On Managing Innovative Design Projects Methodologically: The Case of Framing

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Keywords: Management of Innovative Design, Design Methods, Framing

In this contribution I present a challenge that innovation by design thinking poses to its management, and describe an approach to take it up. The challenge is that advocates of design thinking are critical to managing design projects by upfront defined targets, claiming that it blocks innovation. The approach to take it up is to manage design projects by means of the steps that are discerned in methods of design thinking. For this alternative management the methodological steps of design thinking should be described in a SMART manner, which is explored for the design technique of framing.

INTRODUCTION

Design thinking is currently embraced as a new and general means for innovation in industry and society. The methods of design thinking developed at, e.g., the Design School at Stanford and Potsdam (e.g., Plattner et al. 2009; D.School 2011), IDEO (Brown 2009) and Philips Design (Gardien 2006) are presented as successful in innovative product development and as having the potential to also innovate policies in business (Verganti 2009) and for addressing societal issues (Brown and Wyatt 2010). These promises of design thinking come however with a managerial catch. The advocates of design thinking are critical to existing management practices: designers require a rather free hand for arriving at innovation, and the pre-set targets of project management and the fixed time-windows part of return-of-investment criteria are taken to be limiting that free hand. This criticism challenges the usage of design thinking in industry and society, and the challenge is for both parties: when design thinking is to amount to projects without clear targets and without clear endings, designers need other means to convince their new clients of the feasibility of the projects they present, and these clients in turn need alternative means to managing the design projects they commission.

In this contribution the managerial challenge of design thinking is taken up. I argue that if the methods of design thinking are made more explicit by specifying their methodological steps

in a SMART manner, then design thinking projects can be presented and managed by their methods without blocking innovation with pre-set targets or fixed time-windows.

This contribution is primarily a theoretical one and may be taken as a position paper. The proposed approach toward the managerial challenge of design thinking is made plausibility by argument; empirical evidence is not provided, but the potential of the solution is illustrated by detailing what it implies for the design technique of framing, which is a methodological step part of many design methods for design thinking. An earlier version of the argument has been given in (Vermaas 2012); this contribution gives content by its application to framing.

I start by briefly describing the methods of design thinking and the criticism of existing management tools. Then the argument is given to manage design thinking project by means of their methods. Finally I consider what the proposed approach means for framing.

METHODS FOR INNOVATIVE DESIGN THINKING

There are various methods for innovation by design thinking, similar to that there are various methods for engineering design. A more well-known design thinking method is the one associated with the Stanford and Potsdam Design School and with IDEO, as described with different nuances in the literature (e.g., Brown 2009; Plattner et al. 2009; D.School 2011). In the version of (Plattner et al. 2009) it is a linear sequence of six steps, as depicted in Figure 1. The linearity allows for iterations, and in design projects there may be many. For instance, in the first 'understand' step in which the initial problem as formulated by a client is analysed, and in the subsequent 'observe' step that includes ethnographic studies and interviews with prospective users, the designers concerned may decide that the problem is still not well understood, leading one step back to the ‘understand’ step.

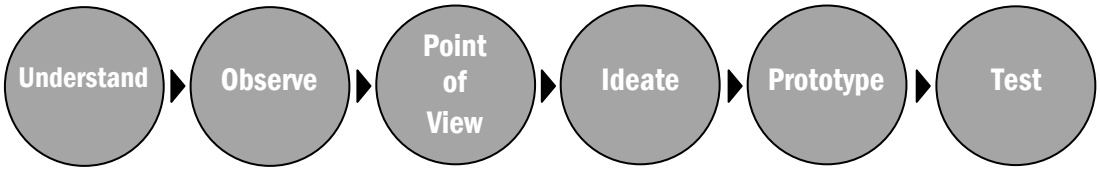

Figure 1: the Design School method in the version of (Plattner et al. 2009)

Another example of a design thinking method is one aimed at modelling how innovative design projects take place at Philips Design (Gardien 2006). It divides these projects in nine steps ordered in a matrix (see Figure 2), where the columns indicate the length of the time perspective - its horizon - considered in a project, and the rows the target to be achieved. Horizon 3 brings together steps with the longer-term perspective of firms to define new options for their business, horizon 2 collect steps with the mid-term perspective of building emerging business, and horizon 1 contains the firms' immediate tasks to maintain their

current core business. The target of steps on row 3 are to identify a value for users, steps on row 2 are about developing a value, and steps on row 1 involve communicating the value to users. A design project can take different trajectories through the methodological matrix. It can, for instance, start by identifying new values through analysing cultural trends (row 3, column 1), then test a value by design probes (row 2, column 1) and design products in collaboration with partners (row 2, column 2), and end in incremental improvements of these products (row 2, column 3). Or a design project can start by identifying values by ethnographic studies of social avant-garde communities (row 3, column 2), move to designing innovative products (row 2, column 2), and present a value through concept products (row 1, column 2).

	horizon 3 (create viable options)	horizon 2 (build emerging business)	horizon 1 (extend & defend core business)
Communicate value	Aspirational promise	concept car	specific campaigns
develop value	innovative debate (probes)	collaborative innovation	Incremental Innovation
identify value	social cultural trends & narratives	future focussed persona research	people & market research

Figure 2: The Philips Design method by (Gardien 2006, fig. 12)

By both these methods for design thinking designers take their distance from the problems of clients. By the Design School method designers are to understand the problem a client formulates, and then to adjust this formulation, or the problem itself, by ethnographic observation. In the third 'point-of-view' step of that method designers moreover take a perspective on the client's problem by deciding how to frame the prospective users and how to frame the problem. Taking a personal music player as jewellery rather than as practical equipment, is an example of a point of view by which designer may stop to see the client's problem as one of merely finding suitable speakers, and frame it instead as one of finding items users enjoy to wear (D.School 2011, p. 22). And if this point of view is not working, designers may revisit this step and reframe the design problem in yet another way. The design method of Philips Design illustrate this distance to clients even more, since on this method design projects may define new business for firms, breaking away from the scheme that (the management of) these firms decide about their future business and then, as clients, hire designers to develop the products that come with this business.

Designers are by contemporary design methods more generally taking distance from the three main stakeholders in design. First, and rather schematically characterised, clients that order design projects are seen as stakeholders who may confront designers with problems that are ill-structured (Simon 1984), wicked (Rittel and Webber 1984) or paradoxical (Dorst 2006). Second, users are taken as stakeholders who formulate their needs in a conservative manner, leading designers toward incremental improvements of existing products rather than to innovation (e.g., Brown 2009; Verganti 2009), as illustrated by quotes as Henry Ford's that "if [he] had asked people what they wanted, they would have said faster horses", and Steve Jobs' "[a] lot of times, people don't know what they want until you show it to them." And, third, managers are seen as stakeholders who jeopardise innovation by requiring upfront fixed outcomes for design projects. Yet, in design projects that are aimed at defining concepts of future families of innovative products rather than at developing single products (e.g., Gardien 2006; Verganti 2009), even the designers involved may initially not know what the outcomes will be. For instance, a project at Philips Design aimed at exploring whether projection of images on bedroom ceilings could define innovative wake-up devices, evolved into innovation of medical CT and MR scanning: the projection of images was eventually used in examination rooms to calm patients, and to let them lay still in the scanning devices to produce scans with higher resolutions (Gardien 2006; 2011). Project management by predefined goals is rejected for such design projects aimed at innovative concepts. "[O]ften the real application of a technology is not in the area in which it was initially envisaged" (Gardien 2006, p. 5), hence, so the argument goes, predefined goals block a search for concepts for new families of products before it can reach innovative results. And managerial tools that define fixed time-windows for design projects by business models or return of investment criteria are rejected too, because also they deny how innovation by design actually evolves (Verganti 2009). Designers should get a free hand, and firms should engage into innovation by design without pigeonholing projects too early (Gardien 2006).

Contemporary design methodology gives the tools by which designers indeed can take their distance from specifically the clients and users. As illustrated by the Design School method, designers can frame the assignments that clients set to arrive at formulations that allow proper design projects (Schön 1983; Cross 2006). And designers can themselves determine the needs of users and do so in more innovative ways that the users, for instance, by empathy and ethnographic studies (e.g., Brown 2009; D.School 2011), or by analysing and collaborating with 'future-focused persona' and 'cultural innovators' who hold the values and beliefs of the next area (Gardien 2006). Yet, when it concerns taking distance for the managers of design projects, design methodology seems not to have generic tools readily available. Designers want freedom to explore innovative ideas, and for acquiring this freedom, methodologists still only negatively argue that managers should neither invoke project management nor impose return-on-investment criteria.

MANAGING INNOVATIVE DESIGN PROJECTS

The position that managers of design projects jeopardise innovation when fixing upfront targets may make sense when it is assumed that these targets specify the *content* design projects are to realise, say, the specific products that are to be designed. When this assumption is dropped, an alternative becomes available, namely to manage innovative design projects by targets that specify the *processes* that make up these projects. Design methodologists already structure these processes - design thinking - by methodological steps, as was illustrated by the methods of the Design School and Philips Design. Hence, design projects could be presented in terms of the different methodological steps they aim to take and be managed by determining if these methodological steps are carried out successfully or not. Such methodological management of design projects would be a generic tool for giving designers also their distance to managers: managers would stop to pigeonhole design projects in terms of their content, yet still be able to supervise and guide these projects.

It may seem that this alternative management of innovative design projects by their methods is already possible since its ingredients are currently available: design methodologists indeed divide design thinking in different methodological steps and have defined the goals of these steps. Yet, these goals are typically formulated in ways that are not yet suitable to determine if the methodological steps were carried out successfully. The 'observe' step in the Design School method (Figure 1) is defined as doing ethnographic studies and interviews with prospective users to decide if the design problem is well understood. But criteria to determine what a good understanding of a client's problem is, are left opaque. The 'concept car' step in the Philips Design method (row 1, column 2; Figure 2) is for arriving at a product that communicates value to users of emerging business of firms, yet what a good 'concept car'-product is, is not spelled out. Hence, what seems needed to make this alternative management of design projects feasible is that the goals of the steps in these methods are specified in more detail. An option to do so is to describe these goals in a SMART manner, that is, Specific, Measurable, Assignable, Realistic and Time-related (Doran 1981). For each methodological step in a design project it would then be defined what its specific goal is, how it is determined whether this goal is realised, who is responsible for doing so, what the probabilities are that the goal is indeed realised, and what resources – time, money, and so on – it may take. For instance, the 'concept car' design step in the Philips Design method may be spelled out SMART as having the goal to communicate a predefined value to users, which makes it a specific and measurable step. The task is assigned to the designers involved, and standards can be set what resources the development of a 'concept car'-product may take, making it a time-bound step. Realism would imply that also a rate of success is given for this step.

Formulating the goals of the steps in design methods in a SMART manner would require considerable work. It would require that design methodologists improve on their descriptions of design methods. It would imply accepting a more realistic perspective on what these methods can do in product development and in resolving problems of industry and society; currently design methods may be advertised as methods that almost always lead to useful

results (e.g., Plattner et al. 2009, p. 103), whereas Realism would mean that for each step fair probabilities are given that designers conclude them successfully. Formulating the steps In design methods in a SMART manner would also imply empirical work to determine these probabilities, say by collecting data about how often a 'concept car' step does lead with the allocated resources to a product that successfully communicates the intended value to customers. Starting points for this work can be found in current design research. For instance, Kumar (2013) spells out for many design tools and methodological steps what the required input is, and what the expected output. And Blessing and Chakrabarti (2009) aim at empirically validating tools and methods in engineering design. In the remainder of this contribution, I focus on the methodological step of framing, part of many design methods, and consider what a SMART formulation of the goal of this step may mean.

The prospect of this possibility of managing design projects by their methods should be clear. SMART descriptions of design methods enable both designers and their managers to acquire a shared understanding of design projects, which allow designers to have their distance and free hand. Designers can then present their projects to their managers (and clients) as structured in well-defined steps, and explain how they are to result into innovation, and with what probabilities. These steps become time-bound, but designers can also explain that this does not mean that design projects always result in marketable projects within a fixed time window; design projects may end merely in 'concept car'-products, or in the identification of new business opportunities for firms, as can be made clear with the Philips Design matrix (Figure 2). Reversely, managers obtain means to monitor the progress made within design projects without defining upfront the products these projects have to result in. By understanding the methodological steps of such projects, managers can evaluate if the goals of these steps are realised, and in this way still be able to determine if design projects are carried out successfully or not.

THE CASE OF FRAMING

Framing may be seen as one of the methodological steps that set apart contemporary design methods from more traditional engineering design methods. By engineering design methods (e.g., Pahl et al. 2007) a design project is aimed at producing a solution to a problem as set by a client. This problem may be somewhat adjusted by the designer and be translated in more technical terms, yet remains throughout the design project by and large fixed, thus providing a stable and clear basis to evaluate the successfulness of the outcome of the project with. Adding the methodological step of framing implies that this evaluative basis is removed from design projects. A designer may then reformulate the problem as set by the client by taking a specific point of view on the client's problem, as is required in the Design School method. Or a designer may reorient a project by dropping the problem s/he is working on, and taking up another more attractive problem, as was done in the Philips Design project on projecting images on ceilings. With framing the designer can even define himself or herself the (initial) problem; the (D.School 2011, p. 1) version of the Design School method, for instance, has as

its first step 'empathize' in which designers may uncover needs of people these people may not be aware of, thus allowing that the designer formulates the problem to be designed for. And in all these cases the initial problem as formulated by the client is not suitable anymore to assess if the design project has a successful outcome, leading to the question of what alternative basis there is to evaluate the outcomes of design projects with. Focussing on framing, this question becomes how to evaluate the reformulation, or introduction, of design problems by designers.

When looking at the current literature in design methodology the methodological step of framing is hardly formulated in a Specific, Measurable, Assignable, Realistic and Time-related manner. The task is Assignable since it are the designers who are responsible for framing the design problem. Yet, how Realistic framing is and how much time and other resources it may take, are open issues. In the literature many design projects have been described in which design problems were successfully framed, as, for instance, the project on projecting images on ceilings. But estimates of the probability of success of framing are hard to find. Hence, in order to formulate the step of framing in a SMART manner empirical research is needed to determine these probabilities, in relation to the resources allocated to it for describe framing in a Time-related manner as well. Presenting such empirical research is not the goal of this contribution; instead I look in this final section at possibilities of formulating framing in a Specific and Measurable manner: what is the specific goal of framing, and what are the criteria to measure if this goal is realised?

The goals of framing

Again looking at the literature, one goal of framing is to find a formulation of the design problem such that a solution can be found. In (Dorst and Cross 2001) framing is modelled semi-formally as part of an analysis of the creativity in design projects, and by this modelling it becomes clear how framing assists in finding design solutions. The modelling of framing is based on an analysis of creative design by (Maher et al. 1996) in terms of the co-evolution of the problem space and the solution space. The problem space consists of requirements set by the problem considered, and the solution space is the search space for design solutions (these are admittedly vague notions of a space). In the model of (Dorst and Cross 2001) an initial design problem defines first, at t=0, a problem space P(t=0) and a solution space S(t=0). Second, the designer starts by exploring the problem space by clustering some of the information about the design problem, and arrives in this way at t=1 at a partial structured problem space P(t=1). Third, the designer uses this partial structuring of the problem space to find a partial structuring of the solution space leading to a solution space S(t=2). Fourth, the designer considers the implications of the partial structuring of the solution space, and uses it to arrive at first concepts for a design solution, leading to a further structured solution space S(t=3). Fifth, the designer transfers the partial structure of the solution space back into the problem space, for deriving further requirements on and implication for the concept design solutions, thus adding again structure to the problem space P(t=4). The problem space and solution space are in this way co-evolving (Figure 3), and framing is taking as identifying a

problem-solution pair. The goal is finding a matching problem-solution pair, which in the model probably means that at some moment t=n a specific design solution is identified in the solution space S(t=n) that solves the problem as structured in the problem space P(t=n) that is considered at that moment. One cycle of structuring the problem and solution spaces is moreover probably not always sufficient for finding a matching pair (i.e., the moment t=n need not be the moment t=4); two or more structuring or restructuring cycles of the problem and solution spaces may be needed.

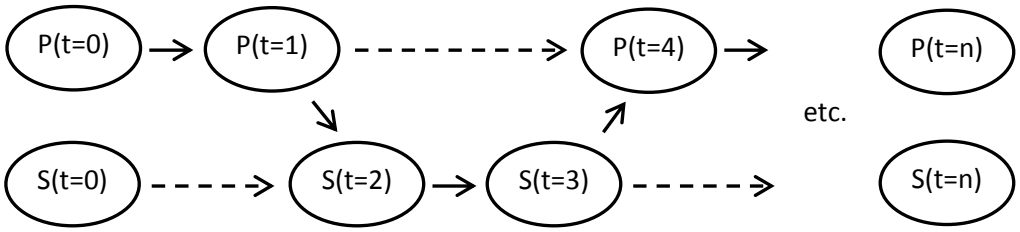

Figure 3: Structuring of problem space and solution space in framing (solid arrows) through time (dashed arrows), after (Dorst and Cross 2001, fig. 5)

This modelling of framing captures the goal of framing to find a design solution: it describes how designers reformulate the design problem such that a solution to it can be found. Giving a SMART formulation of framing with only this goal will however not do because it can be argued that producing a matching problem-solution pair is a necessary but not a sufficient condition for successful framing: the solution in this matching pair may be one the client is not interested in. Consider again the examples of framing discussed before to see that finding a design solution does not yet demarcate successful framing. A client ordering a personal music player, may be pleased when the designer presents a solution to the reformulated problem of finding a jewellery-style item users enjoy to wear, say when the client wants to create a new market for expensive personal music players. Yet, when the client's intention is to offer a service to patients in hospitals, this solution most probably is not a successful one. And a firm selling light-systems may welcome that designers reformulate a search for light-operated alarm clocks into one for light-operated systems to calm persons in CT and MR scans. But a firm that sells alarm clocks most probably rejects this outcome. When capturing these examples in terms of the model of (Dorst and Cross 2001), it may be observed that the final problem space P(t=n) a designer creates by framing need not be similar to the client's original problem space P(t=0). For instance, if the initial client problem is paradoxical (Dorst 2006), then P(t=0) is "empty" and P(t=n) necessary different to it. And if these spaces are not similar, the solutions found by framing need not be of interest to the client. This last possibility seems inherent to this model of framing, since in the modelling there is no constraint that relates the final problem space P(t=n) with the initial one P(t=0). Successful framing should therefore meet a second goal, for which I again turn to the literature.

In Dorst (2011) designing in its barest form is modelled logically as a reasoning process in which a designer determine on the one hand an object, service or system, referred to by a 'what', and on the other hand a working principle, referred to by a 'how', that together realise an aspired 'value' (Figure 4). In more simple design projects only the 'what' is unknown, and the 'how' and 'value' are given, which means that the design task is a conventional one of finding an object, service or system that realises with a given working principle a set aspired 'value'. In more challenging design projects, however, both the 'what' and the 'how' are unknown, and is only the 'value' given, leading to the design task to both determine an object, service or system and a working principle. According to Dorst (2011) experienced designers carry out this more complex task by breaking it up in two subtasks. First, these designers determine a 'how' - the working principle - for creating the 'value', after which the design task again becomes a conventional one. Second, experienced designers solve this conventional task of finding an unknown 'what' that realises with the determined 'how' the aspired 'value'. The first subtask is now taken as framing: framing is choosing a working principle as a (potential) means to realise a given value (Figure 4). Dorst (2011) further spells out how experienced designers arrive at specific framings: they analyse the situation in which a 'value' has to be realised, and recognise on the basis of their experience that a known working principle will do the job; or they search for the "central paradox" why in this situation the aspired 'value' is hard to realise, and then explore the broader context of the situation to find clues for new frames. Yet, important for finding a SMART description of framing is that in the model the aspired value is not changed: different working principles may be tried, and different objects, services or systems may be determined; yet the value remains what it was at the beginning of the design project.

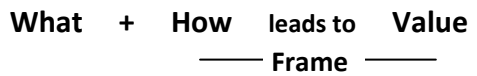

Figure 4 Framing according to (Dorst 2011, pp. 523-524)

From this second model a second goal of framing can be derived, namely that it should determine means - working principles or matching problem-solution pairs - that realise a set value. When adding this second goal to a SMART description of framing, one arrives at a sufficient condition for framing to be successful. The working principles or matching problem-solution produced by framing may still not be ones the client originally had in mind, yet with this second goal, successful framing has to realises a value the client has. Return again to the examples, for now demarcating successful framing properly. A client ordering a personal music player and aiming at creating a new market for expensive personal music players, may indeed be pleased when the designer after framing presents a jewellery-style music player, because this outcome realises the commercial value of the client. For a client

who wants to offer a service to patients in hospitals, this framing of music players may however not be successful, say, because it does not realise the client's value of efficiency. For a firm selling light-systems the reformulation of a search for light-operated alarm clocks into one for light-systems to calm persons in CT and MR scans, may again be successful because the outcome realises the firm's value, but for a firm that sells alarm clocks it is not.

A SMART description of framing

So, a SMART description of framing should include that its goals are a reformulation of the design problem that, first, enables finding solutions to the problem that, second, realise a value of the client. These goals are Specific and Measurable, and thus providing a clear basis to evaluate the successfulness of framing with.

The value to be realised by the solution found by framing may be a value that the client can present explicitly at the beginning of the design project. Yet, it may also be the case that the designer articulates this value during the design project and in that way makes it explicit for the client. When a designer starts a design project by empathising with a client to uncover needs this client may not be aware of, as is done in the (D.School 2011) method, then it is assumed that the designer determines values the client could not explicitly present himself or herself. Specifically in the last case is important for successful framing that the designer checks if the value articulated for a client is indeed a value the client may accept. In actual design projects this importance is reflected by the communication designers typically have with their clients about the progress of design projects, and by the testing of design solutions through mock-ups and prototypes. This communication and testing may be interpreted as aimed at exploring what values the clients actually have and at checking whether the framed design problems realise these values. By the SMART description of framing I propose, this importance is incorporated by making it an explicit goal of framing.

CONCLUSION

In this contribution a challenge was presented that innovation by design thinking poses to its management: the advocates of design thinking are critical to existing management practices since these introduce pre-set targets and time-windows that limit the free hand designers are said to need for arriving at innovation. This challenge is for both parties: when design thinking leads to projects without clear targets and endings, designers need other means to convince their clients and managers of the feasibility of their projects, and these clients in turn need alternative means to managing the design projects they commission.

In this contribution I took up this challenge and argued for managing innovative design projects not through pre-set targets on their outcomes but through the design thinking methods that designers are following. For this alternative management the methodological steps of design thinking methods should be formulated in a SMART manner, which was illustrated by developing a SMART description of the design technique of framing.

By SMART descriptions of design methods, designers and their managers acquire a common understanding of design projects, which allow designers to have their free hand. Designers can present their projects to their managers as structured in well-defined steps, and explain how they are to result into innovation, and with what probabilities. These steps become time-bound, but designers can also explain that this does not mean that design projects need to result in marketable projects within a fixed time window. Reversely, managers obtain an understanding of the methodological steps in such projects, and can without pigeonholing design projects in terms of their outcomes, determine if they are carried out successfully by evaluating if designers are realising the goals of these steps.

The methodological steps in methods for design thinking are currently not described in a SMART manner. In this contribution I developed a Specific and Measurable description of the methodological step of framing, but for extending this to a Realistic and Time-related description empirical work has to be done about the success rates of framing. For enabling management of innovative design projects by their methods, also the other methodological steps in design thinking should be described in a SMART manner, and this requires additional work. Steps such as explorative research by design probes and prototyping design solutions all have their goals that are to be articulated in Specific and Measurable ways by conceptual analysis, as was done in this contribution for framing. For describing these steps also Realistic and Time-related again further empirical research is to be done. The result of these efforts will be a precise understanding of the methodological steps of innovative design projects that can be shared between designers and their managers to help realising the potential of design thinking to bring innovation to industry and society.

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