The Role of Responsiveness for Design Outcomes in B2B Companies

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Competitive paper

Submission to 30th annual IMP conference. Submitted to special track on "Understanding value creation processes in business relationships and networks".

Abstract (226 words)

Co-creation is a process between customers and producers while co-creative design is an outcome that reflects customer customization, strengthens brand image and emphasize recognition. Such co-creative design is vital for b2b products that grow in relationships with customers, suppliers and competitors. Such process is also determined by responsive actions and handling key actor's orientations together with central R&D activities. Companies that strategically around such aspects in combination with innovative strategies are also assumed perform better. Sweden is well recognized for customized and applied solutions for industrial marketing. This paper proposes and test a model that goes to the heart of customized and applied solutions in industrial marketing. We identify and validate four new key constructs with key representatives from Swedish industrial design located in Stockholm. We use their insights to test these constructs and its corresponding relationship on performance. Our model tests the effect of responsiveness, key actor orientation, R&D activities on co-creative design and growth. In addition we test our model both on a proxy of high and low networking and innovation strategy to validate. These sub-samples support us in determining the key logics of this model. Our sample consists of 496 b2b businesses and we combine this survey data with data from secondary sources on growth and networking relationship. Our model has implications on the discussion of central issues for interaction in industrial markets.

Keywords: Design management, responsiveness, design value, resource based view

INTRODUCTION

Co-creative design is critical for companies in b2b as design and functionality is often customized (Zahay, Peltier, Krishen & Schultz, 2014) through efficient network relationships (Kohtamäki, Partanen & Möller, 2013). Design support communication and verify the shared and agreed understanding in product processes. It communicates advantages after making such choice by incorporating values and standards into specific and unique forms to match the end function that customers perceive. This makes design and designing a purposeful act helping the company to reach its overall objectives. There seems almost a universal consensus that design is an essential aspect of innovativeness (Walsh, 1996; Talke, Salomo, Wieringa and Lutz, 2009), which includes responsiveness to market needs (Christopher, 2000; Hult, Hurley & Knight, 2004) and finding an exit for the product through an efficient commercialization. Consequently new product design correlates with the development process of new products (Cooper and Kleinschmidt, 1986; Hertenstein, Platt and Veryzer, 2005; Noble and Kumar, 2008), technological aspects (Candi, 2006), communication strategies (Sung and Mathews, 2010) and user functionality (Crick and Jones, 1998; Bruce and Daly, 2007). Design also embody corporate values, standards, and ethics in the functionality and form of the products (Yildirim, Akalin-Baskaya and Hidayetoglu, 2007). In addition many examples in practice illustrate the combination of functional design and its relationship to innovativeness, its support in communicating the company strategy (branding), and ultimately its relationship to business performance (Heylighen, Deisz and Verstijnen, 2007).

Design therefore is an aspect of a firm level strategic effort completed individually, in design teams or by multidisciplinary teams covering aspects beyond appearance (Crick and Jones, 1998; Hendry, 2004; Verganti, 2006, 2008). However, there is a wide variation in the value placed on design in organizations. Company designers and design teams have different amounts or resources allocated to perform their task, but also different roles with regard to the product itself. Some companies integrate designers directly to strategic business plans to help predicting better functionality by using smart design (e.g., iMac, iPhone and iPad), in contrast to the traditional approach of assigning designers to develop mostly forms to a product with certain attributes and functionality. This leads to a paradox - if design has important benefits and significant payoffs to firms, why is there such a wide variation in investing in design?

Various studies tend to build a consensus on the importance of design in the innovation process, but they consequently isolate design among the other actors of innovation and separate design from management theories, when obviously the designer is not the only actor that deserves to be credited with the success of innovation (Borja de Mozota, 2003). In this paper, we explain the context in which design would be most valued by the firm's *strategic managers* – managers in b2b companies and who make the decision to take the design to the market. We conceptualize design as an organizational competency, and subscribe to the definition that design is the part of the innovation process which enhances and communicates the value inherent in products or services (Hertenschein et al, 2005; Veryzer, 2005; Yamamoto and Lambert, 1994). It further also encompasses both functionality and aesthetics (Candi, 2006), and provides a basis for competitive advantage (Olson, Cooper, and Slater, 1998). This conceptualization is based on the Resource-Based View (RBV) of the firm, which holds that a firm is a bundle of resources and competencies. There is heterogeneity among firms regarding this resource and competency bundle. Superior resources, such as better managers, competent and creative designers, superior location of facilities, are also scarce, non-imitable, non-substitutable, and non-tradable (immobile), which may offer the firm a good basis to differentiate its products, and enjoy the benefits of a long-term competitive

advantage (see Peteraf, 1993; Hooley et al, 1998, for a complete exposition of RBV's contribution to competitive advantage). Managers can also elevate design to a strategic competency, and incorporate it as a centerpiece of the firm's strategy, to differentiate their products from their competitors. Thus valuing and nurturing design as a strategic competency highlights a deliberate choice by managers. Another perspective on the value of the design comes from the environment in which the firm operates. Specifically, the value of heterogeneous resources depends on the competitive environment in which the firm operates. In markets where there are a variety of firms and competition is intense (Peteraf, 1993), the value of heterogeneous resources can be expected to be high, thereby leading to a higher value placed on design as a competency.

Thus, two arguments exist in extant literature about the conditions leading to perceived value of design. One argument, based on RBV, calls for perceived value of design being high when design is a distinctive competency of the firm (i.e. rare, non-imitable, non-substitutable, and immobile). The other argument, based on external factors, posits that competitive environments increase the value of product differentiation and innovation, increasing the value of design under these conditions (Lockton, Harrison and Stanton, 2012). In this paper, we develop and test a model that combines these two perspectives to predict firm responsiveness to the customer, which in turn predicts the perceived value of design from the perspective of a firm's managers. The model responds to the following question: Under what conditions is design valued by managers?

MODEL DEVELOPMENT

Design as a competency. Design is a multi-disciplinary, and inter-disciplinary competency in an organization, melding many different skills and areas of knowledge of a firm in an idiosyncratic whole. Design is an important and crucial skill for any product or service based b2b company (Bloch, 1995). Design competency refers to the entire system of the firm that leads, conceives, develops, integrates, and communicates design elements in the firms' products and services (Zahay, Peltier, Krishen & Schultz, 2014). Thus, like any organization wide competency, it has both technical and commercializing skills components. For instance, in field studies of design projects, Sonnenwald (1996) identified thirteen communication roles for people who spanned boundaries at the organization, tasks and discipline levels to manage and prevent communication breakdowns. Partidario & Vergragt (2002) further pointed out that when specialists as key actors seek to work across disciplinary boundaries the likelihood for contention increases because of the difficulty of exchanging discipline-specific knowledge. Design communication thus appears to have a unique quality that separates it from other forms of communication, such as an inductive scientific argument or workflow commitments in a business setting. In this regard, Nelson and Stolterman (2003) presents a model called the allopoietic design communication process, which proposes that design communication proceeds through the following phases: 1) conversation for developing trust; 2) dialogue for developing common understandings; and 3) diathenic graphologue ("to let a thing be seen through its image") for developing new insights. The design and development of new products typically involve collaboration among scientists, engineers, industrial designers, market researchers and marketing managers (Langerak, et al., 2007).

An R&D activity implies uncertainty (Stephanou, 2010). Gerybadze & Reger (1999) define R&D on the basis of leading market and customer requirements. R&D activities is thus a market discipline. These activities of R&D arise in the interface between sales, production and customers (Möller & Rajala, 1999). Often these activities take place between key actors in integrated networks (Wagner & Hoegl, 2006). The above definitions on R&D activities

may thus also explain the tension and opportunities that arise. Conceptually R&D activities reflect the ability to evaluate a firm's true condition (monitoring), and the responsiveness of a firm's managers.

In a marketing context, the above views on R&D activities concur with that of market orientation. Using a theories-in-use approach described by Zaltman, LeMasters and Heffring (1982), Kohli and Jaworski (1990) define market orientation as composed of three sets of activities: (1) organization-wide generation of market intelligence pertaining to current and future customer needs, (2) dissemination of intelligence across departments and (3) organization wide responsiveness to it. The responsiveness component is further defined as being composed of two sets of activities – responsive design (i.e. using market intelligence to develop plans) and response implementation (i.e. executing such plans) (Jaworski and Kohli, 1993). The above definition focuses on specific behaviors, as also identified in the R&D activities literature mentioned earlier, and therefore facilitates operationalizing the market orientation construct (Narver & Slater, 1990; Day, 1994; Day 1999; Piercy et al., 2002; Webster, 2009). According to Hooley et al., (1990) the real customer focus and responsiveness to market changes, is the context in which management and marketing strategy is built and implemented. Responsiveness to changing market needs often calls for the introduction of new products and services to match the evolving customer needs and expectations (Jaworski and Kohli, 1993). The reality, however, is that new products, services often run a high risk of failure and tend to be more salient than established products. Kohli and Jaworski (1990) argue that key actor orientation demonstrates a willingness to take risks and to accept occasional failures as being natural, junior managers are more likely to propose and introduce new offerings in response to changes in customer needs. By contrast, if key actor is risk aversive and intolerant to failures, subordinates are less likely to focus on generating or disseminating market intelligence or responding to changes in customer needs. Firms that are consistent and disciplined in their approach to innovation and customer responsiveness can emerge as market leaders (Treacy & Wiersema, 1997).

Conceptually, responsiveness refers to the transmission of information and knowledge about the firm (objectives, priorities, competitors, design strategy, post evaluation measurement and feedback) to the designers (Rothwell & Gardiner, 1989; Topalian, 1994; Dickson, Schneider, Lawrence & Hytry, 1995; Olsen, Slater & Cooper, 2000). In addition responsiveness relates to decisions on organizational aspects of design: the existence of an in-house design function and the use of external expertise (Dumas & Mintzberg, 1989; Bruce & Morris, 1994; Topalian, 1994).

In context of design management, new standards, deadline, technology, market logic place some pressure on design teams to come up with original ideas that match certain requirements customers have (Im and Workman, 2004; Peeters, van Tuijl and Reymen, 2007). Following the discussion in the previous paragraph, we label such pressure to match ideas (based on continuous monitoring and responsiveness thereto) to the market as R&D activities, or alternatively market orientation.

Business performance hinges on customer acceptance - satisfied customers lead to increased sales and ultimately allow the firm to stay in business (Jaworski and Kohli, 1993). As part of the decomposition of business processes design, managers can only respond to customers through asking and observing their acceptance to the process. We believe this process to be critical to observe the benefits customers perceive and particularly how they value design (Candi, 2006). Furthermore, such responsiveness depend on key actor orientation and R&D activities.

As R&D activities are an interrelated activity with other firms it also corresponds to growth (Howells, Gagliardi & Malik, 2008). Many b2b companies are dependent on patents and launching their patents and therefore select an external growth strategy. In addition and companies with greater openness, richer network may more strongly apply their design competencies to their products and services (Wang, Chen, Wang, Lutao & Vanhaverbeke, 2014).

Hypothesis 1 (a) R&D activities are related to responsiveness to customers, and this relationship is stable across (b) b2b companies growing externally and (c) b2b companies with greater network capabilities.

Key actor orientation quality and responsiveness. Key actor orientation is proposed as another important aspect in organizations that value design. Olson, Cooper and Slater (1998) argue that many business practitioners are in a situation where designers know little about business and general managers' lack of knowledge about design. Superior key actor orientation motivate staff, allocate resources, and direct action to be responsive to customer needs (Borja de Mozota, 2003; Kohtamäki, Partanen & Möller, 2013). Superior involvement with key actors, through designers, may be able to identify perceptions about the products and services from a customer perspective, since they have a better understanding of the benefits of such a design. Thus, superior involvement with key actors include activities associated with the creation of an organizational context that favors the design process, and values designers, with special emphasis on communication, dialogue, creativity encouragement and participation (Rothwell and Gariner, 1989; Dickson, Schneider, Lawrence and Hytry, 1995). The above insights suggest that key actor orientation quality is a significant predictor of responsiveness to customers and growth (Ellis, Rod, Beal & Lindsay, 2012) as well as network (Andersen & Christensen, 2005).

Hypothesis 2 (a) Key actor orientation is related to responsiveness to customers, and this relationship is stable across (b) b2b companies growing externally and (c) b2b companies with greater network capabilities.

Responsiveness and design value. Design helps in being responsive to customers, which accounts for its importance in the context of global competition and global customers. Until recently it was thought to be relatively easy to outsource design to foreign countries (Chang & Tsai, 2002: Ernst, 2005) to promote standardization and efficiency. Today, design is changing and is more context specific because services are a greater part of the product, so is the image, ethics, environmental standards and originality. These aspects are culturally and geographically determined, and can be incorporated as an important aspect of a brand's identity as a customer-responsive brand. Services such as tourism and other experienced based products has for long been place dependent. A wine yard or another touristic place cannot just be transferred with all its values to another country.

Design in commercial use and part of a marketing-mix (i.e., the four classic P's) is different than a strictly art-based design, which is typically dependent on a single person's creativity to perform a visually appealing appearance and gestalt an object (Bloch, 1995). Industrial design which goes beyond appearance and include competency with several interrelated components. In such process the appearance is complemented with form within certain standards, platforms, costs and performance (Ughanwa, 1991; Crick and Jones, 1998). Again, these dimensions of design competency help in being more responsive to customers.

The arguments above suggest that increased customer responsiveness will lead to increased value placed on design. Design competency, resulting in rapid development of new designs

may help the firm be more responsive to customers. Therefore when firms operate in contexts where responsiveness to customers is prized (in the context of R&D activities combined with enlightened key actor orientation), the value placed in design would be high. Formally:

Hypothesis 3 (a) Responsiveness of a b2b firm is related to the value placed on design, and this relationship is stable across (b) b2b companies growing externally and (c) b2b companies with greater network capabilities.

Hypothesis 4 (a) Responsiveness mediates the effect of R&D activities on the value placed on design, and this relationship is stable across (b) b2b companies growing externally and (c) b2b companies with greater network capabilities.

Hypothesis 5 (a) Responsiveness mediates the effect of key actor orientation on the value placed on design, and this relationship is stable across (b) b2b companies growing externally and (c) b2b companies with greater network capabilities.

Figure 1 displays the model we tested.

Figure 1 about here

METHOD

Design has strong implications for firm strategies in both manufacturing and service intense firms. One observation is though whereas these variables may hinder the initiation stage of innovative behaviour, the same variables may actually facilitate the implementation stage of innovative behaviour. This theory is therefore dependent on identifying reliable and valid models of different firm structures. Many of these structures are based on the ideas that firms pursue in their strategies. We therefore had to rely on observation based on self-reported measures in combination with public data of firm performance and relationship towards other companies. The self-reported scales we used in this study were developed from practitioner insights within the industry (Swedish industrial design). Since these scales were not only adapted but also adopted to suite our purpose, we pre-tested all scales in an effort to calibrate the research instrument.

In order to test our proposed theory against our population we used confirmatory factor analysis (CFA). But, before completing a CFA we did some basic statistical analysis in SPSS. These basic statistical analyses were based on examining different Pearson correlation tables, which we also used for our further analysis in AMOS.

Byrne (1998) argue that CFA is appropriate to use when having an idea of how the theory may be constructed into a model. With the CFA a researcher can test if there is a true correspondence between the data and the model. CFA also allows for the identification of theoretical error in the model, and empirical i.e., measurement error in the indicators of the theoretical (latent) variables of the model.

Sweden – the context of the study

Despite its relatively small population (approximately 9.5 million) Sweden is considered a top-ranked innovative country (Arundel, Bordoy, Hollanders, Nesta & Patel, 2003) in which design has played a significant role. Many Swedish companies such as Volvo (safety), IKEA (distribution), Blåkläder (functionality) and H&M (fashion) establishes loyal customers because of distinguished strategies in design. Design of these Swedish innovations has much be permeated by engineering to develop practical, safe and user friendly products. For instance the Swedish auto industries were pioneers in developing front wheel transmission in cars (SAAB), which changed the experience for the driver. The Swedish auto industry was also for a long time known for its safety (Volvo) including three point seat belts and airbags. Much of the success of well known Swedish furnishing company IKEA could be explained by its logistics, in which users can easily assemble their own furniture but also the way they sell simple and practical design. Swedish design in many instances include technology to connect people, in which Ericsson and Telia research group, as pioneers for mobile phones, had a tremendous impact on its market. Other well known practical design solutions are the child harness and the traditional blue collar dresses. Finally, Sweden also dominated both the legal and illegal downloads of music with Piratebay and lately the legal Spotify which strictly obey the users' logics rather than producers'.

This paper is based on a sample of 496 Swedish b2b companies. Each company were informed about what we meant by design – that is a professional and creative process in which both estetic and functional requirements are considered. Furthermore design originates from product development born out of communication with market.

The data collection started during week 44 in year 2007 and continued until week 6 in year 2008. We use a stratifed sample, which included 25 % firms of four size cathegories (that is 20-49 employees, 50-99 empolyees, 100-199 employees and more than 200 employees) and two industry categories (that is service and manufacturing). The above stratification ensured representation of the whole Swedish industry structure. In order to reach a significant number of companies, a total of 1800 companies were contacted by phone, which generated 432 interviews. This sample was considered as relatively low, which necessitated a second round of prospecting, during which an addintional number of 2 012 companies were contacted (according to same stratifying principles). This resulted in a further 488 interviews. In total the sample generated therefore consisted of 920 responses. From this sample we picked only the 496 b2b companies and complemented the study from two additional databases with financial data from Retriver and Orbis.

EMPIRICAL RESULTS

The objective of this paper is to test the model, reflected in Figure 1. Input for this model is raw data which are presented in seven different correlation Tables 1. We provide these tables so the study can be replicated but also to provide an idea about the structure in the data.

The results are based upon following four key constructs, including 10 variables (see Appendix). Our first group of controls include following four variables regarding competitive external growth strategies. Secondly, we look into whether the company has a relative network capability measured by its belongingness to the main component of border interlocks

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Table 1-3 about here

Reliability

High construct reliability indicates that internal consistency exists, meaning the measures (indicators) all consistently represent the same latent construct (Hair, et al, 2010). We used two different rules to examine construct reliability. In those measures that only had two or less indicators we reported the Pearson correlation coefficient (Table 1). We wanted this coefficient to be high and particularly higher than any of the correlations towards the other items associated with other constructs. We started by reporting Cronbach's alpha for those constructs that had more than two measures and correlations for those that had less than three (see Table 2).

Confirmatory factor analysis

Further, our analyses are based on a two step approach (Anderson & Gerbing, 1988). The idea with a two step approach is to confirm whether the models, including the measurements are acceptable before the researcher enter examining the sequential order of the model. The two step approach began with an examination of the overall model. We correlated all of the proposed constructs (see Table 2). We forced the observations Q1-Q10 so that all of these loaded to each proposed latent construct (see Table 3).

Following protocol, we examined the Goodness-of-Fit indexes to start with. The most conservative fit index is the Chi square (χ^2) measure. Chi square should, given there is a correspondence between the population and theory, be non-significant (p-value>.05). Our model does not pass this test (see Table 4). The reason for this most likely is that we have a high sample size that inflates the Chi square measure, because chi square is sensitive to sample size. The recommendation in the literature is then to follow other indices (see e.g., Hair et al., 2010). We therefore examined other indices in order to get an idea about how well the model works. We used three indexes which all passed the recommended levels. In order to get an acceptable fit Comparative Fit Index (CFI) should exceed .90; Standardized Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA) should be lower than .08; in order to claim acceptable Goodness-of-fit (Bentler, 1990). Our model passed these recommended levels (see Table 4).

Test of hypotheses

Once we had established the factor structure we continued with our next objective to study the proposed sequential paths. We do not report the factor structure, basically because this structure did not significantly differ from the one we received in our CFA. Thus, to follow underlying loadings we refer to CFA (see Table 3). In addition we find in Table 5 that we can explain 26.4-49.6 % of variance in our dependent variables.

Table 4-6 about here

Table 5 confirms, as expected, that R&D activates (H1a) has a significant relationship to responsiveness (β = .55; p<.001). This relationship (H1b) is also stable for companies pursuing an external growth strategy (β = .51; p<.001) and companies (H1c) with a strong network capacity (β = .55; p<.001). Similarly (H2a) that hypothesize key actor orientation on

responsiveness is supported (β = .24; p<.001). However, our controls for companies with an external growth strategy (H2b) reported a non-significant relationship (β = .08; p>.05). For companies with a strong network capacity (H1c) we could confirm this path (β = .27; p<.01). Finally responsiveness (H3a) also has a substantial significant relationship to design value (β =.63; p<.001). Same relationship (H3b) is stable for companies with an external growth strategy (β = .51; p<.01) and for those with a strong network structure (H3c) (β = .70; p<.001).

We also hypothesized various mediation effects. First that R&D activity is mediated by responsiveness (See Table 6, H4a-c) on design outcomes. These indirect effects are true for all samples as standardized indirect effects are as follows (Group all: β =.34; p<.01; External growth: β =.26; p<.05; and Network capabilities: β =.39; p<.01). Similarly we expected key actor orientation (see Table 6, 5a-c) to be mediated by responsiveness. This is true when accounting for all (β =.15; p<.01). However, there is differences in companies with an external growth as this is insignificant (β =.04; p>.05) but (H5c) supported and significant for those with network capabilities (β =.19; p<.01).

DISCUSSION

In this paper we specifically asked the following question: When do b2b managers value design? Our results show that b2b managers that typically value design and responsiveness are oriented by key actors and R&D activities. However, when looking into the more detailed tests of our model we found that those companies explicitly reporting goodwill in their public reporting and thus having excess values from acquisition are less oriented by key actor orientation.

CONCLUSIONS

This paper provided a model of value of design. The finding of the research tells us that identifying individuals that knows design is more likely in companies with large network capacity. Secondly, our observation is that companies with external growth may overlook importance of design in favor for functional aspects and patents. More studies on patents in relationship to network could shed light on this matter.

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FIGURES AND TABLES

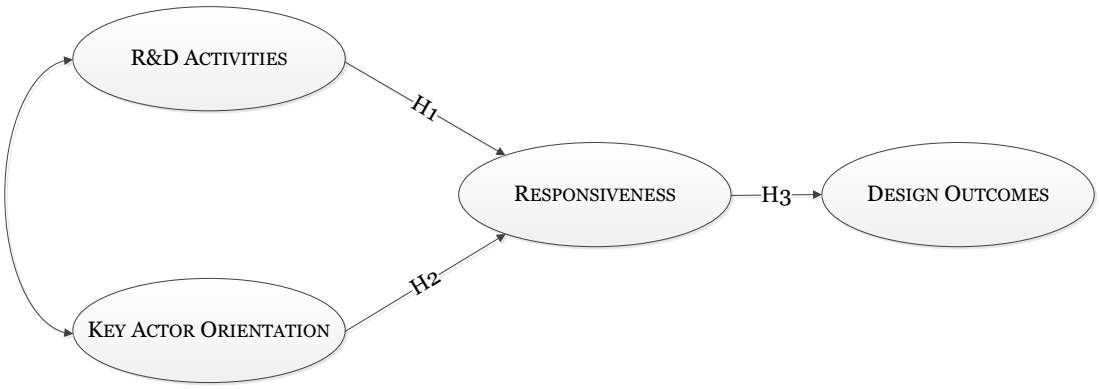

Figure 1: Hypothesis

Table 1: Descriptives (all N=496)

	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
X1	3.24	0.95	1.00									
X2	3.24	0.96	**.70****	1.00								
X3	3.20	0.97	**.74****	**.74****	1.00							
X4	5.94	1.32	.07	.02	.04	1.00						
X5	6.16	1.12	.02	-.02	.02	**.57****	1.00					
X6	5.12	1.31	.08	.03	.11*	**.38****	**.48****	1.00				
X7	4.03	1.10	.19**	.18**	.19**	.08	.07	.01	1.00			
X8	3.94	1.12	.19**	.16**	.18**	.14**	.12**	.04	**.40****	1.00		
X9	5.03	1.60	.37**	.37**	.32**	.08	.10*	.12**	.22**	.15**	1.00	
X10	4.42	1.68	.28**	.20**	.27**	.16**	.15**	.17**	.15**	.19**	**.56****	1.00

**p<0.01; *p<0.05
Q1-2 R&D activities; Q3-5 Key actor orientation; Q6-8 Responsiveness; Q9-10 Design Value

Table 2: Descriptives (all N=496)

		Alpha (α)	Correlation			
Path		corr (r)	(1)	(2)	(3)	(4)
1.	R&D	*r* =.40	1.00			
2.	KAO	α =.72	.058	1.00		
3.	RSP	α=.89	.24**	.11*	1.00	
4.	DV	*r*= .56	.38**	.18**	.24**	1.00

R&D: R&D activities; KAO: Key actor orientation; RSP: Responsiveness;
DV: Design Value: *r*: Correlation; α=Cronbach's alpha

Table 3: Standardized factor loadings CFA (N=496; N=95; N=356)

	All (N=496)	External growth (n=95)	NW Capabilities (n=356)
Path	Std. loading	Std. loading	Std. loading
λ_1 Responsiveness	0.85	0.84	0.82
λ_2 Responsiveness	0.83	0.68	0.85
λ_3 Key actor orientation	0.88	0.84	0.85
λ_4 Key actor orientation	0.68	0.77	0.68
λ_5 Key actor orientation	0.84	0.78	0.85
λ_6 R&D activities	0.57	0.62	0.61
λ_7 R&D activities	0.50	0.68	0.48
λ_8 R&D activities	0.49	0.82	0.47
λ_9 Design Value	0.80	0.74	0.76
λ_{10} Design Value	0.69	0.74	0.67

Table4:

Goodness-of-fit structural model

Index	all N =496
χ^2. (d.f)	230.737 (93)
p-value	.000
CFI	.95
RMSEA	.040

Table 5:

Results of tested hypothesis across all- and sub-samples

	All (N=496)	External growth (n=95)	NW Capabilities (n=356)	
	beta (t-value)	beta (t-value)	beta (t-value)	Decision
H1a-c: R&D-->responsiveness	0.55***(6.72)	0.51***(3.46)	0.55***(5.50)	Supported
H2a-c: Key actor orientation--> responsiveness	0.24***(3.44)	$0.08^{N.S}$(0.68)	0.27**(3.24)	Supported
H3a-c: Responsiveness -- > design outcomes	0.63***(6.16)	0.51**3.10)	0.70***(5.20)	Supported
R-square responsiveness	36.80 %	28.20 %	38.00 %	
R-square design outcomes	39.80 %	26.40 %	49.60 %	

***p<.001; **p<01; *p<.05
t-value in parenthesis
N.S = Non significant R^2

Table 6:

Results of tested mediation (indirect effects)

	All (N=496)	External growth (n=95)	NW Capabilities	
	beta	beta	beta	Decision
H4a-c: R&D-->responsiveness-->design outcome	0.34**	0.26*	0.39**	a-c Supported
H5a-c: Key actor orientation--> responsiveness->design outcome	0.15*	$0.04^{N.S}$	0.19**	a-c Supported

APPENDIX - MEASUREMENTS

1. Construct three is ***R&D activities*** measured by activities tied to market

   Have requirements for design increased the recent years if you consider following (scale ranging from 1=decreased to 4=increased):

   Q6. Requirements increased for product development
   Q7. Requirements for communication increased
   Q8. Requirements for sustainable development increased

2. Construct two is ***key actor orientation*** measured by significance of business dependent aspects important for the business success

   How important are following aspects for your business success (scale ranging from 1=no significance to 7=very strong significance).

   Q3. In general customer needs important for business success
   Q4. In general competent employees important for business success
   Q5. In general internal good communication for business success

3. Construct one is ***responsiveness*** measured by the systematical procedure to approach customers

   How do you collect responses from customers (scale ranging from 1=disagree to 7=strongly agree)

   Q1. We systematically collect failure report and customers complains as part of development
   Q2. We continuously visit our customer to get an idea of their needs and solutions

4. Final construct Design value measured by perception of design significance on brand image and product characteristics.

   What benefits do you perceive that design has for your company as regards to following (scale ranging from 1=no significance to 7 very strong significance):

   Q9. Strengthen the brand
   Q10. Making the products more customer friendly.