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Design and the Art of Management  
THEMED ISSUE

THE DENVER BIENNIAL  
OF THE AMERICAS  
Bruce Mau

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Bauer and Eagen

DANCE AND ORGANIZATIONAL LEARNING  
Rowe and Smart

BUILDING DESIGN CAPABILITY  
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THE ARTIST ENTREPRENEUR  
Fletcher

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# Aesthesis:

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# Design and the Art of Management — *themed issue*

Ken Friedman, Laurene Vaughan and Jonathan Vickery

The editors of *Aesthesis* have been thinking of new approaches to 'the art of management' – or perhaps thinking about new ways to approach old problems. It seemed natural for us to think of design and design thinking as central to this intellectual endeavour – design is the process by which designated problem-solvers address the problems of legitimate stakeholders using innovation and creativity. But design is more than just problem solving. Design engages the sensibility, and designed artefacts take their shape in terms of feeling and form as well as function. The papers submitted for this issue on design, management, and organization covered all those areas and more.

In different shapes and guises, the articles in this issue all merge on the subject of 'design thinking', whether looking at 'tools', processes, experience or interactions. In terms of subject matter, the term 'design' in this issue emerges as a dynamic element of investigation into organizational learning, collaborative networks, product development, organizational resource management, service capability development, strategic urban planning, organizational creativity, contemporary art, and the conceptual-philosophical content of the epistemic functions of design that give us frameworks to think, create, assess, analyse and evaluate. Design always involves three great questions. How do we make things? How do we make things work? How do we make things work better?

Nobel Laureate Herbert Simon (1982: 129) defines design as the process by which we '[de]vise' courses of action aimed at changing existing situations into preferred ones.' Creating something new or reshaping something that exists for a purpose, meeting a need, and solving a problem, are courses of action toward a preferred situation even though we may not yet be able to articulate this preferred situation. This definition therefore covers most forms of design.

Design is not necessarily an outcome, but rather a process. The verb 'design' describes a process of thought and planning, and this verb takes precedence over all other meanings. The word 'design' had a place in the English language by the 1500s; its first written citation dates from the year 1548. Merriam-Webster (1993: 343) defines the verb design as 'to conceive and plan out in the mind; to have as a specific purpose; to devise for a specific function or end'. Related to these definitions is the act of drawing, with an emphasis on the nature of the drawing as a plan or map, as well as 'to draw plans for; to create, fashion, execute or construct according to plan'.

The American architect and designer Buckminster Fuller (1981: 229-231) describes design as the difference between a 'class-one evolution' and 'class-two evolution'. Class-one evolution is natural evolution according to Darwin, the natural phenomena studied through evolutionary biology. Class-two evolution involves 'all those events that seem to be resultant upon human initiative-taking or political reforms that adjust to the change wrought by the progressive introduction of environment-altering artifacts' (Fuller 1981: 229). Design is both intrinsic and essential to human development in a fundamental sense, but also creates artefacts that change the very context of that development.

One argument for the importance of design is the increasing number of areas now subject to human initiative. The vast range of technologies that surround us mediate most of the human world and influence our daily lives. These include the artifacts of information technology, mass media, telecommunication, chemistry, pharmacology, chemical engineering, and mechanical engineering, along with the designed processes of nearly every service industry and public good now available other than public access to nature. Within the next few years, these areas will come to include the artifacts of biotechnology, nanotechnology, and the new hybrid technologies.

Fuller's metaphor of 'the critical path', which was the title of his last book (1983), articulated a scenario where our world is as much subject to disintegration as it is development or growing better. The way that the new artificial world affects the natural world has immense ramifications that parallel Fuller's idea of class-two evolution. This is what Victor Margolin (2002) called 'the politics of the artificial', where design has become so intrinsic to our environmental development that we need seriously to assess its power, and create new boundaries, ethics and agreed protocols.

Design plays a role in the evolution of an increasingly manufactured world, from ordinary objects to advanced technology. The design process takes on new meaning as designers take on increasingly important tasks. These tasks are important not because designers are more visible and prestigious, but because design has greater effects and wider scope than ever before. Despite this scope and scale, however, robust design solutions are always based on and embedded in specific problems. In Jens Bernsen's (1986) memorable phrase, the problem comes first in design. Each problem implies partially new solutions located in a specific context. The continual interaction of design problems and design solutions

generates the problematics and knowledge of the field.

Design as an activity translates utilitarian, symbolic, and psychological needs into functions; it translates needs and wants into ideas; and it translates these ideas into the structural descriptions and entities to produce required functions that satisfy needs. As such, design always serves strategic goals on some level, large or small. The different forms of professional design practice require a process incorporating the strategic and managerial aspects of design as well as the hands-on developmental application of design. These move from thinking, research, and planning at one end of the process, on to manufacture, assembly, packaging, and presentation at the other.

For business firms, design is a comprehensive part of an integrated process that links selecting challenges and solving problems to developing products and marketing them successfully. For business firms, design is a comprehensive part of an integrated process that links selecting challenges and solving problems to developing products and marketing them successfully. The immaterial forms of design process have long been hidden, and now we are in the midst of a transition. Getting from one point to the next in this complex map of process, project, and product requires 'design thinking'. Design is in the business literature and designers are being brought in to organizations as they seek new ways of being, working, and producing. It is an exciting time of evolution. The literature on design thinking and the role and contribution of design to the fields of organizational and business development is expanding – and this issue of *Aesthesis* is part of this process.

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# MANAGING INTERACTION DESIGN AND BUSINESS INNOVATION:

Understanding interaction design as a key activity of the operating core

Stefan Holmlid

Design management systems in traditional product and service industries have developed over an extended period of time (Felber 1984; Sebastian 2005). Typically these assume a product development process where value is created in a linear manner and production is separated from design. For the software and system development industries, where digital interaction design is the predominant design discipline (Löwgren & Stolterman 2005) few studies have been done on design management. Studies on design management issues for digital interaction design have, for example, identified problems for interaction designers to find a stronghold in organizations (Carlshamre and Rantzer 2000), or characteristics of the software development context that is distinct for management of interaction design (Holmlid 2006). As their point of departure these studies have taken organizations that develop IT-systems. As a contrast, in this paper, we expand on the current literature by analyzing two studies of design management in an organization that uses software as part of their business process. We claim that for such organizations, design management of digital interaction design primarily is a concern for the operating core and the strategic apex, thus driving and directing the efforts made by support staff and technostructure.

Design management systems in traditional product and service industries have developed over an extended period of time. In the central literature a product development process, adhering to a traditional value-chain perspective is assumed (Gorb 1990; Svengren, 1995; Ulrich and Eppinger 2003; Bruce and Bessant 2002; Bruce and Jevnaker 1998). In the product development processes based on such a perspective, production and reproduction essentially is separated from design.

Design, in the sense used here, refers to the work done by product designers, industrial designers, etc., that is, a user or human-centered strategy where the experiences of the user is expressed through sketches and models, in a process where the user is involved as an agent for sense-making.

Design theorist Buchanan (2001) defined a set of design orders that allows designers to move their attention between different design objects. These design objects range from symbols, over things and actions, to thoughts. The assumed corresponding design disciplines are graphic design, industrial design, interaction design and environment design. This can be described as a layered model, similar to those that can be found in Swedish design theory (Paulsson and Paulsson

1957; Hård af Segerstad 1957).

As argued elsewhere (Holmlid 2007, Holmlid 2009a; Holmlid 2009b) Buchanan's framework makes it necessary to sometimes distinguish between different kinds of interaction design. In this paper we will mainly deal with *digital interaction design*.

Digital interaction design has been the predominant design discipline within the software and system development industries for the last few decades and is still growing (Löwgren and Stolterman 2005; Winograd, 1996). The research area is multi-disciplinary, and there is a great deal of research being undertaken. Some of these areas are as follows:

- >> *Characterization of the designed object* (Löwgren 2007a; Löwgren and Stolterman 2005; Edeholt and Löwgren 2003).
- >> *Design philosophies, such as cooperative design, participatory design, user-centered design and contextual design* (see e.g. Winograd 1996; Ehn and Löwgren 1997; Bannon Bødker 1991)
- >> *Different design techniques and expressions* (Arvola and Artman 2007; Löwgren 2007b, Sanders and William 2001).
- >> *Operative design methods* (Löwgren and Stolterman 2005; Gaver, Dunne and Pacenti 1999; Mattelmäki 2005; Sökjer 2007; Wenttzel and Holmlid 2009).
- >> *Studies on designing for use as opposed to designing technology* (Löwgren and Stolterman 2005; Hallnäs and Redström 2002)
- >> *Acquisition of usable systems* (Markensten and Artman 2004; Holmlid and Artman 2003; Markensten 2005; Holmlid 2005)

The few studies concerning design management issues for digital interaction design primarily have concentrated on design management in organizations developing software, such as software companies, consultancies etc.

Carlshamre and Rantzer (2000), in a case with a leading telecom software company, describe the efforts made and the obstacles of establishing interaction design in an organization. Such cases relate to the texts on return-on-investment for specific design issues, such as usability (Bias and Mayhew 2008). In a study by Holmlid (2006) characteristics of the software development context that is distinct for management of interaction design was identified. The three cases in Holmlid (2006) are all taken from a software industry, developing and selling systems as if they were products, in a business to business model.

In contrast to these development organizations, there is a large amount of organizations that uses software as part of their business process, either backstage, or as part of their service interface directly with clients. Some of the software is developed by other companies, and some of it can be developed by an IT-department. But, studies on design management of digital interaction design for such organizations are missing, and in this paper we provide one such study based on two cases.

## BACKGROUND

For the benefit of the analysis of the cases we use two analytic tools for discussing the management of design, Mintzberg's configuration of organizations (Mintzberg, 1980) and Svengren's two arenas (Svengren, 1995).

### Configuring organizations

Mintzberg (1980) proposes that an organization can be described through five components: the strategic apex, the technostructure, an operational core, the supporting staff, and the middle line. Briefly these can be described as;

- >> *The operating core*: the basic work of producing products and/or providing services;
- >> *The strategic apex*: the top-management of the organization;
- >> *The middle line*: managers who have a direct line relationship between the top-management and the operating core;
- >> *The technostructure*: analysts who plan and control work processes and outputs in the organization;
- >> *The support staff*: specialists who provide support to the organization as internal services.

Mintzberg claims that there are consistent and re-occurring compositions of these components that are referred to as *configurations*. Some of the typical configurations Mintzberg identifies are

- >> *The simple structure*: strategic apex has a key role and there is both horizontal and vertical centralization.
- >> *The machine bureaucracy*: standardization of work procedures is a central issue; the techno-structure has a key position and vertical centralization is weak.
- >> *The professional organization*: standardization of skills is a central issue; the operating core has a key position and there is a high degree of horizontal and vertical standardization.

Dumas and Mintzberg (1989) point out five strategies to integrate design into an organization. In some cases the identified strategies are viewed as stages an organization goes through in order to become more design mature. The five strategies are; design

champion, design policy, design program, design function and infused design. This structure is well-known within, for example, the usability engineering community (see e.g. Carlshamre and Rantzer 2000), where usability has been viewed as a method or technology that needs to be diffused into an organization. One figure of thought behind these models is that there is a stepwise progression that goes from individuals to institutionalization in an organization. It follows that in each stage there are drivers that maintain a certain strategy, and that there are key activities that might change the strategy. An example of that is when an organization decides to establish a usability lab. A usability lab is a physical facility, with specialized equipment that can be showcased. It needs infrastructural funding as well as funding for its usage. In studies of management of service design in organizations (Junginger 2006), similar models and ways of reasoning are currently seen, where design thinking rather than design methods become integrated into an organization.

### Managing design

Svengren (1992, 1995), identifies two arenas on which design management operates. Her results are based mainly on

**Table 1. Summary of research focus of different design management studies**

Design Order	Design Discipline	Value created through development of product/system/service	Value created through use/utilization of product /system /service
Things	Product Design	Gorb, 1987, 1990 Svengren, 1992, 1995 Bruce and Jevnaker, 1998 Felber, 1984 Lawrence, 1987 Jevnaker, 1998 Bruce and Morris, 1998 Sebastian, 2005 Junginger, 2007	
Inter-action	Digital Interaction Design	Carlshamre and Rantzer, 2000 Holmlid, 2006	
	Service Design	Holmlid, 2005 Holmlid, 2008 Sangiorgi and Clark, 2004 Kimbell, 2008	Morelli and Sangiorgi, 2006 Holmlid, 2009b

experiences from organizations developing products and systems. The two arenas identified are:

>> *The strategic arena*: comprising corporate identity and design policy,

>> *The operational arena*: comprising project management and design work.

This view is supported by e.g. Felber (1984), and Lawrence (1987). Felber (1984) differentiates between businesses with uncoordinated areas of design work and strategically coordinated design work. In the uncoordinated case design work is typically the responsibility of its specific organizational function, such as product design being the responsibility of a research and development function, design of communication being the responsibility of the marketing function, etc.

Lawrence (1987) identifies functional design management and strategic design management, which resembles Svengren's two arenas. A similar way of describing design management is held forward by Gorb (1987 1990), where he identifies several different meanings of design management, and one definition: '...the effective deployment by line managers of the design resources available to an organization in the pursuance of its corporate objectives. It is therefore directly concerned with the organizational place of design, with the identification of specific design disciplines which are relevant to the resolution of key management issues, and with the training of managers to use design effectively' (Gorb 1990: 2).

Sebastian (2005), not wholly unrelated, states that there are three design management approaches: *managing the product, managing the process and managing the organization*. In the same article, he is critical towards these, and suggests that design management should focus on 'managing the creative cognition through the dynamics of a design team' (Sebastian 2005: 92), and that perspectives from cognitive science should become central to design management. Other authors highlight design as an organizational capability (Jevnaker 1998; Bruce & Morris 1998)

Moreover, Svengren (1995) concludes that, for companies developing goods, three integrative processes are important to understand the drivers of the development of design as a strategic resource; functional integration, visual integration and conceptual integration.

## METHOD

The study follows a qualitative case study approach (Creswell 2007; Stake 1995; Yin 2003), and the two cases

used here make clearly identifiable and bounded cases.

The empirical material was collected from multiple sources over a period of two years. The researchers acted as participant observers. Below there is a short summary list of the sources of data material utilized.

>> *Audio recordings* of and field notes from interviews; interviews were performed with managers, IT-developers, business process analysts, and designers.

>> *Video recordings* of and field notes from design workshops; workshops were performed with business developers and designers in case two.

>> *Field notes* from project meetings; the researchers participated in meetings throughout the project processes.

>> *Project documentation*: The researchers were given access to documentation of the project work and the project progress.

>> *Project participant notes*: Selected project participants were given the opportunity to provide their notes from meetings and daily operations.

The analysis of the data material was based on the theories introduced above with key terms analyzed for each of the two cases. Qualitative analysis and categorization was based primarily on field notes from interviews and meetings. The other sources of data were used as a means of deepening understanding, verifying or nullifying statements, and to direct continued data-collection.

The choice of government agencies that also have internal development of IT as a common practice, allow us to focus the analysis on specific issues of design management. Some issues that under other contextual premises would have been important to discuss are here fixated. One of these is business strategy. The agencies have no competitors for the specific cases here. They have no external pressure or incentives to reposition themselves on a market, or question whether the activities they are doing are needed. As the internal IT-department is the only system developer that is allowed, management issues will concern internal affairs and prioritizations rather than choosing between developers. We are mainly interested in how design is managed, and thus the action space for design. We will not be judging the quality of the output of the development process, but direct our attention towards how design is managed and the action space given to design.

### Case study background

Two cases will be used to support our claims. They are collected from a government agency where the IT-department is the main actor developing software for the organization.

Swedish government agencies are transforming from a visit- and form-based business to a 24/7 oriented business partially based on moving into an internet based service model. One of the drivers of this transformation has been the introduction of self-services and computer mediated services. Another transformation, concerning some government agencies, is the requirement that they should clearly distinguish between the procuring organization and the system developing organization, in terms of resources as well as governance. This transformation is sometimes used as a driving force to redefine processes, project governance, and the positioning of roles and activities.

In case one a traditional development model is used, where all departments that would be part of the project are part of the project from the beginning. The project-management structure is normally fairly linear, in a pre-planning manner. Milestones and tollgates are used as the primary generator of documented results, and the progression towards a finished product. A large project is managed by a project manager who is responsible for the whole project, and to divide the project into sub-projects to achieve partial results.

In the second case a three-stage development model is utilized, called the program model. The adoption of this project-management model is part of the wider change process towards clearer delineation between procuring and development organizations. During the first stage of the model the organizational prerequisites for system development are established, as well as the organizational change that is needed. In the second stage the procured system is developed. The third stage is an implementation stage. The three stages in the model are co-ordinated by the program management. The responsibility for the first stage, in the organization of the cases, lies with the business-department. The IT-department is responsible for the second stage.

In the first case presented here the digital interaction designers were part of the IT-department, and in the second case the digital interaction designers were part of one of the operative departments. The case descriptions are held short and informative, and end on the borderline in the development process between system specification and system development.



## CASE ONE

The agency is responsible for the population registration system, and there had been a decision to develop a new system. Top management decided, based on recommendations from earlier work together with another research team, that the system development process should be set up as a role model of user-centered design for the organization. The interaction designers, being a part of the IT-department, were given an important role and were allowed to define how the system development process should be structured. Initially the results were a school example of user-centered design, with development of scenarios, prototypes, personas etc, to specify what the system should be capable of doing and how the users would like to interact with it. The digital interaction designers, as well as the user from the operating core participating in the development process, were satisfied and were anticipating a well-designed and usable system.

Before this work had been completed the Swedish government issued a policy stating that all government agencies should strive for delivering their services on a 24h basis, the so called 24h government directive. As this directive was issued, the top management of the agency sought

advice from experts in the organization. The idea of providing services to clients on a 24 hour basis was closely connected to self-services with internet as service channel.

Expert advice was sought from technology experts in the IT-department. Based on their analysis, there was issued an internal policy stating that in accordance with the 24hour government directive, the agency should change technology base to web-based technology. The directive, in effect, was understood to influence self-service systems as well as internal systems (such as the population registration system). This was not stated explicitly in the directive, but there was nothing in the directive that gave direction as to whether it was valid for only parts of the system portfolio.

After the policy was issued by top-management, the technology developers of the IT-department dismissed the work by the interaction designers, stating that it was not possible to develop the system specified through the user-centered process, with the new technology. The technology experts were successful in their efforts, and the work performed by the interaction designers was dismissed and was ended prematurely.

## CASE TWO

The agency is responsible for a social support process handling debt relief processes for citizens that cannot deal with it themselves. Due to a new government directive the agency were to take a wider responsibility for the process, adding some of the actions earlier performed by a court to the agency process. To be able to do this the business processes had to be changed and a new system developed, with, for example, more complex demands on privacy and security issues.

The line-manager responsible for reviewing and developing the business processes had an interaction designer employed, and together with the designer the manager decided to involve interaction designers in the business process development scheme. In the development of the business processes, professionals working with debt relief managed the development process and participated as experts on debt relief case handling.

Throughout the development of the revised business processes, the process developers and the interaction designers worked together with interviews, process mapping, scenarios, personas, prototypes, etc.

<b>Table 2: Key term analysis</b>			
The following descriptive analysis of the cases is based on key terms from the theoretical background			
<b>Source</b>	<b>Term</b>	<b>Case One</b>	<b>Case Two</b>
Lawrence (1987)	Place of design	IT department, technostructure	Business, operating core
	Identify design disciplines	First digital interaction design then software engineering design	Business process design and digital interaction design
	Training of managers	No	No
Felber (1984)	Uncoordinated	Yes	No
	Strategic	No	Yes
Sebastian (2005)	Product	When the software engineering designers received initiative	Yes, but only on a conceptual level
	Process	At first usage process was considered, but later abandoned	Yes
	Organization	No	Yes
	Team dynamic	Not in a positive sense	Yes



The main outcome, regarding the IT-system, of the process was a system acquisition specification following closely the suggestions made by Markensten (2005), comprising a section describing what the system should do, and a section on how the system should be used to do that. In short, this meant that the specification consisted of a tested prototype, a set of user-interface descriptions, a set of personas, scenarios, as well as a traditional text-based section.

When this specification was received by the IT-department, who were supposed to develop the system, the immediate response was that it did not conform to the standards for specifications that they had set up. This caused some friction, but the IT-department decided that they initially had to transform, or interpret, the specification into a format that they were accustomed to working with. This delayed the start of the actual system development. During this period the IT-department came to appreciate the initial specification that was given to them.

## DISCUSSION

### Strategic direction and design

In case one, it is a fact that the digital interaction designers were not part of the operating core or the strategic apex. The place of design is with the IT-department, which is part of the technostructure. Based on Felber (1984) this would be interpreted as uncoordinated design.

This position seem to have made it easier for conflicting views within the technostructure to influence strategic decision making, without revealing the actual conflict. In the end this will have impact on how the system would fit with business processes. Top management were handling these issues as several parallel strategic decisions, using the IT-competence from the IT-department as experts for one of them, and the designers for the other. They seem not to have identified that this parallel decision making was nullifying an earlier strategic decision, the one concerning user-centered design. The fact that the technology decision seemed to be an issue of technology, and the user-centered design decision seemed to be a non-technology issue, possibly occluded that they were inter-connected for management.

In the end, both decisions concerned the IT-department, and the issue of resolving the conflict between these became an internal affair for the IT-department. That is, implicitly the two areas of work were viewed as being issues concerning system development, thus being part of the operational arena of the IT-department. Furthermore, the interaction design work was defined as not specifically being part of the strategic arena, nor as being part of the operational arena of the core business process, registering the population.

In the second case, on the other hand, it seems to be precisely because the digital interaction designers are part of the operating core, that both the abilities of the technostructure and the strategic decisions are directed towards developing a system aligned with the changes in the business process. It is important that the interaction designers receive confident and informed support by the middle-line, through the department manager. This creates action space for top-management, because they have line-managers that are trained in identifying needed design disciplines and using designers. The interaction design work of the system is in this case construed as being an issue of corporate identity, and less an issue of technology, and thus more of a strategic design setup.

If, in case one, the user-centered design decision and the technology decision had been issues for separate components of the organization, the conflict between them would have had to be resolved in another way; either as a new top management decision, or as a consequence of defined structures and configurations of decision making between different components of the organization. Given the change process applied, where the IT-department is involved from the very beginning, the management structure had not introduced any such possibilities outside a project structure.

A fair amount of research on digital interaction design focuses on usage instead of technology, and when combined with organizational theory, such as Mintzberg's, design of these interactions then becomes a matter of how business processes are carried out. The design of these actions and interactions, as they work within meaningful events and contexts, may therefore be taken as a starting point when developing a business processes.

### Design and drivers of innovation

In case one, management at first defines the designers to have the initiative of directing innovation work, already at the start of the change process. Given the user-centered working practice, involving users in defining and designing technology, the

designers created action space for innovation. In essence, it allowed for business development and business innovation to drive innovation of technology.

With the new directives interpreted as self-service technology through the internet, the innovation initiative was shifted to technology development. At that time, from the perspective of the IT-department the requirements on the IT-development, as defined by the user-centered process, were non-feasible. This resulted in a decision to allow the IT-department to drive and direct innovation work.

The possibilities known and maintained by the IT-department were projected onto the possibilities of business process development, constraining the fulfillment of needs of the operating core. The effect was that the innovation of the business was restricted by technology limitations.

In the second case the business process developers and the designers together directed the development of business and technology usage, in turn driving the need for technology development and innovation. Here, based on the three-stage project model, the initiative could not be shifted to the IT-department at the outset of the project, because they would only later be a part of the project. The capabilities of business and business development combined with the needs for performance of the operating core, expressed through means of design, were used as a directive force on technology innovation.

That is, it is important who is given the mandate to initiate and direct innovation work, in the construction of what kind of organization one wants to achieve: technology driven or business oriented. In the end, the distinction between these two has to deal with whether the organization is perceived as being driven by its technostructure or being a customer-oriented organization.

By utilizing design competencies and design processes as part of understanding and developing the operating core the customer perspective is taken into account as a primary source for creating and envisioning the possible futures of the organization. From an organizational point of view this provides possibilities to embrace user-driven innovation for business development.

Another aspect of innovation emanating in the cases is the objects that become part of innovation processes. In case one, innovation mainly has to deal with information technology and the technostructure. That is, from the business perspective and the customers point of view, there is little room for innovation in customer relations,

business processes etc. In the second case, innovation can be performed from the basis of the operating-core and strategic values, involving customers, technology users inside and outside of the organization, as well as other stakeholders in the innovation process, in order to understand, define and enable the co-creation of the different values that these stakeholders have. After that, and only then, the innovation process starts from the perspective of the technostructure.

#### Technology usage and the operating core

In the second case, the digital interaction designers were collaborating with the business process developers in a multi-disciplinary team. This gave the process developers a possibility to, at an early stage, refrain from assuming how the technology support should act, and gave them a tool to express how they wanted the technology support to behave for specific scenarios and personas. It also provided the process developers with a powerful expression of their view of the technology support, as a link between the process descriptions and a more formal requirements specification. In that sense, the operating core took a tighter grip on its support structure, and required that technostructure was developed to support that. An example of the opposite is case one, where the digital interaction design and the technology requirements are seen as competitive descriptions, instead of complementary. This actually works as to deconstruct a possible team. In the second case, the three-stage project structure provides a sequential structure and a progression for digital interaction design and system development; the system is developed based on the digital interaction design, and not the other way around.

A traditional requirements specification is primarily written as a technical specification, used as a goal document, and as a means of tracking how the system development project performs. It works as a way of framing the operational arena for a system development project. In the cases described here it works as a guiding document for the IT-department (part of the technostructure). Traditionally these documents are words, tables and diagrams only, written in a language of technology developers. As a consequence, the language of a business process developer is not used in these specifications. In the second case this is evident from the fact that the IT-department wanted to transform the specification into their own language. In case one, on the other hand, there is a conflict between different ways of expressing the requirements.

So, in one sense, the work of the digital interaction designers provided a platform where the business process developers and the technology developers could discuss and act together towards a common vision, through the scenarios, prototypes and personas. Based on these descriptions, requirement specification for usable and useful systems effectively can be produced, managed and monitored. In that sense the digital interaction design became part of the strategic arena, as part of a design policy of the organization. For the business developers it meant that they expressed their requirements clearly in terms of technology usage to the IT-department.

#### CONCLUSION

In this paper we have expanded on current literature on design management of digital interaction design. Current literature mainly is concerned with various organizations *developing* software for other organizations. We have focused on an organization that uses software as an integral part of its business process, by analyzing two interaction design studies from a design management perspective.

We conclude that for such organizations, design management of digital interaction design primarily is a concern for the operating core and the strategic apex, thus driving and directing the efforts made by support staff and technostructure.

>> *By managing design as a strategic issue* for the operating core, innovation of the business can be based on strategies and value creation of the operating core, driving the development and innovation of the technostructure.

>> *Process and business developers* that work with interaction designers will benefit by having the imagined future business process also expressed in terms of technology usage, through scenarios, storyboards and prototypes. From these descriptions technology requirement specification for usable and useful systems effectively can be produced, managed and monitored.

>> *Such design-based specifications* raises the lowest acceptable bound for interaction design work in the development organization, and increases the meaningful action space for the detailed digital interaction design in the development organization.

>> *Because usage of technology* links the business process and its technology support, interaction design, in this type of organization, is a matter of how business processes are carried out, and not a matter of information technology engineering and design.

Consequently the management of digital interaction design has to emanate operationally from the process owners and the operating core, and strategically from the business development and from strategies on value creation/actualisation. //

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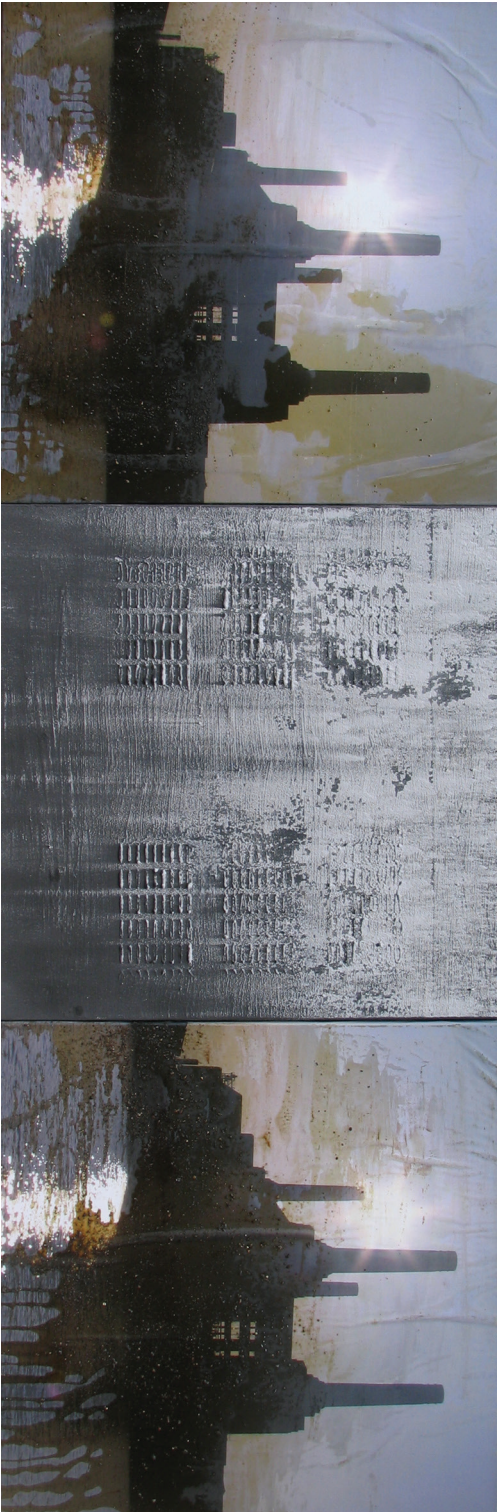
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