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# Designing and design thinking in strategy concepts: frameworks towards an intervention tool

This paper documents the results of an exploratory study of design's potential at strategic level, and of the difficulties faced by organisations in exploiting design strategically. The study follows an approach based on the design research method and on procedural action research. The exploratory phase began with a review of literature on design management and models of strategy, eliciting a theoretical description of the ways in which design's contribution might be termed strategic. A qualitative empirical study followed, comprising 19 interviews with managers and designers. These cases studies, along with extant literature informed a theoretical framework of design in the value chain, and also confirmed the need for a tool or method to help organisations improve design integration. The next phase of this study will develop such a tool based on this framework, incorporating design research methods.

In considering design's strategic role there are two important trends of recent years to note: first, design's role in differentiating products and services is of growing importance in a global market; second, design's broader and subtler contributions to an organisation are increasingly understood, recognised and valued. But much business strategy literature predates or neglects these trends, and in the empirical literature of design management they are often discussed under the catch-all of 'strategic design'. The theoretical stage of this study aims to address both these points:

- The roles of designing and design thinking are reconsidered, revisiting established strategy theories of positioning and differentiation, in particular Michael Porter's value chain and five forces [Porter 1980, 1985].
- Three ways are proposed in which design might be termed strategic: competing by 'high design' is a strategy in itself, an integrated design approach helps maintain a strategic position, and design thinking informs strategy formulation. This distinction might be beneficial for managing design, for communicating design's value to managers and leaders, and for conceptual clarity in academic discussion.

Design's value has typically been recognised as coming mainly from industrial design practice in operations and product development. More recently, the ideal is thought to be an integrated effort of many design disciplines concerted across operations [Phatak & Chandron 1989], which is represented here in a revision of the value chain framework. Based on this holistic design ideal, we propose that firms should aim to integrate design consistently and completely across the value chain, across all customer touch-points, and for all their stake-holders. This is the basis for an intervention tool under development to allow organisations to explore the degree of design integration.

## **1. Theoretical background**

Recognition of design's importance to business has risen in past decades, since Kotler and Rath urged business leaders to revise their view of design as a cosmetic, decorative treatment applied late in development. Instead they should recognise how it can "optimize customer satisfaction and company profitability and value [and] enhance products, environment, communications and identity" [Kotler & Rath 1984]. Lorenz [1990, 1994] saw the strategic benefits of industrial (product) design, but didn't examine the contributions of other design disciplines. Strategic design, he suggests, "integrates industrial design into the company... devoted to such broad activities as lifestyle research, in order to anticipate product concepts ahead of competitors." A key role of product designers is as the connector between the end user and the marketing and production staff [Blaich 1993, Lorenz 1994]. They are the best skilled for spotting "trends in lifestyles and changes in social priorities" and making "the intuitive leap to imagine what consumers need, want, or may enthusiastically accept as a new product" [Blaich 1993]. Trueman and Jobber [1998] propose that design contributes in four realms: value, image, process and production. Assuming design is only about image misses out on the advantages of the other three, and of the further "product integrity" [Fujimoto 1990] that comes with the integration across all four realms.

So the academic examination of value added through *product* design is long-standing and quite comprehensive, but more recent thinking emphasises its broader contribution to operations outside of manufacturing. Furthermore, design methods can be applied to conceiving operations and strategies as well as new or improved products. Several firms previously known as design agencies now call themselves innovation or product development consultants, eager to provide strategic consulting (as seen on the web sites of IDEO, PDD, Design Continuum, ZIBA). Seidel [2000] finds four key strategic contributions that arise through engaging product design consultants: visualising and communicating strategy, recognising unseen market opportunities, matching competencies dispersed through the organisation, and providing design process guidance.

## **2. Strategy Theories from the Design Perspective**

If design is strategic then where does it fit in established strategy thinking? We briefly consider next how design services are related to strategy concepts of differentiation and positioning. Michael Porter built his system of strategic management on established 'planning' approaches to strategy, which held that strategies were based on analysis of measurable factors, then methodically implemented. Porter's view maintained strategy is about being and staying different, and his frameworks for analysing and planning competitive differentiation [Porter 1980] have become established 'textbook' tools.

## 2.1. Generic strategies

Porter argued there only a few key generic strategy types, “value disciplines” which combine to identify positions in the marketplace; it is important to occupy either cost leadership or differentiation, combined with a market focus (either broad or narrow). Design can play an important role in all these.

Differentiation protects against competition through perceived uniqueness, and is perhaps here that design plays its most obvious and visible role, at both product level and at brand or corporate level. The conception and specification of desirable, useful, usable, affordable products and services are generally perceived as the main competence of designers, and are usually the main reason companies engage external design expertise [Borja de Morzota 2003]. But if we look beyond the customer, building loyalty through design for others stake-holders might be valuable for manipulating the forces at play outside the organisation. These are considered in Porter’s Five Forces analysis.

Cost leadership generally requires advantageous access to raw materials, labour, or other significant input, but with an emphasis on efficiency, design at the product level can save costs through effective process design and in design for manufacture. Emphasising and communicating a cost leadership position is also a design job, but not always recognised as such; in such a strategy, based on minimising all costs, design might be seen as an unnecessary and unjustifiable expense [Design Council 2006, Moultrie et al 2006].

## 2.2. Outside the organisation: Five Forces Analysis

Porter’s five forces analysis [Porter 1985] identifies the forces shaping the competitive environment:

- Threat of new entrants - how easily new competitors can enter the market; what the barriers are.
- Threat of substitutes - how easily customers can find alternative products or services.
- Buyer bargaining power - how strongly buyers can dictate or influence the prices they pay.
- Supplier bargaining power - how strongly suppliers can dictate or influence the prices they charge.
- Rivalry within the market - how crowded is the market; whether there are dominant players.

Considering how these forces might change over time is a useful way of exploring scenarios to shape the strategic plan, and effective design can contribute to the forces at play. Customers’ loyalty is especially powerful in three of these forces, reducing their tendency to switch allegiance to rivals, new entrants or substitutes. Loyalty is strengthened by design, focusing on meeting customer needs through a compelling, appealing experience, reinforced with a strong brand identity and image. In terms of rivalry within the market, design enables a manufacturer to rise above competitive price wars and other profit-cutting practices.

Of course, design can also be a strategic weapon for competitors. A risk in design-led strategies is the ease of copying, if a product or service is based on an easily-replicable idea, however ingenious or original, if not robustly protected through IP rights. Many aspects of form and style are difficult to protect legally, and simply part of the pattern of trends. However, some aspects may be so inextricably associated with the original owner that if a new entrant were to imitate them they would undermine their own image. This can be achieved if a product is seen as definitive in its class: 'me-too' followers will be perceived as imitators, and so valued less by some consumers [Kim & Mauborgne 2004].

Variations in look and feel are practically limitless, so there is always a chance of a radically different newcomer entering a market without necessarily any technological differentiator. A radically distinctive design can elevate a late-comer above its established competitors, its difference all the more exciting and appealing for the sameness of its rivals.

Potential substitutes from other industries (such as, for a car manufacturer, public transport or the bicycle) are inherently different in both positive and negative ways, and the offering must set itself apart with a clear appeal, which is part of successful product performance. Although there may be many substitutes that can perform the same function, design can make the experience *feel* very different.

Supplier bargaining power is largely defined by operational and strategic factors, such as the size of the operation relative to the supplier, the degree of commodification of materials used, demand from other buyers (direct rivals or otherwise) and on partnerships, vertical integration, logistics and geography. Technological design choices can reduce dependence on particular suppliers or technologies if this force is expected to become a threat. However, there are also more human factors at play here; where there are transactions there are value judgements and personal experiences. One might argue that the supplier relationship is as important as the buyer (or customer) relationship. If so, design can make a significant contribution to understanding and influencing emotional and functional aspects of the relationship, just as with the buyer. Such a view of design, as a tool for shaping important experiences and relationships in all five of Porter's realms, is a step towards an integrated design view.

### **2.3. Within the Organisation: the Value Chain**

Porter's generic value chain describes an organisation's internal environment in terms of primary and support value activities. The value and associated cost of each are assessed with a view to maximising the former and minimising the latter [Porter 1985]. The value chain is interesting when considering an integrated design ethos; Lorenz [1994] noted

that Porter only recognised design in its technological sense, as a primary activity in ‘operations’ and ‘technology development’. This might be extended to include communication design in marketing, represented as separate activities within each of these, in “their traditionally subservient role” [Lorenz 1994] (figure 1).

[Figure 1: Design activities in “their traditionally subservient role to marketing and engineering.” after Porter and Lorenz.]

More currently, design’s greater value is seen as resulting from an integrated effort of many areas of design specialisation (graphic, interactive, industrial etc.) concerted across operations [Kotler & Rath 1984, Phatak & Chandron 1989]. A design-led view argues that design can be applied to the other activities, not just the product, to improve the quality, user satisfaction and even the image of the other value stages. Few academic papers have explicitly considered design’s place in the value chain. In one, Borja de Morzota [2003] finds design acts at three levels in the value chain, as simultaneously a differentiator, co-ordinator, and transformational process:

- By optimizing the primary activities: design action on the consumer perceived value.
- By optimizing the coordination among functions and the support activities of the firm: design as a new function in the structure that transforms the management process.
- By optimizing the external coordination of the firm in its environment: design generating a new vision of the industry. [Borja de Morzota 2003]

Understanding and creating perceived value draws on the core expertise of the designer, but quantifying it in Porter’s terms is difficult when much is in the intangible values of good and services [Kotler & Rath 1984], and for two other reasons. First, there are many essential contributions to the design process that come from non-designers and are unacknowledged. Gorb and Dumas [1987] coined the term *silent design* for “design by people who are not designers and are not aware that they are participating in design activity”, a phenomenon that can be both detrimental and beneficial [Dumas & Mintzberg 1991]. Second, the contributions of design professionals to business success are often “invisible and rarely acknowledged”, enhancing performance in “associated ‘non-design’ areas where they are not considered to have any interest, let alone competencies” – a sort of ‘silent design in reverse’ [Topalian, 2007].

So it is a tough challenge to quantify the design effort in terms of both cost and value. This challenge of ‘that which can’t be measured’ also arises in strategy itself, which we explore next.

#### **2.4. Exploring complex scenarios: Design Thinking in Strategy**

Of course there is much more to business success than meeting a demand. As Porter states, “satisfying buyer needs may be a requisite for industry profitability, but in itself is not sufficient. The crucial question is whether this value is competed away to others.” [Porter 1985, p9]. He recognises that strategy is not just a matter of optimising operations,

that is merely good management; the hard part is the trade-off, making tough choices between competing possibilities. The business leader, he says, “has to be the guardian of trade-offs. Thousands of ideas pour in every day... and 99% are inconsistent with the organization’s strategy.” [Hammonds, 2001]. Despite this acknowledgement, Porter’s models are criticised for a heavy reliance on analysis and little consideration for a rapidly changing world . Hamel and Prahalad [1989] suggest that “concepts such as strategic fit and generic strategies... often abetted the process of competitive decline”. The flaws in traditional planning approaches to strategy have long been known, according to Prof Jeanne Liedtka:

They include the attempt to make a ‘science’ of planning, with its subsequent loss of creativity; the excessive emphasis on numbers; the drive for administrative efficiency at the expense of substance; and the dominance of single techniques, inappropriately applied. Yet, decades later, strategists continue to struggle to propose clear alternatives to traditional processes.

*[Liedtka 2004]*

This is echoed by Richard Rumelt, professor of strategy at UCLA’s Anderson School of Management and an early proponent of the resource-based view. He suggests that many strategic plans are not really strategy at all, simply budget plans and market share projections for the next few years:

Calling this strategic planning creates false expectations that the exercise will somehow produce a coherent strategy...[The way to succeed is actually] to exploit some change in your environment – in technology, consumer tastes, laws, resource prices, or competitive behavior – and ride that change with quickness and skill... We create our competencies by making bets and putting the right resources in place to develop those competencies.

*[Lovallo & Mendonca 2007]*

Exploiting and riding change, making bets, and Porter’s description of trade-off – all these ring true to this author’s own experience of the design process. Just as trade-off in strategy creates the need for decision, and purposefully limits what a company offers, much of the design process is the act of commitment to one option over all others. Liedtka suggests that the “clear alternative” is elusive because the typical business leader is uncomfortable making decisions around qualitative factors, working without the metrics to justify a decision. But many of the tools and approaches of design practice are for making safer bets on the future, and the notion of applying ‘design thinking’ to strategy is gaining favour; it might be said that strategy formulation is actually *designing* an enterprise [Liedtka 2004]. Like design, “strategies create futures. That is what they are for. Futures cannot be determined by analysis alone” [Francis 2001]. Predictive tools “are all very valuable but depend on an analysis of the present. What happens if the future is not an extension of the present?” [De Bono 1992 p27].

Designers are well practised in applying creative methods to complex problems framed in real-world constraints, but neither creativity or even ‘design thinking’ rest solely in the domain of the designers. Academic institutions are increasing their interdisciplinary design/business programs – Business Week [October 15 2007] listed a ‘top-60’ of such institutions, of which 42 identified themselves as Art and/or Design schools, 11 as Business and/or Engineering. Those already in the working world are urged to master the design approach themselves, being “more widely participative, more dialogue-based, issue-rather-than-calendar-driven, conflict-using rather than conflict-avoiding, all aimed at invention and learning, rather than control... Involve more members of the organization in two-way strategic conversations... View the process as one of iteration and experimentation, and pay sequential attention to idea generation and evaluation in a way that attends first to possibilities before moving onto constraints” [Liedtka 2004].

## **2.5. Three ways design can be strategic**

It can be seen that from many of the various strategy viewpoints design can play a valuable role, with common themes emerging from this examination. Design expertise can contribute:

- in conceiving and creating high-value products;
- in building product (or brand) differentiation and customer intimacy;
- as an integrator and mediator between professional domains, both within the organisation (e.g. marketing, production) and outside (e.g. suppliers, distributors, partners);
- as a hard-to-imitate tacit knowledge resource;
- in shaping, communicating and reinforcing an organisation’s internal culture;
- in exploring uncertainty and assessing trade-off, through prototyping and visualisation;
- in stimulating creativity and providing fresh perspectives in the strategy context.

It is suggested then that design’s strategic relevance can be considered in three ways: competing by ‘high design’ can be a strategic position in itself; an integrated, coherent design approach can help implement strategic positioning; design methods (so-called ‘design thinking’) can inform strategy formulation.

### **Competing by ‘high design’ can be a strategic position**

Perhaps the most obvious and simplistic view of strategic design is using design to command a high price, usually by emphasising characteristics of luxury, performance or exclusivity, often based more on non-functional (aesthetic and

symbolic) qualities than functional ones. It is exemplified by the dreaded (often pejorative) term of ‘*designer*’ goods. While it is valid as a market stance, it should be stressed that design is about so much more. Firms that do not pursue this strategy, an SME widget maker for instance, may overlook design’s potential for their own strategic aims, thinking of it only as an expensive irrelevance. But we don’t have to look far to see firms using design to implement a strategy of cost leadership, so we widen our definition here in the second type.

### **An integrated, coherent design approach can help implement strategic positioning**

We have seen that the strategic value of design includes contributions from all design disciplines, beyond just industrial design within production. Designers can implement a firm’s strategy by creating “ideas, products and product positions for a world where people’s buying decisions are influenced by emotion, fashion and context.” [Francis 2001]. Successful design-led companies apply and integrate design values to all aspects of the business, internal and external [Design Council 2005, 2006], to really understand their customers, and forge a unique relationship with them. This applies for both ‘high design’ and cost-led brands. An integrated, holistic use of design is valuable in positioning and differentiation, and in shaping competitive forces. Communication design is an aid to learning: to capturing and communicating knowledge, shaping internal culture. Design knowledge itself is tacit: path dependent and hard to imitate, and a major contributor to successful innovation.

All these contributions are difficult to quantify, but considering this view of design as an integrator and a co-ordinator both externally and among secondary and primary functions, a revised model of the value chain is proposed here including a holistic design function as a secondary (support) activity, which spans the breadth of the operation (figure 2).

### **Design methods can inform strategy formulation**

We have seen that the tools and perspective and philosophies behind the design approach (or ‘design thinking’) are increasingly seen as valuable in *strategy making*. This may be far removed from the design activity around the offering, and may not necessarily involve trained designers.

In all three types of strategic design, the people, skills, objectives, and outcomes may vary greatly, so understanding and exploiting them may need very different approaches and a clear distinction in order to focus on specific areas. The management of an integrated design approach to implement a strategy is a fundamentally different activity from the use of design methods to inform a strategy. Since both can be far removed from the product design process itself, both may be valuable to non-manufacturing firms, and indeed non-profit organisations.

Having arrived at the concepts outlined above, the study now draws on interviews with designers and other expert professionals to explore their experiences and views on this wide topic, with particular reference to integrated design and the value chain representation.

### 3. First phase interviews

Semi-structured interviews were conducted with 17 senior professionals from 12 organisations: design service providers, firms that use design extensively in-house, and a research and advisory centre. A summary of interviewees is provided in table 1. The interviews sought to understand how design is valued at a strategic level, and the difficulties faced in integrating design strategically. The topics outlined above were raised very broadly, and interviewees were encouraged to speak widely about their experiences.

All interviews were recorded, transcribed and coded to identify common themes, concerns and recurring practices. The results were integrated with insights from literature to propose (i) a novel interpretation of the value chain reflecting the strategic role of design, and (ii) representations of three key phenomena identified from the interviews.

### 4. Key findings

There is an established consensus that strategic design requires (and is defined by) a holistic and integrated use of design. All interviewees expressed concerns about attitudes and practice, from which (with empirical and industry literature) three important themes emerged and phenomena were identified concerning design integration (or lack of it):

- **Silent design**, as defined by Gorb and Dumas: design by people who are not designers and are not aware that they are participating in design activity.
- **Partial design**: design is only used to a limited degree, such as in superficial cosmetic styling of a product, or in marketing communications.
- **Disparate design**: design activity may be widespread throughout all operations, but is not co-ordinated holistically to realise its synergistic potential.

These are described below, and represented in variations of the integrated design value chain of figure 2. For brevity only sample quotations are included.

[Figure 2: Design is an integrated support activity in the value chain, spanning all primary operations.]

#### 4.1. Silent Design

The interviewees' descriptions suggest silent design is connected to cultural awareness of the potential impact of poor design decisions, and to individuals recognising their own limits of design expertise.

“Most people who run a business can read a balance sheet. They may even be able to get their heads around contract law. But they know when they're at the limits of their knowledge, when to call in the professional. And the challenge we're facing is not enough understand [the limits of their knowledge of] design.” (E8)

Another issue is that the control and reduction of unskilled design may be traded off against de-centralised decision-making and an empowered workforce. It is also reasonable to assume a connection to the availability of design resources, though not safe to assume that availability always ensures its appropriate use. It is represented in the value chain as an erosion effect on design's support role (figure 3).

“It sticks out a mile when someone's doing it. We're always accused of being control freaks but you do need to control it very tightly. It's very good within the UK because people know who we are, respect us, understand it's not their remit. We've got some great working relationships with other departments. So, although it's political, people do understand and have an awareness of whose role it is to do the design within all areas of the company.” (C7)

[Figure 3: Silent design undermines integrated effort.]

#### 4.2. Disparate Design

Interviews suggest there may be instances where design is applied appropriately in the whole operation chain, in keeping with an ambition towards integrated design. However, this is without full co-ordination and integration with other operational areas, or indeed between these design activities. Design effort is *complete* but not *consistent*. Such a situation, termed *disparate design*, is represented as a broken bar in the value chain (figure 4).

“No one takes responsibility in Marketing, or anywhere, for actually stitching things together. Everybody is working vertically on their only little bit... and certainly not incentivised to create a holistic, horizontally flowing, wonderfully satisfying experience” (D7)

“Particularly in the world of products... the marketing people have got to interact and interface with someone from their technology departments. And that usually involves creative designers, engineers, technologists in the feasibility assessment and strategy and the definition of whatever the trade-offs are to make something feasible, exciting in terms of the marketplace and bring those together.” (B2)

[Figure 4: Disparate Design activity may be throughout all operations, but is inconsistent or not co-ordinated.]

### 4.3. Partial Design

Similarly, design may be applied in some operational areas only, although it may be used extensively and expertly in these areas. For example, a firm may use packaging and product design to a great effect, while omitting or under-utilising design in other areas, such as its advertising or web site, or workplace design. Or more seriously, it may fail to properly connect customer needs with the firm's technologies or capabilities. This may be a costly mistake, resulting in a functional product, nicely-styled but lacking any real value in the eyes of the consumer. Design effort might be *consistent* but is not *complete*. This situation we term partial design, and represent in Figure 5.

“We had a fantastic [mobile] e-mail service, that took eighteen separate web pages for anyone to register for. So no one ever did! What was the point of developing this brilliant service ?” (D7)

[Figure 5: Partial Design: design is only used to a limited degree (e.g. shown here supporting Operations and Sales)]

## 5. Second phase interviews

Since its development, the integrated design value chain diagram of figure 2 has been used in further discussions and interviews. It has proved useful as a tool of graphic elicitation [Crilly et al 2006], drawing out views in each case on the strategic role of design, on its practice and management, on the validity of the diagram itself, and providing hints for its refinement. The study is still in progress, but some indicative quotes are provided here:

### 5.1. Design's strategic role in the organisation

The interviewee was Head of Multimedia Design for a very large mobile phone handset manufacturer (M18, see Table 1). During the discussion the standard version of Porter's value chain (figure 1) was shown with brief verbal explanation from the interviewer. He quickly recognised it and related it to a model used within the firm. He was asked where design might belong on the representation, and then shown the integrated design version:

M18 (referring to figure 1): Here we call these [secondary activities] capability strategies, and these would be them here. We apply them across the whole business, and design is a capability strategy.

*Interviewer: So design would be on there too?*

M18: Yes, across here.

*I: Like this? [showing the revised version]*

M18: Exactly like that, yes. And Technology is on there as well, Human Resources we call People. So we have People, Technology, Design, Operations... there's 5 in total, I'm not sure... Anyway...

*I: There is nothing in this model that says which way the arrow goes, what the direction of the strategy is.*

M18: No, and that's why it's a capability strategy. You still need the *business* strategy to say what are you pointing this at. The capability strategy says what we believe are our core capabilities that will enable us to achieve our strate-

gic objectives. And our strategic objective is out here [points outside the diagram], so therefore the capability strategy is doing two things: it has to inform as well as support. Because it is not just a delivery strategy, because it's a capability, it means it's embedded in the core of our business, it's in the core of our being, so it does have to actually make the strategy, make what the strategy is, as well as making it happen.

We find clear affirmation of the model's validity in this case, in that design is considered a "capability strategy" that runs through the firm, informing and supporting the overall strategy.

## 5.2. Design practice and management

In another discussion, the interviewee (N19) was asked to describe the role of design, and his own as designer, during the development of an award-winning consumer product. The revised value chain diagram was introduced, which he was invited to annotate. This seemed to provide a useful and meaningful structure with which to describe the roles, influences, conflicts and strengths he felt were key to the case.

At one point, the interviewee divided the bar representing Design into three, running horizontally through the value chain:

N19: Yes, well, design has several strands. There's my input, their input [in house], and other people's input. If this strand is me, then my input is huge here [Inbound], fairly influential there [Operations], slightly influential there [Outbound], that [Marketing & Sales] would be influencing me, and I would be influencing it only a little bit. In Service I'd only have a tiny bit of discussion, like, "this part keeps breaking" or "we can't get them to press this button at the correct time, it's a design fault". All that. So that's my design activity.

In the course of the interview many notes, lines and arrows were added to embellish the picture and assist in the verbal descriptions:

N19: *This* is the engine room and *this* is the captain. But these will also be putting the net wider, sharing the brand to... [draws a wide loop outside the diagram] these would be trade shows and contacts which will eventually get converted into buyers.

The sketch resulting at the end of the discussion, although messy and hard to read (figure 6), provides a useful record of the discussion when read with the interview transcript.

[Figure 6: Integrated Design model after use in graphic elicitation interview.]

## 6. Conclusions

It might be claimed that an integrated design approach is desirable for the competitive advantage it brings, yet there are myriad factors which impede or diminish the effective strategic exploitation of design. It is hoped then that the

terms and representations proposed here provide meaningful and useful descriptive distinctions, as well as a foundation for the next phase of this study.

### **6.1. Next steps: towards an intervention tool**

Discussions around the novel re-interpretation of Porter's value chain demonstrate the difficulties faced in successfully managing design at a strategic level, but also elicit useful insights into design's role.

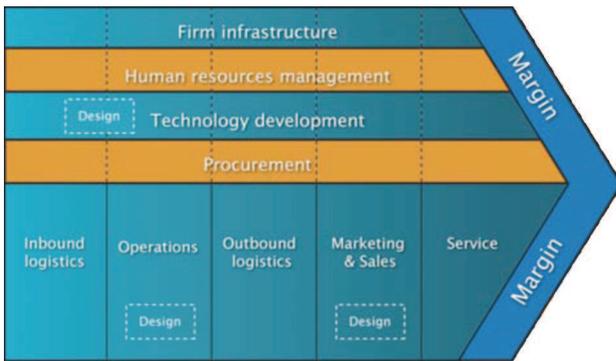
The findings presented here are part of a larger endeavour, seeking to develop an intervention tool with which organisations may assess their level of design integration. The background research, the diagrams arising from it, and others not presented here have all informed the development of a tool currently under trial. This involves gathering evidence of designed artefacts around the organisation in the form of photos, sketches, written notes, printed output or the artefacts themselves. These records are then mapped to the internal value chain and to other representations of design within and outside the organisation. It is hoped that the resulting picture, while neither quantitative, objective nor comprehensive, provides a meaningful and useful aid to understanding and deploying design expertise. Trials so far are encouraging, and further details will be published separately.

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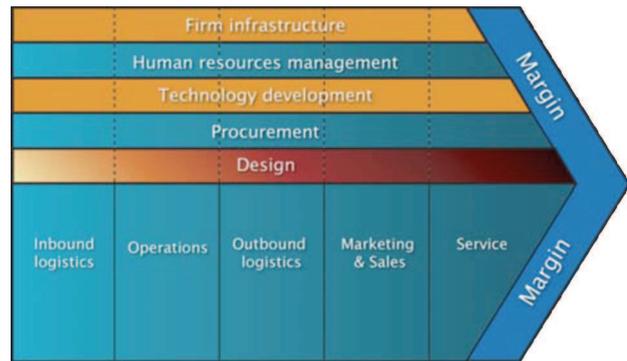
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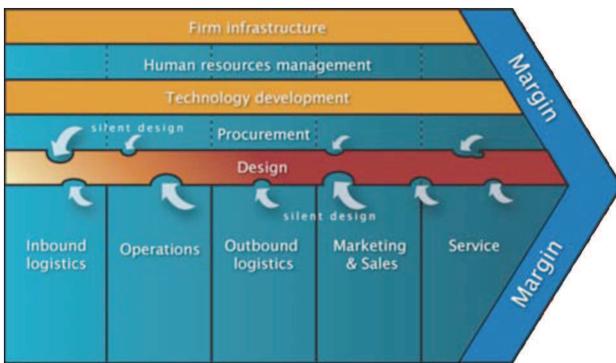
## 8. Appendix



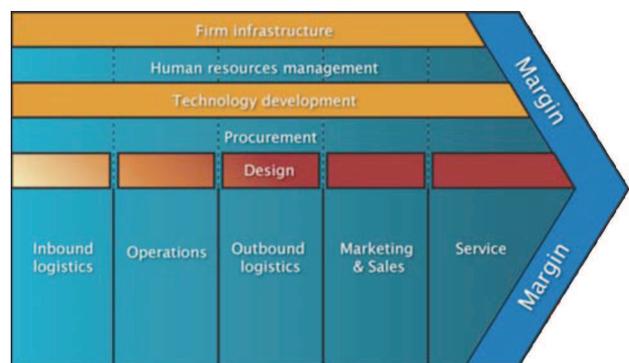
**Figure 1: Design activities in “their traditionally subservient role to marketing and engineering.”**



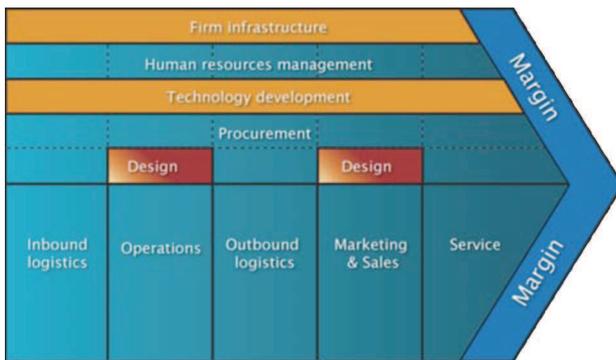
**Figure 2: Design is an integrated support activity in the value chain, spanning all primary operations.**



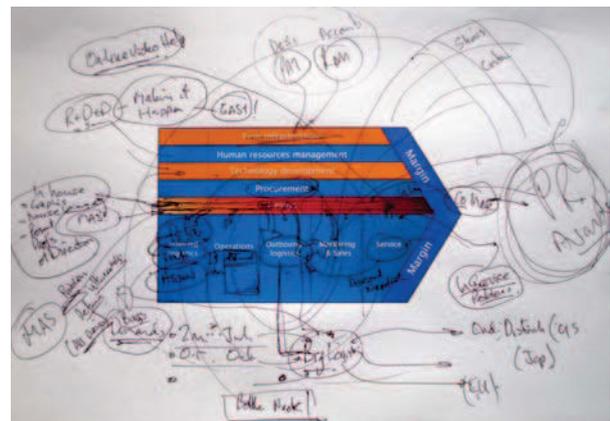
**Figure 3: Silent design undermines integrated effort.**



**Figure 4: Disparate Design activity may be throughout all operations, but is inconsistent or not co-ordinated.**



**Figure 5: Partial Design: design is only used to a limited degree (e.g. shown here supporting Operations and Sales)**



**Figure 6: Integrated Design model used in graphic elicitation.**

Firm / Organisation		Respondent / Position	
A	Product design and development consultancy (US & Europe)	1	Marketing and Strategy Director
B	London product design and development consultancy	2	Director of Product Strategy
		3	Business development manager
		4	Senior partner
C	Inter-continental airline company	5	Head of Design
		6	Deputy Head of Design
D	Europe-wide wireless, mobile and broadband operator	7	Director of Product Experience (mobile operations)
E	Publicly-funded design research and advisory centre.	8	Deputy Chief Executive
		9	Programme Development Manager
		10	Design mentor / associate
F	Product design and development consultancy (<10 employees)	11	Designer / senior partner
G	Global phone & electronics manufacturer.	12	Head of Consumer Experience Design (mobile devices, Europe)
H	Multinational architecture, engineering and design practice	13	Senior architect
I	Freelance	14	Self-employed product design engineer of 12 years
J	Design strategy consultancy	15	Director (designer and strategist). Former director of Design and Innovation at design research and advisory centre (E)
K	Design & innovation strategy consultancy	16	Director
L	Internal Communications consultancy	17	Communications consultant
M	Global mobile phone manufacturer	18	Head of Multimedia Design
N	Freelance commissioned to design domestic electrical product, winner of IDEA Gold Award 2007 (consumer products)	19	Self-employed product designer / engineer,

**Table 1: Participant firms and respondents**

