for instance, in 2003 the median of the number of in-house designers was also 2, and the total number of in-house designers in Finland 145.

As expected, in-house designers are more likely to work in those manufacturing companies that apply design continuously: only two firms that use design occasionally employed in-house designers in Finland or abroad. In addition, large firms and companies operating in international markets hire more frequently their own designers compared to small firms and domestic-oriented companies. By industry, firms in the manufacturing of textiles, clothes and furniture employ in-house designers more often than firms in other industries; it is least likely to find in-house designers is in the manufacturing of basic metals and metal products.

In-house designers are used less frequently than external design services, when analyzed by the different functions in which design is utilized, as well. In tasks related to product design 30% of the companies using design employ in-house designers, while 70% from the same group acquire design services related to this function from subcontractors, design consultancies or other agents in the market. 17% use both in-house designers and subcontractors in tasks related to product design. In-house designers do marketing communication assignments in 19% of the cases, while almost 70% of the companies buy these services outside their own company. 10% use both in-house designers and subcontractors for marketing communication assignments. Design tasks related to companies' own business services is by choice bought from design consultancies, design subcontractors, or the like, as only 6% of all companies using design utilize their own designers in this function. 15% of design users rely on purchased design know-how, and 2% utilize both in-house designers and market resources in tasks related to business services. Still, the tendency is clear, the more intensive and continuous the design use in a company, the more likely it will utilize in-house designers for tasks related to product design, business services, or marketing communications.

Characteristics of design users

In Table 2 we have composed a profile of continuous users i.e. those companies that use design on a regular basis to study more closely what kind of companies they are. Firm characteristics include 1) the design management orientation of a company, 2) R&D-intensity, 3) company size, and 4) international orientation.

Table 2 shows that continuous users are likely to be large and international companies. They are also likely to be R&D-intensive. Continuous users also seem to manage their design function in a way in which design is integrated with other organizational functions.

Table 2. Descriptive statistics of continuous users

	N	Continuous user
Total:	222	23%
By design management orientation		
Design integrators	29	59%
Non-design integrators	193	18%
By technology intensity		
High R&D intensity	54	39%
Low R&D intensity	138	20%
By size		
Large firms	90	30%
SME	132	19%
By international orientation		
International firms	54	46%
Domestic firms	144	15%

Notes: All differences in group comparisons are statistically significant at better than 10% level.

In this context it is interesting to step forward in the analysis and study the partial correlations between the probability of being a continuous user and other company characteristics. We do this by running logit regression, in which the dependent variable is 'continuous user', and besides the above mentioned firm characteristics, we have included controls for industries in the regression analysis. With this method, we can analyze the correlation between continuous use and the particular variable, while controlling for the effects of other firm characteristics.

The results reported in Table 3 indicate that both the international and integrated design management orientations correlate positively with continuous use, even after other firm characteristics have been controlled for. In addition, R&D intensity and larger size correlate positively with continuous use but neither of these is statistically significant. From industry dummies, the coefficient of textiles and furniture (Industry 6) is significantly positive. According to the Wald test (unreported in the table), it differs statistically significantly also from other industries than the omitted industry.

Table 3. Partial correlations between continuous user and other firm characteristics

Logit estimation		
Dependent variable: Continuous user		
	Coef.	S.E.(robust)
R&D intensive	0.761	0.492
International	1.652	0.487 ***
SME	-0.167	0.470
Design integrator	1.798	0.583 ***
Industry 1	-0.600	0.891
Industry 2	0.319	0.793
Industry 3	-0.614	0.944
Industry 4	0.902	0.687
Industry 5	0.350	0.817
Industry 6	2.589	0.863 ***
Observations	174	
Chi2	37.370 ***	
R2 pseudo	0.270	
Log pseudolikelihood	-71.060	

Notes: See Table 1 for variable descriptions. Statistical significance of coefficients: *** = significant at 1% level. Coefficients without stars are not statistically significant at 10% level.

2.3. POSITION OF THE DESIGN FUNCTION

Most of the companies in our sample apply design for purposes of basic operative design functions, namely for product appearance, developing usability and strengthening brand communication (Q6a). Still, as Table 4 shows, it is interesting to see that many firms have responded that the significance of design has increased in their company during the last five years (Q6f). Table also shows that design and marketing are relatively well integrated functions in manufacturing companies, as is integration of design and R&D (Q6d and Q6e). What is less common is that designers are involved in the onset of the service or product development process, and that design is part of strategic decision making (Q6b and Q6c).

Quite logically, the position of the design function varies in companies depending on the nature of design use. According to t-tests performed, a significant company characteristic for all of the above mentioned aspects is 'continuous user'. It becomes categorically statistically significant for all arguments. An interesting result is that international activity is a significant company characteristic in aspect (b) which explores the extent to which designers are involved in new product development. Companies operating in international markets integrate the design function earlier in the product development process than domestic companies.

Table 4. Position of the design function in the sample firms
(1=totally disagree, 2=fairly disagree, 3=fairly agree, 4=totally agree)

	Average of responses	Significant firm characteristics
a) We use design mainly on issues concerning giving form, usability and brand communication.	3.45	continuous user
b) Designers are involved at the very onset of the product and service development process.	2.54	continuous user, international firm
c) Design is part of our company's strategic decision making process and our company's upper management is committed to definition of design policy.	2.73	continuous user
d) Design and R&D are strongly integrated to each other in our company.	2.91	continuous user
e) Design and marketing are strongly integrated to each other in our company.	2.94	continuous user
f) The importance of design has increased in our company during the past 5 years.	3.32	continuous user

Notes: Reported firm characteristics have $p < 0.10$ in t-tests. See Table 1 for variable descriptions.

In this context, we are interested in determining if the companies that define their design activity as strategic in nature, differ in the multivariate dimensions of company characteristics from those firms that do not, since, according to various studies, design as a strategic tool carries important managerial value. Table 5 shows partial correlations estimated by ordered logit method for 'Strategic user' and the following firm characteristics: R&D-intensity, international orientation, company size (SME), frequency of design use, and the industry. Results reveal that SME and continuous use correlate statistically significantly with the strategic use when the effects of other variables are controlled for. 'Continuous use' refers to committed and most likely long-term design function engagement, while 'strategic use' implies that this function has been supported and run by company management as a part of the company's strategic decision making process. SMEs are more likely to be strategic users than large companies. This is a bit surprising since large companies are more typically design users than SMEs. The reason for this finding might be that in SMEs limited liability distribution makes it easier for management to apply design strategically, while in large companies design use often stays at a project level, and upgrading it to the upper levels of the organizations (division and corporation level) requires serious efforts, and strong design management models. Internationally oriented companies are more likely to be strategic users, i.e, the coefficient indicates a positive correlation, but one that is not statistically significant. R&D intensity shows a negative correlation, which is also not statistically significant. Coefficients for various industries do not show statistical significance either, when they are compared to the omitted group 'other manufacturing'.

Table 5. Partial correlations between strategic user and other firm characteristics

Ordered logit estimation		
Dependent variable: Strategic user (Q6C)		
	Coef.	S.E.(robust)
R&D intensive	-0.620	0.481
International	0.476	0.590
SME	1.409	0.530 ***
Continuous user	1.557	0.470 ***
Industry 1	-1.102	0.849
Industry 2	-0.207	0.737
Industry 3	-1.475	0.906
Industry 4	-0.051	0.652
Industry 5	-0.453	0.841
Industry 6	0.021	1.036
Observations	77	
Chi2	26.423 ***	
R2 pseudo	0.114	
Log pseudolikelihood	-97.902	

Notes: See Table 1 for variable descriptions. Statistical significance of coefficients: *** = significant at 1% level. Coefficients without stars are not statistically significant at 10% level.

2.4. IMPACT OF DESIGN

The impact of design on business operations can be multidimensional, and its evaluation is a challenge, as argued earlier. Separation of the contribution of design to company performance from the impact of other factors is difficult, especially as companies rarely have systematic methods for evaluating the impact of design.

Based on earlier research and case study experiences from companies using design in the manufacturing sector, we selected ten business performance effects which respondents were asked to evaluate for their own company. The evaluation scale provided was the 4 digit Likert scale (0-3). This set of questions referred to the last three years. Potential business effects are reported in Table 6 with average response scores. The table shows that the most important effect of design is the ability to differentiate a company's products or services from competitors' products and services (Q7e). The second most important effect is brand or trademark strengthening or the improvement of company image (Q7g). The third most important effect is increased sales of products or services (Q7a). The sales increase effect differs statistically significantly from the first and second most important impacts (Q7e and Q7g). On the other hand, the means of Q7e and Q7g do not differ statistically from each other. The lowest scores are received by the decrease of production costs (Q7c) and the increased efficiency in the production process or the ease of manufacturing (Q7d).

The impact of design varies when analyzed by different company characteristics, as well. A significant company characteristic for all arguments except for 'increased efficiency of a company's internal and external communication' (Q7j) is 'continuous

user'. Analogically, this applies to 'design integrator'. Both of these variables are in association with the more powerful impact of design on companies. Another significant company feature is 'international orientation' for the 'increased sales of products and services' (Q7a) and 'widening of company's customer segments or increase of customer loyalty' (Q7f) effects. The effects on pricing (Q7b) and differentiation advantages (Q7e) are clearly higher for SMEs than for large companies.

Table 6. Impact of design on business in the sample firms

(0=no effect, 1=slightly positive effect, 2=fairly positive effect, 3=extremely positive effect)

	Average of responses	Significant firm characteristics
a) Increase of sales of a product or service	1.51	continuous user, design integrator, international firm
b) Room for premium pricing over a product or service	0.99	continuous user, design integrator, SME
c) Decrease of production costs of a product or service	0.48	continuous user, design integrator
d) Increased efficiency in production process or ease of manufacturing	0.55	continuous user, design integrator
e) Ability to differentiate company's products or services compared to competitors' products or services	1.92	continuous user, design integrator, SME
f) Widening of company's customer segments or increase of customer loyalty	1.26	continuous user, design integrator, international firm
g) Strengthening of brand/trademark or company image	1.79	continuous user, design integrator
h) Lengthening of the life cycle of a product or service	0.89	continuous user, design integrator
i) Creation of new product concept, or product or service innovation	1.06	continuous user, design integrator
j) Increased efficiency of company's internal and external communications	1.30	

Notes: Reported firm characteristics have $p < 0.10$ in t-tests. See Table 1 for variable descriptions.

In the end, it is interesting to find what kinds of company features are associated with the impacts of design when controlling for the effects of the other background characteristics. In this context we chose the three most important effects identified above in Table 6, i.e., the impact on sales increase (Q7a), ability to differentiate a firm's products compared to the competitors' products (Q7e) and ability to strengthen brand,

trademark or company image (Q7g). We study partial correlations by running ordered logit regressions for each of these dependent variables. The results are presented in Table 7. They indicate that the integration of the design function and the continuous use of design correlate positively with each of the impact variables even when controlling for other company characteristics. The small size, namely SME, correlates positively with the sales increase and the ability to differentiate effects, and also with the image impact though this last correlation is insignificant at the 10% level. The coefficient of R&D intensity is positive but statistically insignificant in all regressions. International orientation also has a positive but insignificant coefficient in sales increase regression. In the other two regressions its sign is negative but insignificant at the 10% level. From industry dummies Industry 5 (electronics and electrical engineering) obtains a weakly significant negative coefficient ($p = 0.096$) in sales increase regression when compared to omitted industry (other manufacturing). Wald tests (unreported in the table) indicate however that the coefficient of Industry 5 does not differ statistically from other industry dummies. In the other two regressions the coefficients of industry dummies are statistically insignificant.

Table 7. Partial correlations between the impacts of design and firm characteristics

	Ordered logit estimation, dependent variable:					
	(i) Sales increase (Q7A)		(ii) Differentiate (Q7E)		(iii) Image (Q7G)	
	Coef.	S.E.(robust)	Coef.	S.E.(robust)	Coef.	S.E.(robust)
R&D intensive	0.378	0.514	0.352	0.588	0.505	0.621
International	0.610	0.572	-0.616	0.552	-0.099	0.525
SME	1.174	0.610 *	0.998	0.545 *	0.332	0.659
Design integrator	1.713	0.679 **	1.813	0.777 **	1.552	0.657 **
Continuous user	1.054	0.480 **	1.657	0.474 ***	0.881	0.500 *
Industry 1	-0.578	0.724	-0.401	1.055	-0.195	0.789
Industry 2	-0.327	1.164	-1.023	1.077	-0.837	0.764
Industry 3	-0.596	1.004	-1.200	1.297	-0.985	1.182
Industry 4	-0.771	0.758	0.160	0.968	-1.081	0.885
Industry 5	-1.305	0.784 *	0.395	0.948	-1.124	1.112
Industry 6	-0.589	1.221	-0.891	1.041	-0.963	0.903
Observations	75		75		75	
Chi2	23.820 **		32.851 ***		20.264 **	
R2 pseudo	0.125		0.160		0.086	
Log pseudolikelihood	-82.490		-74.713		-83.767	

Notes: See Table 1 for variable descriptions. Statistical significance of coefficients: *** = significant at 1% level, ** = significant at 5% level, * = significant at 10% level. Coefficients without stars are not statistically significant at 10% level.

2.5. FUTURE USE OF DESIGN

How about the future? What kind of companies are planning to increase their usage of design? Those already exploiting it intensively, or those starting to realize the potential it might create?

Table 8 depicts the development of design use during the 2005-2010 period. In total, 41% of respondents estimate to increase the use of design. An equal proportion responds that the usage will remain as it was at the time of survey. 18% of respondents are unsure about the future of design in their companies and no respondents are going to decrease their usage.

Of those companies in the sample that use design continuously, 67% estimate that the use of design will increase during the next five years (2005-2010), while 31% estimates that the use will stay at same level as it is now. Of those companies which use design occasionally, 58% estimate increase of use and likewise 38% anticipate no change in behavior. Of the companies that do not use design, almost half will not undertake design activities in the forthcoming years, while 21% of them will start the use in the next five years. However, in this group (non-users) there is a remarkable number of companies which cannot say what will happen in this respect (33%). The increasing demand will allocate mainly to services acquired from the external design consultancies.

It is likely that firms in the field of mechanical engineering and manufacturing of textiles, leather and furniture are going to increase design use more than companies in other sectors. In the mentioned sectors the number of firms that say they will increase design use is clearly higher than those that will say it will remain as it is.

If we compare firms' intentions to use design in the 2005-2010 period by company size, we notice that large companies are going to increase their design use slightly more often than SMEs. Among SMEs there are more of those who are unsure about the future use of design.

The stage of internationalization is also reflected in companies' tendency to use design in the future. Those companies that have employees abroad are more design oriented than domestic market companies. The former say that they will increase design use more often than domestic firms. It seems obvious that when companies establish themselves in international markets, design is needed to promote company image, strengthen product brands or increase product differentiation.

In the questionnaire, we also asked which operations will the increased use of design focus on. 92% of the firms increasing their use of design will allocate it to product development and 56% to marketing communications. 14% of the firms increasing design use will allocate it to production processes. Of the firms increasing their use, 91% will buy external design services, and 14% will hire in-house designers.

According to the results, overall design use will increase. A positive indication of this is that no company in the sample anticipated a decrease in design application. However, those companies that have used design before will most likely increase its utilization. In this respect, design utilization seems to follow a sort of positive path dependency.

Table 8. Development of design use during the 2005-2010 period

	N	Decrease	Remain as it is	Increase	Cannot say
Total:	207	0%	41%	41%	18%
By the use of design					
Continuous users	51	0%	31%	67%	2%
Occasional users	50	0%	38%	58%	4%
Non-users	106	0%	46%	21%	33%
By design management orientation					
Design integrators	29	0%	28%	72%	0%
Non-design integrators	128	0%	43%	36%	21%
By industry					
Wood, pulp & paper; publ.	28	0%	57%	25%	18%
Chemicals	21	0%	67%	19%	14%
Basic metals & metal products	47	0%	38%	40%	21%
Mechanical engineering	50	0%	28%	50%	22%
Electronics & electrical eng.	24	0%	42%	42%	17%
Textiles, etc., furniture	14	0%	29%	50%	21%
Other manufacturing	23	0%	35%	57%	9%
By technology intensity					
High R&D intensity	51	0%	35%	57%	8%
Low R&D intensity	128	0%	43%	35%	22%
By size					
Large firms	85	0%	46%	42%	12%
SME	122	0%	37%	40%	23%
By international orientation					
International firms	53	0%	38%	53%	9%
Domestic firms	132	0%	43%	33%	24%

Notes: See Table 1 for variable descriptions.

3. CONCLUSIONS

The application and use of design is still surprisingly low in manufacturing industries, even if the characteristics of design users are quite what could be expected: companies that use design are, on average, larger than non-users in terms of sales volume, personnel, and R&D expenses. Also, the industry is related to the probability of design use, namely, companies in the manufacturing of textiles, clothes, leather, footwear and furniture are more likely to be professional design users than companies in other industries.

23% of the firms in our survey utilized design regularly and an equal proportion occasionally. On average, the design costs in the firms applying design accounted for 0.3% of net sales. This is a relatively low share compared to, e.g., investment in research and development which on average accounted for 2% of net sales in the same group of firms. 27% of firms applying design had in-house designers. The proportion of in-house designers in the total number of employees was 0.5% in 2005. Still, the tendency seems clear, the more intensive and continuous the design use in a company, the more likely it will employ in-house designers.

Compared to non-users and occasional users of design, continuous design users are likely to be larger and more international. They are also likely to be R&D-intensive. Continuous users also typically manage their design function in a way in which it is more integrated with other organizational functions, such as marketing, and research and development.

As a whole, the manufacturing sector typically uses design in traditional forms of design tasks and in operative or tactical levels, rather than applying it strategically. However, survey results reveal that companies see the significance and meaning of the design function to have increased in past five years both in general, and also for their own company.

Our study also showed that there are clear differences among the companies using design. Commitment to the design function goes hand in hand with the position it occupies in a company. In those companies where design is used continuously, it also clearly occupies a higher and more integrated position in corporate structure (e.g. with respect to marketing, R&D, and strategy) than in those firms using design only occasionally.

The most important effects of design for companies during the last three years have been (1) ability to differentiate the company's products and services compared to competitor products and services (2) strengthening of brand, trademark, or company image, and (3) increased sales of product or services.

The impact of design on business, however, depends on the organization and the management of the design function. This finding gives support to the hypothesis that design usage needs to be continuous in order to increase the intended impact. Also, if design use is strategic, and the design function is well integrated with the R&D and marketing functions, it is likely that the effect on sales increase will be significantly higher, especially in the case of SMEs even if other firm characteristics, such as the industry, R&D-intensity and international orientation are controlled for.

The future use of design in Finnish manufacturing seems quite bright. According to the survey, design use will increase in manufacturing companies in Finland during the next five-year period. A positive indication of this is the fact that no company in our

survey anticipated a decrease in design use. However, those companies that have used design before seem to be more inclined to increase their utilization than those that do not have any previous experience. In this respect, design utilization seems to follow a positive path dependency. Companies that are international, R&D-intensive or are operating in the field of mechanical engineering or manufacturing of textiles, clothes, or furniture are more certain to increase the use of design during the 2005-2010 period.

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APPENDIX 1. ORIGINAL QUESTIONNAIRE IN FINNISH

MUOTOILUN KÄYTTÖ, ASEMA JA VAIKUTTAVUUS YRITYKSISSÄ

Määritelmä: Muotoilulla (design) tarkoitetaan tässä kaikkea sitä ammattimaista muotoilutoimintaa, joka palvelee teollista tuotantoa ja palveluliiketoimintaa. Muotoilijoiden työkenttään kuuluvat tyypillisesti tuotteen tai palvelun toiminnallisuuteen, käytettävyyteen, muotoon ja ulkonäköön liittyvät asiat. Muotoilu voidaan jaotella seuraaviin osa-alueisiin: teollinen muotoilu, graafinen suunnittelu, sisustus- ja kalustesuunnittelu, digitaalisen median suunnittelu, taideteollinen muotoilu, käsityömuotoilu/taidekäsityö, muotoilujohtaminen

1. Kuinka usein yrityksenne hyödyntää muotoilua?

- ☐ Jatkuvasti ☐ Satunnaisesti ☐ Ei lainkaan

Jos vastasitte "ei lainkaan", voitte siirtyä kysymykseen 8.

2. Arvioikaa, kuinka suuret olivat muotoilukulut (ks. määritelmä yllä) kokonaisuudessaan

	vuonna 2003	vuonna 2004	vuonna 2005
euroa			
% suhteessa t&k-menoihin*			

3. Mikäli yrityksenne palveluksessa työskentelee muotoilijoita, montako heitä oli?

	vuonna 2003	vuonna 2004	vuonna 2005
Suomessa			
Ulkomailla			

4. Missä seuraavista toiminnoista yrityksenne hyödyntää muotoilua? Valitkaa sopivimmat vaihtoehdot.

	Yrityksen palveluksessa oleva muotoilija	Ostopalvelut/muotoilulihankinta
a) Yrityksenne tuotteissa	<input type="checkbox"/>	<input type="checkbox"/>
b) Yrityksenne palveluissa	<input type="checkbox"/>	<input type="checkbox"/>
c) Yrityksenne markkinointiviestinnässä (brändin rakennus, graafinen ilme, messusuunnittelu jne.)	<input type="checkbox"/>	<input type="checkbox"/>
d) Muussa, missä? _____	<input type="checkbox"/>	<input type="checkbox"/>

5. Jos yrityksenne käyttää ostopalveluja muotoilussa, arvioikaa mikä on niiden osuus kaikista muotoilun kokonaiskustannuksista (v. 2005) _____ %**6. Ottakaa kantaa seuraaviin väitteisiin: (-2=täysin eri mieltä, -1=jokseenkin eri mieltä, +1=jokseenkin samaa mieltä, +2=täysin samaa mieltä) Valitkaa sopivin vaihtoehto.**

	-2	-1	1	2
a) Käytämme muotoilua pääasiassa muodon antamiseen, käytettävyyteen tai brändäykseen liittyvissä asioissa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Muotoilijamme ovat mukana jo tuote- tai palvelukirjon suunnittelussa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Muotoilu on osa yrityksemme strategista päätöksentekoa, ja yrityksemme ylin johto on sitoutunut muotoilulinjauksiin.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Muotoilu ja t&k ovat vahvasti integroituneet toisiinsa yrityksessämme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Muotoilu ja markkinointi ovat vahvasti integroituneet toisiinsa yrityksessämme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Muotoilun merkitys yrityksellemme on kasvanut viimeisen 5 vuoden aikana.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Kuinka yrityksenne muotoilun käyttö on mielestänne vaikuttanut liiketoimintaanne viimeisen kolmen vuoden aikana? (0=ei vaikutusta, 1=hieman myönteisesti, 2=jonkin verran myönteisesti, 3=erittäin myönteisesti)

	0	1	2	3
a) Tuotteen tai palvelun myynnin kasvu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Tuotteen tai palvelun hinnoitteluviran kasvu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Tuotteen tai palvelun tuotantokustannusten lasku	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Toimitusketjun tai tuotantoprosessin tehostuminen tai tuotteen valmistettavuus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Tuotteen tai palvelun erottautumiskyky kilpailijoiden tuotteista	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Yrityksenne asiakaskunnan laajeneminen tai asiakasuskollisuuden kasvu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Brändin/tuotemerkin tunnettuus tai yritysmaagon kohentuminen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Tuotteen tai palvelun elinkaaren piteneminen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Uuden tuotekonseptin tai tuote-/palveluinnovaation syntyminen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Yrityksenne sisäisen tai ulkoisen viestinnän tehostuminen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Miten arvioitte muotoilun käytön kehittyvän yrityksessänne seuraavan 5 vuoden aikana (2005-2010)?

- ☐ vähenee ☐ ennallaan ☐ kasvaa ☐ en osaa sanoa

Jos vastasitte "kasvaa", vastatkaa vielä seuraaviin tarkennuksiin:

- ☐ palkkaamme muotoilijan/muotoilijoita ☐ ostimme muotoilupalveluita

Lisääntynyt muotoilun käyttö kohdistuu:

- ☐ tuotekehitykseen ☐ markkinointiviestintään ☐ tuotanto-/toimitusprosessiin
☐ muuhun, mihin? _____

Ajatuksia ja kommentteja muotoilusta?

*Tutkimus- ja kehittämistoiminnalla (T&K) tarkoitetaan systemaattista toimintaa, jonka tavoitteena on tiedon lisääminen tai olemassa olevan osaamisen käyttäminen uusien sovellusten kehittämiseksi. T&K:ksi luetaan sekä yrityksen oman henkilökunnan työ että ulkopuolelta tilatut T&K-projektit.

APPENDIX 2. ABBREVIATED QUESTIONNAIRE IN ENGLISH

Q1How frequently your company uses design in business?

1. Continuously
2. Occasionally
3. Not at all

If your company does not use design at all, skip to Question 8.

Estimate your company's design costs in 2003-2005.

Q2aDesign costs in euros in 2003?

Q2a1Design costs as a share of R&D costs in 2003?

Q2bDesign costs in euros in 2004?

Q2b1Design costs as a share of R&D costs in 2004?

Q2cDesign costs in euros in 2005?

Q2c1Design costs as a share of R&D costs in 2005?

In the case that your company employs in-house designers, how many designers the company had...

Q3ain Finland in 2003?

Q3bin Finland in 2004?

Q3cin Finland in 2005?

Q3dabroad in 2003?

Q3eabroad in 2004?

Q3fabroad in 2005?

In which of the following functions your company utilizes design?

Q4a1In-house designers in the company's products

Q4a2Design services acquired from the markets in the company's products

Q4b1In-house designers in the company's business services

Q4b2Design services acquired from the markets in the company's business services

Q4c1In-house designers in the company's marketing communication

Q4c2Design services acquired from the markets in the company's marketing communication

Q4d1In-house designers in other functions

Q4d2Design services acquired from the markets in other functions

Q5In the case that your company acquires design services from the markets, what is their share of total design costs (in 2005)?

Answer to the following statements on scale 1-4 (1=Totally disagree, 2=Fairly disagree, 3=Fairly agree, 4=Totally agree)

Q6a We use design mainly on issues concerning giving form, usability and brand communication.

Q6bDesigners are involved at the very onset of the product and service development process.

Q6cDesign is part of our company's strategic decision making process and our company's upper management is committed to definition of design policy.

Q6dDesign and R&D are strongly integrated to each other in our company.

Q6eDesign and marketing are strongly integrated to each other in our company.

Q6fThe importance of design has increased in our company during the past 5 years.

Estimate how the use of design has influenced on your company's business during the last three years. Answer to the Questions 7a-7j on scale 0-3 (0 = No effect, 1 = Slightly positive effect, 2 = Fairly positive effect, 3 = Extremely positive effect)

- Q7a Increase of sales of a product or service.
 Q7b Room for premium pricing over a product or service.
 Q7c Decrease of production costs of a product or service.
 Q7d Increased efficiency in production process or ease of manufacturing.
 Q7e Ability to differentiate company's products or services from competitors' products or services.
 Q7f Widening of company's customer segments or increase of customer loyalty.
 Q7g Strengthening of brand/trademark or company image.
 Q7h Lengthening of the life cycle of a product or service.
 Q7i Creation of new product concept or product/service innovation.
 Q7j Increased efficiency of company's internal and external communications.

- Q8 How would you evaluate your company's design usage to develop during the next five years (2005-2010)?
1. The use of design will decrease
 2. The use of design will be unchanged
 3. The use of design will increase
 4. Cannot say

If the answer is "increase" then Questions Q8a1-Q8b4:

- Q8a1 Your company will hire more designers. (Yes/No)
 Q8a2 Your company will buy design services from the markets. (Yes/No)
 Q8b1 Increasing use of design will partly or totally be allocated to product development. (Yes/No)
 Q8b2 Increasing use of design will partly or totally be allocated to marketing communication. (Yes/No)
 Q8b3 Increasing use of design will partly or totally be allocated to production processes. (Yes/No)
 Q8b4 Increasing use of design will partly or totally be allocated to other functions. (Yes/No)

APPENDIX 3. RESPONSE RATE BY INDUSTRY

	Respose rates calculated from		
	# of firms	Net sales	Employment
Wood, pulp and paper; publishing	25	46	36
Chemicals	37	40	66
Basic metals and metal products	39	69	57
Mechanical engineering	43	52	49
Electronics and electrical engineering	34	85	74
Textiles, leather, footwear, furniture	20	40	31
Other manufacturing	35	39	48
Total	34	56	52

APPENDIX 4. SUMMARY STATISTICS

Q1	FREQ.	PERCENT	CUM.	
Continuously	52	23.42	23.42	
Occasionally	50	22.52	45.95	
Not at all	120	54.05	100.00	
Total	222	100.00		
Q2A	MEAN	MEDIAN	S.D.	N
	468811	47500	2900459	74
Q2A1	MEAN	MEDIAN	S.D.	N
	11.76	5	17.30	65
Q2B	MEAN	MEDIAN	S.D.	N
	498634	30500	3417627	82
Q2B1	MEAN	MEDIAN	S.D.	N
	11.22	5	16.62	70
Q2C	MEAN	MEDIAN	S.D.	N
	598610	30000	4330845	85
Q2C1	MEAN	MEDIAN	S.D.	N
	11.87	6	17.94	72
Q3A	MEAN	MEDIAN	S.D.	N
	5.58	2	12.79	26
Q3B	MEAN	MEDIAN	S.D.	N
	5.75	1.5	14.28	28
Q3C	MEAN	MEDIAN	S.D.	N
	6.04	2	14.58	28
Q3D	Less than three observations			
Q3E	Less than three observations			
Q3F	Less than three observations			
Q4A1	FREQ.	PERCENT	CUM.	
Yes	31	30.39	30.39	
No	71	69.61	100.00	
Total	102	100.00		
Q4A2	FREQ.	PERCENT	CUM.	
Yes	72	70.59	70.59	
No	30	29.41	100.00	
Total	102	100.00		
Q4B1	FREQ.	PERCENT	CUM.	
Yes	6	5.88	5.88	
No	96	94.12	100.00	
Total	102	100.00		
Q4B2	FREQ.	PERCENT	CUM.	
Yes	15	14.71	14.71	
No	87	85.29	100.00	
Total	102	100.00		
Q4C1	FREQ.	PERCENT	CUM.	
Yes	19	18.63	18.63	
No	83	81.37	100.00	
Total	102	100.00		
Q4C2	FREQ.	PERCENT	CUM.	
Yes	70	68.63	68.63	
No	32	31.37	100.00	
Total	102	100.00		

Q5	MEAN	MEDIAN	S.D.	N
	75.68	100	34.91	76

Q6A	FREQ.	PERCENT	CUM.
Disagree	3	3.03	3.03
Fairly disagree	3	3.03	6.06
Fairly agree	37	37.37	43.43
Agree	56	56.57	100.00
Total	99	100.00	

Q6B	FREQ.	PERCENT	CUM.
Disagree	24	24.49	24.49
Fairly disagree	18	18.37	42.86
Fairly agree	34	34.69	77.55
Agree	22	22.45	100.00
Total	98	100.00	

Q6C	FREQ.	PERCENT	CUM.
Disagree	12	12.37	12.37
Fairly disagree	26	26.80	39.18
Fairly agree	33	34.02	73.20
Agree	26	26.80	100.00
Total	97	100.00	

Q6D	FREQ.	PERCENT	CUM.
Disagree	11	11.00	11.00
Fairly disagree	18	18.00	29.00
Fairly agree	38	38.00	67.00
Agree	33	33.00	100.00
Total	100	100.00	

Q6E	FREQ.	PERCENT	CUM.
Disagree	6	6.06	6.06
Fairly disagree	17	17.17	23.23
Fairly agree	51	51.52	74.75
Agree	25	25.25	100.00
Total	99	100.00	

Q6F	FREQ.	PERCENT	CUM.
Disagree	2	2.00	2.00
Fairly disagree	8	8.00	10.00
Fairly agree	44	44.00	54.00
Agree	46	46.00	100.00
Total	100	100.00	

Q7A	FREQ.	PERCENT	CUM.
No effect	15	15.46	15.46
Slightly positive	28	28.87	44.33
Fairly positive	42	43.30	87.63
Extremely positive	12	12.37	100.00
Total	97	100.00	

Q7B	FREQ.	PERCENT	CUM.
No effect	32	32.99	32.99
Slightly positive	39	40.21	73.20
Fairly positive	20	20.62	93.81
Extremely positive	6	6.19	100.00
Total	97	100.00	

Q7C	FREQ.	PERCENT	CUM.
No effect	60	61.86	61.86
Slightly positive	31	31.96	93.81
Fairly positive	2	2.06	95.88
Extremely positive	4	4.12	100.00
Total	97	100.00	

Q7D	FREQ.	PERCENT	CUM.
No effect	54	56.25	56.25
Slightly positive	32	33.33	89.58
Fairly positive	9	9.38	98.96
Extremely positive	1	1.04	100.00
Total	96	100.00	

Q7E	FREQ.	PERCENT	CUM.
No effect	4	4.12	4.12
Slightly positive	26	26.80	30.93
Fairly positive	39	40.21	71.13
Extremely positive	28	28.87	100.00
Total	97	100.00	

Q7F	FREQ.	PERCENT	CUM.
No effect	23	23.96	23.96
Slightly positive	35	36.46	60.42
Fairly positive	27	28.13	88.54
Extremely positive	11	11.46	100.00
Total	96	100.00	

Q7G	FREQ.	PERCENT	CUM.
No effect	6	6.19	6.19
Slightly positive	28	28.87	35.05
Fairly positive	42	43.30	78.35
Extremely positive	21	21.65	100.00
Total	97	100.00	

Q7H	FREQ.	PERCENT	CUM.
No effect	44	45.36	45.36
Slightly positive	25	25.77	71.13
Fairly positive	22	22.68	93.81
Extremely positive	6	6.19	100.00
Total	97	100.00	

Q7I	FREQ.	PERCENT	CUM.
No effect	37	38.14	38.14
Slightly positive	26	26.80	64.95
Fairly positive	24	24.74	89.69
Extremely positive	10	10.31	100.00
Total	97	100.00	

Q7J	FREQ.	PERCENT	CUM.
No effect	20	20.62	20.62
Slightly positive	38	39.18	59.79
Fairly positive	28	28.87	88.66
Extremely positive	11	11.34	100.00
Total	97	100.00	

Q8	FREQ.	PERCENT	CUM.
Unchanged	84	40.58	40.58
Increase	85	41.06	81.64
Cannot say	38	18.36	100.00
Total	207	100.00	

Q8A1	FREQ.	PERCENT	CUM.
Yes	12	14.12	14.12
No	73	85.88	100.00
Total	85	100.00	

Q8A2	FREQ.	PERCENT	CUM.
Yes	77	90.59	90.59
No	8	9.41	100.00
Total	85	100.00	

Q8B1	FREQ.	PERCENT	CUM.
Yes	78	91.76	91.76
No	7	8.24	100.00
Total	85	100.00	

Q8B2	FREQ.	PERCENT	CUM.
Yes	48	56.47	56.47
No	37	43.53	100.00
Total	85	100.00	

Q8B3	FREQ.	PERCENT	CUM.
Yes	12	14.12	14.12
No	73	85.88	100.00
Total	85	100.00	

Q8B4	FREQ.	PERCENT	CUM.
Yes	4	4.71	4.71
No	81	95.29	100.00
Total	85	100.00	

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