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The Design Thinking Approach To Projects
by Eva Dijksterhuis, Gilbert Silvius
Second edition

THE DESIGN THINKING APPROACH TO PROJECTS[1]

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Abstract

Project success is one of the most studied topics in project management. Notwithstanding this vast literature base, project results continue to disappoint stakeholders. Turner and Cochrane (1993) argued that the traditional measure of success, completing the project on time and within budget, is based on the assumption that in projects both the goals and the method of achieving them are well understood at the start of the project. For some projects however, the objectives and/or the methods are not clearly defined. These projects, so-called type-4 projects, are only successful if they achieve a unitary, beneficial change with value for users.

A domain that has great experience in dealing with these type of problems, where only the aspired end value is known, not the goals and methods, is Design Thinking. In project management literature, however, little mention is made of Design Thinking. The aim of this paper is to contribute to the missing link between project management and Design Thinking and to give project managers insight in the application of Design Thinking in their approach to projects

The paper reports a conceptual analysis of the concept of Design Thinking and its application in Project Management. The research question of this study was formulated as: How does the Design Thinking approach to project management differ from the Rational Analytic approach? Based on a study of the literature, the study developed a conceptual framework of the differences between the Rational Analytic approach and the Design Thinking approach to projects.

Keywords: *Project management, Success, Design thinking, Agile.*

JEL code: *M1*

Introduction

Project success is one of the most researched topics in project management (Joslin & Müller, 2015). Research focuses on identifying critical factors for success (Cooke-Davies, 2002) or on the definition of success (Joslin & Müller, 2015). In these studies, different criteria for success are used. Most early research on project success seems to emphasize the three traditional dimensions (Silvius & Schipper, 2015): (within) time, (within) budget and (within) specification, also known as the known 'iron triangle' of time, budget and quality, "despite the fact that this method is currently subject to widespread criticism" (Bakker et al., 2010). More recently, Turner and Zolin (2012) expand project performance factors beyond the standard consideration of time, cost, and quality, and suggest inclusion of measures of user appreciation. Aspects of sustainability can also be introduced into the definition of project success (Silvius & Schipper, 2015). Project success, both the determination and the achievement, is a widely discussed subject. Literature seems to

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agree on one thing: whether a project is considered a success depends on the perspective taken to judge it (Koops et al., 2015). In spite of these well-known research results and despite column-miles of words that have been written about project management, project results continue to disappoint stakeholders (Cooke-Davies, 2002).

Some research focuses on the definition of projects and it's relation to project success. Turner and Cochrane (1993) propose a new definition of projects. They argue that traditional definitions of projects are based on the assumption that in projects both the goals and the method of achieving them are well understood at the start of the project. These objectives become part of the definition of success, and the project manager is said to be successful if they deliver them on time and within budget. For some projects however, the objectives and/or the methods of achieving them are not clearly defined. These two parameters – how well defined are the goals, and how well defined are the methods – result in a 2 x 2 matrix that Turner and Cochrane have named the "goals-and-methods matrix". What should be clear in any project is the fact that a project is only successful if it "achieves a unitary, beneficial change" (Turner & Cochrane, 1993). This beneficial change is also described as "purpose" or "value for users".

A domain that has great experience in creating value for users is the domain of design. Designers and engineers often create products where at the start of the problem solving ONLY the aspired end value is known, NOT the goals and methods (Dorst, 2011). In research literature, the term 'Design Thinking' has emerged as a way of thinking which leads to transformation, evolution and innovation, to new forms of living and to new ways of managing business (Tschimmel, 2012). The term Design Thinking has been part of the collective consciousness of design researchers since Peter G. Rowe used it as the title of his 1987 book "Design Thinking" (1987). It has gained popularity and is widely seen as an exciting new paradigm for dealing with problems in sectors as far afield as IT, Business, Education and Medicine (Dorst, 2011). It has become a label for the awareness that any kind of business and organization can benefit from designers' way of thinking and working (Tschimmel, 2012). Studying the way designers work and adopting some 'designerly' practices could be interesting to organizations, because designers have been dealing with open, complex problems for many years (Dorst, 2011).

Problem solving where only the aspired value is known, not the goals and methods, can be related to Type-4 projects, as described in the goals-and-methods matrix (Turner & Cochrane, 1993). Figure 1 presents this matrix.
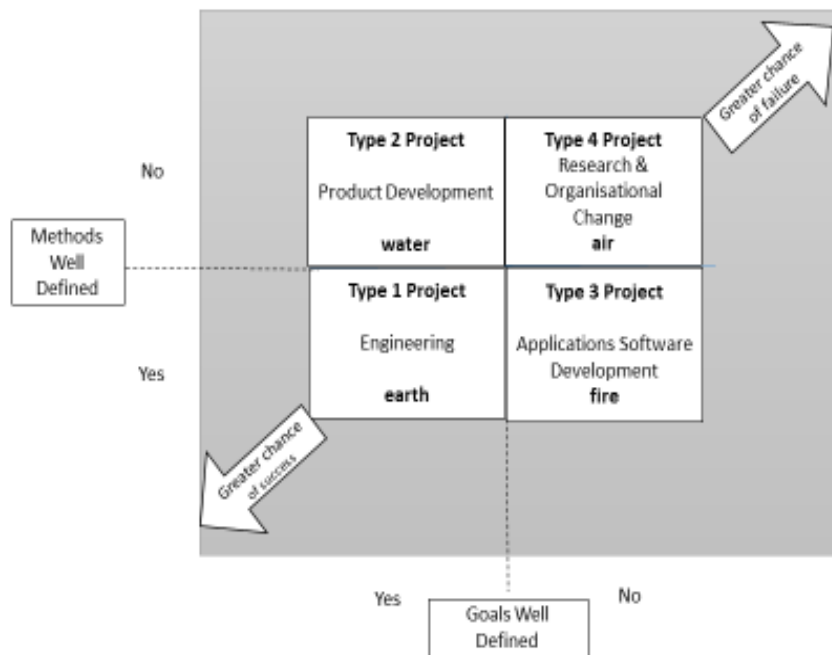
PM World Journal
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www.pmworldjournal.net

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Figure 1. **Goals-and-methods matrix.**

Source: Adapted from Turner & Cochrane, 1993

Type-4 have a greater chance of failure (Turner & Cochrane, 1993), because project management traditionally assumes that in projects both the goals and the methods of achieving them are known at the start of the project. Cochrane and Turner therefore propose new methods in dealing with these types of projects, such as working with multi-disciplinary teams, a facilitator to negotiate agreement between parties, milestone planning and configuration management. But as projects still continue to disappoint users, *what can Project Management learn from Design Thinking*?

Design Thinking has provided useful new insights into the general management domain, especially where it concerns complex, wicked, problems (Dorst, 2011). Type-4 projects show similar characteristics to design-problems. However, in Project Management literature and research, little mention is made of Design Thinking. So, what novel ways of approaching open, complex problems is the project management community missing out on? The research question of the study reported in this paper was formulated as: *How does the Design Thinking approach to project management differ from the Rational Analytic approach?*

The paper will report an extensive literature review of the concepts of design thinking and will confront project management with these concepts. As a conclusion, we will provide a conceptual framework, comparing the Design Thinking approach to project management with the Rational Analytic approach. The goal of this study is to contribute to the missing link between Project Management Theory and Design Thinking. And to give project managers insight in the application of Design Thinking in their approach to projects.

*PM World **Journal***
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Methodological approach

As this study aims to develop an understanding of a relatively unexplored territory, it is considered to be of an exploratory nature. We used the systematic literature review methodology (Tranfield et al, 2003) of selection, extraction, analysis and synthesis of published academic books and articles. And although all the data we collected was already published, it is generally accepted that worthy insights and contributions can be derived also from existing theoretical works (Martens and Monteiro de Carvalho, 2014).

Following the recommendation by Bauer and Bakkelbasi (2005) that "researchers should consult Google Scholar …, especially for a relatively recent article, author or subject area", we used Google Scholar as search engine. For data extraction, we used the databases Science Direct, Business Source Premier, Ebsco-Host and JSTOR to retrieve the full publications for our analysis. We used qualitative content analysis methods to analyze the articles. In this analysis, we combined the conventional, directed and summative content analysis approaches (Hsieh and Shannon, 2005).

Findings

The section consists of two parts: firstly the concept of Design Thinking is explained using a variety of academic sources. Secondly, an overview is given of the occurrence of (related) concepts of Design Thinking in Project Management research literature.

The Concept of Design Thinking

The concept of Design Thinking has been defined in the literature in a variety of ways. This section will start with the most commonly used terminology to describe the phenomenon. Secondly, the core of Design Thinking will be explained by looking into the key reasoning patterns in design.

Design Thinking can be described as team based, user centered process, powered by a thorough understanding of what users want and need (Brown, 2008). It is used for finding a solution for an often ill-defined problem in any organizational or social context. The problem solving process includes a complex inquiry phase and a suspension of decisions and even suspension of the problem definition itself (Kuiper & Kolsteeg, 2012). It originated in the last decade of the 1900's, where researchers studied the essential mental strategies of designers (Cross et al., 1992). More recently (2001 – 2012), the concept of design thinking has been stretched, and has broken free from its domain limits. Today, Design Thinking is understood as a complex thinking process of conceiving new realities, expressing the introduction of design culture and its methods into fields such as business innovation (Tschimmel, 2012). It is not a predefined series of orderly steps, but "a human-centered, creative iterative and practical approach to finding innovative ideas and solutions (Brown, 2008).

In his article "The core of "design thinking" and it's application, Dorst (2011), explains the core of Design Thinking and what it could bring to practitioners and organizations in other fields. He uses a model from formal logic to describe the key reasoning patterns in design and explains how this type of reasoning is very different from other fields. He then explains how designers adopt and create "a frame" to deal with a problem at hand.

Problem solving

In problem solving humans adopt different kinds of reasoning patterns. In the sciences two types of reasoning are distinguished: Deduction an Induction. The difference between the two is the different setting of the knowns and unknowns in this equation:

WHAT (thing) + HOW (working principle) leads to RESULT (observed)

PM World Journal
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In Deduction, because the "what" and the "how" are known, the result can be predicted and informs "justification". In Induction, the "what" and the "result" are known, the proposing of a "working principle" that could explain the observed result is a creative act and a "discovery".

In design however, the result is not a statement or a fact, but the creation of value for others.

WHAT (thing) + HOW (working principle) leads to VALUE (aspired)

This basic reasoning pattern is called Abduction. Dorst (2011) explains two forms of Abduction, one of which most closely represents the open, complex problems for which organizations are seeking new approaches:

??? (thing) + ??? (working principle) leads to VALUE (aspired)

The challenge in this form of Abduction is to figure out "what" to create, while there is no known "working principle" that can be trusted to lead to the aspired value. Designers resolve this type of problem by framing and frame creation.

Design Reasoning

A "frame" is the general implication that by applying a certain working principle a specific value will be created (Dorst, 2011). This means that he "thing" and the "working principle" are created together:

WHAT + HOW leads to VALUE

--------frame-----------

In design literature (since Schön (1988)) "framing" is the term used to describe the creation of a (novel) standpoint from which a problematic situation can be tackled. The "frame" is a complex set of statements that include a specific perception of a problem statement. The reasoning is as follows: IF we look at the problem situation from this viewpoint, and adopt the working principle associated with that position, THEN we will create the value we are striving for. This type of reasoning requires an iterative process of reasoning "backwards" (starting with the value) and then "forward", to see whether the "thing" that has been created, together with the working principle, actually creates the aspired value.

The uniqueness of design reasoning is found with various authors on the subject. Different terms are used, but they all seek to explain how designers think differently. Tschimmel (2012) calls it: "thinking in new and different perspectives and about future possibilities". Tim Brown, CEO of IDEO, a company specialized in organizational change from the perspective of Design Thinking speaks about "a fundamental way of thinking" (Brown, 2009) . The most important aspect of Design Thinking in his view is "insight". Insight in a problem is obtained by observation and empathy, as opposed to relying on quantitative data. To explain this central concept of "insight" he uses Thomas Edison's invention of the light bulb (Brown, 2008). Thomas Edison invented the electric light bulb and then wrapped an entire industry around it. The light bulb is most often thought of as his most signature invention, but Edison understood that the bulb was just an object, and that without a system of electric power generation and transmission, it never would be truly useful. Edison's genius lay in his ability to envision how people would want to use what he made, and he engineered towards that insight. "Insight" and "aspired value" both represent design

PM World Journal
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

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Second edition

reasoning as a "methodology that imbues the full spectrum of innovation activities with a human-centered design ethos" (Brown, 2008).

The core of design practice

In this section the core of design practice will be introduced. Frame creation as a deliberate strategy by designers is explained. Moreover, it will be explained how designers reframe a problem as is initially presented by the client. The setting in which designers engage in the activity of framing and reframing, is called briefing. We will explore this activity and show what designers perceive their role to be in this process and how they work towards new frames.

- Frame creation and changing frames

The ability to create frames and "to reframe a problematic situation in new and interesting ways is widely seen as one of the key characteristics of design thinking" (Paton & Dorst, 2011). *So how are frames created?* In creating new frames, what expert designers are engaging in is a subtle process of analysis that has much in common with phenomenological methods of analysis, through which a complex situation is read in terms of "themes" (Manen, 1990). In this method, a "theme" is the experience of focus, of meaning. Themes are not clearly positioned in either the problem space or the solution space. The process of distilling themes is described as insightful invention, discovery and disclosure. These "themes" become triggers for creation of new frames that allow the central problem to be approached in a new and interesting way. This gathering of clues is a deliberate strategy with designers. To an outsider it may look like an informal activity, and the terms designers use are sometimes vague: they talk about "getting close to a situation", the importance of "richness" of the problem area, they stress the importance of "getting first-hand-experience" of the problem situation.

Dorst (2011) illustrates this practice in an example: "*The situation described is that of an entertainment Quarter in a metropolis. The area involved is one with bars and clubs, attracting 30.000 young people on a good night. Issues that arise in the area include drunkenness, fights, petty theft, drug dealing and sporadic violence. Over the years, local government has been using mainly "strong arm tactics", i.e. increasing police presence and putting in CCTV camera's. All that extra visible security has made for a grim public environment, and the problems have persisted.*
A group of designers was brought in to try and find alternative solutions. They soon realized that the problem was framed by the local government as a law-and-order problem, needing law-and-order answers. After emerging themselves in the neighborhood and observing the behavior of the young people, the themes that emerged were: young people wanting to have a good time, getting bored and frustrated by lack of good organization in the area and excessive safety controls. The designers suggested to treat the problem AS IF they were dealing with a good-sized music festival. This metaphor triggered new scenarios for action, improving transportation, crowd control, safety and way finding. These measures significantly improved the area."

This example shows that by reframing a problem, based on emerging themes from their investigation, designers develop new solutions. The original frame limits the solution space: only measures that fit into the law-and-order paradigm are taken. By reframing it as a music festival, and defining the value to be achieved as: "young people wanting to have a good time", a different solution space can be tapped into.

In design practice, as well as in organizational change in general, the problem situation as is first presented to the designer – the change manager or project manager – is often implicitly framed by

PM World *Journal*
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www.pmworldjournal.net

The Design Thinking Approach To Projects
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Second edition

the client organization. Designers actively uncover this implicit frame and develop new frames in close cooperation with their client. In the next section this process is explained.

- Briefing and the role of the designer

A design project usually starts with a brief, formulated by the client. The designer and the client engage in a series of interactions, in order to develop a mutual understanding of the project. The end-result is an accepted brief that is understood and agreed upon, in which the designer's and the client's frame have come to overlap or align to a certain extent (Dorst, 2011). Designers describe this process as a process of negotiation to define a "vision" of what the project should be, and what the shared appreciation is of the value to be achieved.

In their research, Dorst and Patton (2011), describe the particular roles that designers perceive themselves to play in this process:

- o Technician: the designer is given a solidly defined brief and is expected to carry this out.
- o Facilitator: the client knows what he wants, but not what is required to achieve it completely. The designer gives expert advice.
- o Expert/Artist: the client knows what he needs, and the designer is responsible for framing the project with the client to a workable outcome
- o Collaborator: both client and designer work mutually on framing the project in terms of both problem and solutions space.

The designers interviewed in the research identified the expert/artist role and the collaborator role as being the most desirable mode for briefing. The aim of the research was not to identify whether projects in which the designer had acted as a "collaborator" were more successful. So no claims can be made to that effect. However, the interviewees describe the reason for negotiating to change a client-given brief to be: to make the project more successful.

In the table below (Table 1), the four roles identified are shown in relation to topics involved in the process of briefing: point of entry of the designer to the project, involvement in problem space formulation, involvement in solution space formulation and amount of iterations.

Table 1

Briefing modes an ability to reframe during briefing

Mode	Point of entry to project	Involvement in problem space formulation	Involvement in solution space formulation	Amount of iteration
Technician	End of planning	No	No	Low
Facilitator	Near end of planning	No	Partial	Low
Expert/Artist	Mid-planning	Partial	Yes	Med
Collaborator	Beginning of planning	Yes	Yes	High

PM World Journal
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

The Design Thinking Approach To Projects
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Second edition

So how do designers negotiate new frames? An important aim for designers is to shift clients away from a problem-solving approach. First, the conversation should be about the exploration of the aspired value. To do this, designers use abstractions in the form of visual abstractions or analogies. "Mood board" discussions are a good example of this form. The abstraction of the mood board allows the designer to highlight desirable aspects of the outcome, but not the particular resolution. The mood board assists in creating a more open conversation about the project.

Another way to negotiate new frames is identified as contextual engagement: designers create interaction and activities with the client that facilitate reframing the project with the client. This can take the form of workshops in which client and designer co-explore the problem space, often in playful, "fun" –type meetings where a variety of ideas are played with in order to "loosen" fixation on a particular outcome.

Language plays an important role in this form of co-creation: the process of reframing comes through regular dialogue, and through sharing a context-specific language framework. Decision-makers in the client's organization need to participate in this dialogue, in order to adopt the new frame.

Design Thinking in Project Management Literature

In this section, an overview is given of the occurrence of (related) concepts of Design Thinking in Project Management research literature. And although there are a great number of articles relating to General Management in relation to Design Thinking, specific mention of Design Thinking in Project Management academic literature is rare. Related terms that have been found, will be described in this section: Agile, problem-setting, uncertainty, change/innovation and chaos theory.

Agile

In software development, the term design is used in relation to software design management. The 12 Principles of Agile Software have influenced the Project Management practice since the Manifesto for Agile Software Development was published in 2001 (Beck & Beedle, 2001). Characteristics of Design Thinking are echoed in some of the terminology used in Agile: customer collaboration, iterative development cycles, welcome change. Nerur and Balijepally (2007) corroborate this view, but provide a critical note by observing a lack of academic foundation of Agile methods. The authors argue that Agile has the same theoretical basis as conceptual shifts in patterns of thought in other disciplines (Design and Strategy), but the rich perspectives that these other disciplines could provide for the emerging Agile philosophy is conspicuously absent in research. They argue that the metaphor of design offers a strong theoretical basis for the conceptual foundation of Agile methods. The authors urge the Agile community to examine it's theoretical roots. This call has not been answered, since no academic articles on the subject can be found.

Problem setting

De Blois and De Coninck (2008) elaborate on the relationship between project management and design. The authors introduce the notion of the "organizing project". A project is seen as an organizing process, in which all actors and stakeholders play a predominant role as opposed to the traditional perspective on projects as "the organized project". A project is not an object itself, independent of its context. Rather, the trilogy action, stakeholder, transformation defines the project: the project links the ideas, the intentions, the aims, the stakeholders, it produces the project and the objects. The concept of the organizing project is explained by the notion of thinking/management by design, highlighting the role of actors' and stakeholder participation through the design process. The authors stress that knowledge of design as an activity needs to be developed further, because what is usually NOT taken into account is the "iterative" nature of the design activity. Designing serves the purpose of establishing and conceiving the problem

PM World Journal
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

The Design Thinking Approach To Projects
by Eva Dijksterhuis, Gilbert Silvius
Second edition

space, while keeping it open to welcome potential emerging solutions. In Project Management theory, the problem-setting activity seems often ignored and is usually referred to as the feasibility phase (Macmillan, 2001). The authors recognize the need for the Project Management community to develop tools for conducting projects that are moulded over problem-setting mode (defining the problem space), rather than solution driven (devising the solution of a given problem). In his paper that builds on discussions that took place over a series of meetings in the UK of the Rethinking Project Management Network, Atkinson et al. (2006) also conclude that in professional Project Management guidelines the role of conception at the front end of the project life cycle is minimized. The assumption is that project objectives are clear, or clarified in the feasibility phase.

But in practice objectives are often unclear, contradictory, or impossible. Many projects that are managed in this way experience problems for this reason. The project manager is regarded as a convenient recipient of project risk, providing psychological relief to the project owner from the burden of uncertainty and risk bearing, and someone who subsequently unwillingly serves as scape-goat if things fail to turn out as desired by the project owner.(Atkinson et al., 2006). The Rethinking PM Network regards management of uncertainty as a necessary condition of effective PM. What is needed, however, is the development of project uncertainty management as ambiguity management. The next section of this literature review will focus on that subject.

Uncertainty

In traditional PM uncertainty is approached as management of risk and opportunity. The solutions to tackle these uncertainties originate in the "control" space: control of performance and results of execution (de Blois & De Coninck, 2008). The measures that Cochrane and Turner (1993) propose, milestone planning and configurations management, are examples of solutions that originate in the "control space". This type of uncertainty can be anticipated, planned and managed. It leaves no room for identifying unknown spaces (de Blois & De Coninck, 2008). Sources of uncertainty are wide-ranging (Atkinson et al., 2006). They are not confined to potential events, but include lack of information, ambiguity, varying agendas in different stages of the project life cycle. The Rethinking PM Network concludes that common PM does not address these uncertainties.

Conventional pm focuses on operational planning and control. Many projects, however, are characterized by very high, difficult to quantify, levels of uncertainty where management flexibility and tolerance of vagueness is necessary. This calls for the need to develop less tangible management processes associated with building trust, sense-making, organizational learning and building a culture that is more suited to deal with high levels of uncertainty.(Atkinson et al., 2006)

The result is that project management is commonly regarded as concerned with ensuring things get done right, assuming that there is a well-defined idea of what needs to get done. With this view, project management is not concerned with thinking about whether the right things are done, why the project should proceed, or what performance criteria would be appropriate. Perhaps the conventional common view of pm is essentially to see the project task as a set of processes to ensure a project meets its (predetermined) objectives. The whole 'raison d'étre' of project management is to remove (or substantially reduce) uncertainty about meeting specified objectives. However, project management in this sense is a castle built on shifting sand, if in practice objectives are unclear, contradictory, or impossible.(Atkinson et al., 2006).

In their article, Atkinson et al. (2006) make a clear distinction between uncertainty and ambiguity. Uncertainty is defined by the difference between the data required and the data already possessed: it is "lack of information". Ambiguity means the existence of multiple and conflicting interpretations: it is linked to confusion and lack of understanding. Uncertainty warrants the acquisition of objective information and answering of specific questions. Ambiguity warrants sense-making, the exchange of views and the definitions of situations/problems. This sense-making is especially important in the concept stage of the project life-cycle, and during preliminary design and planning activities. Unfortunately, if the need for ongoing sense-making is not acknowledged, pressures to finish a project may increasingly preclude further sense-making. He

PM World Journal
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

The Design Thinking Approach To Projects
by Eva Dijksterhuis, Gilbert Silvius
Second edition

concludes by giving directions for development of project uncertainty management: what is needed is to formulate qualitative success measures to assist managing projects, instead of just quantitative success measures. Also: to develop ideas about the role of trust, and to balance trust and control. Furthermore: learning by experience and managing stakeholder expectations.

Change/Innovation

Project management in academic studies tends to be regarded as an adequate solution to the problems raised by innovation (Lenfle, 2008) .The authors argue that in the literature, there is a missing link between project management and innovation management. Justification for Project Management lies in the fact that something "new" is created, but the divers situations of "newness" are not addressed. Also, the rational view of PM in which the accomplishment of clearly defined goals within budget, quality requirements and time is dominant, does not address the fact that innovation is first and foremost characterized by divergence and unforeseeable uncertainties that render the rational approach irrelevant. (Lenfle, 2008). Is the project format suited to the management of this kind of change? To deal with these issues, they propose the following managing principles:

1. Set up a dedicated organization
2. The central role of experimentation and concurrent exploration: making a plan of action to tackle unforeseeable uncertainties in order to allow problems and solutions to be discovered.
3. The dual nature of performance and goal reformulation: the management process must take into account the two different dimensions of performance: the value of the product AND the accumulation of knowledge. The accumulation of knowledge during the project is not the same as "lessons learned" after the project is completed. Knowledge accumulated must allow for reformulation of the objectives along the way.

Hornstein (2015) also stresses the necessity of the integration of project management and organizational change management. He also notes that organizational change involves more than obedient adherence to a technical process. Effective change management and leadership is necessary, as is demonstrated in management and organizational literature. However, the academic analyses of project outcomes focuses mainly on the project process. In researching project success, researchers focus more on technical issues (time, budget, scope, quality), less on the human factor. This human factor deals with: whether or not employees adopt the change, organizational resistance, user/customer satisfaction. Change management is about creating ownership and shared meaning, more important than following the process steps.

Chaos-theory

In her dissertation, Mulder (2012) researched the premise that in Project Management Theory, modern management concepts are used insufficiently. This premise is validated in her research: concepts such as 'social', 'motivate', 'create', 'value' en 'trust' are significantly less present in literature on project management than in literature on general management. Her research has resulted in an approach called: Value-based Project Management. Based on chaos theory, it describes an format to deal with projects that are complex, ambiguous and uncertain. There is no reference to Design Thinking, however, some of the terminology are reminiscent of its concepts, e.g.: use a development approach that allows for vagueness, make sure users participate right from the beginning, keep the dialogue with the stakeholders going.

Concluding remarks

In summary, one might observe that in academic literature on Project Management a few references are made to Design Thinking or related terms. Various authors (Nerur & Balijepally, 2007; Hornstein, 2015; Mulder, 2012; Lenfle, 2008) observe a lack of theoretical connection to modern general management concepts. All authors argue that dealing with uncertainty, ambiguity and creating value for customers are key issues around which Project Management theory should

PM World Journal
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

The Design Thinking Approach To Projects
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evolve. De Blois (2008) explicitly argues that knowledge about design as an activity needs to be developed further. Project Management should be more focused on the problem space, instead of the solution space. Where the goal of projects are unclear, more time should be dedicated to sense-making and reformulating objectives along the way (Lenfle, 2008) Ambiguity warrants sense-making, the exchange of views and the definitions of situations/problems. This sense-making is especially important in the concept stage of the project life-cycle, and during preliminary design and planning activities.(Atkinson et al., 2006). Design Thinking can contribute to just these types of issues.

Discussion: The Design Thinking Approach to Projects

The literature presented in the previous sections has shown that the core of design practice lies in the ability of designers to frame and reframe a given problem. Designers use a systematic human-centered approach to explore the definition of a problem and synthesize solutions (Buchanan, 2010). In order to create a paradigm shift in Project Management towards applying Design Thinking, the Project Manager needs to reassess his/her mode of thinking. Applying Design Thinking implies a different approach to a project than the Rational Analytic approach that is dominant in Project Management theory and practices.

Tschimmel (2012) and Glen et al. (2014) both compare the Design Thinking approach to problem solving to a traditional, Rational Analytical, approach. These two models are very similar and for the purpose of this paper, the two are combined into one conceptual framework (Table 2). The model used by Tschimmel is a list of characteristics of a Design Thinking Manager versus a traditional thinking manager. The characteristics are listed without further categorization. Glen et al. use a comparison between the rational analytic manager and a design thinking manager, and arrange the comparison into seven categories: problem formulation, criteria, method, information-processing emphasis, solution process, rationale and outcome. The descriptions of the approached in both models are very similar. By introducing the categories used by Glen et al. to the descriptions used by Tschimmel, the two models can be integrated into a single conceptual framework. To complement the characteristics of the two contrasting approaches, descriptions were added by the author of this article using the literature on Design Thinking and definitions from the IPMA Competence Baseline version 3 (International Project Management Association, 2006).

Table 2

Comparison of Rational Analytic and Design Thinking approaches

	Rational Analytic approach	**Design Thinking approach**
Problem formulation	Well-defined goal and constraints. Immediate perception and quick interpretation of a situation. Result oriented. Views the start of a project as receiving an assignment to achieve a "job" in the form of a project. Receives orders from the client. (International Project Management Association, 2006)	Goals and constraints uncovered during the design thinking process. Intensive observation and wondering, challenging stereotypical perception, asking questions and postponing decisions/ problem definition. Views the start of a project as the start of a dialogue with decision-makers and users. Interacts with the client.
Criteria	Objective definition of criteria, established before generation of alternatives. Project sponsor and stakeholder- driven. Focused on a well-defined project result. Meeting commitments and fulfilling expectations.	Both objective and subjective criteria used to define design objectives, since the end user is the ultimate judge of efficacy. Empathic and human-driven, deep understanding of peoples' needs and dreams. Focused on the wants and needs

PM World Journal
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

The Design Thinking Approach To Projects
by Eva Dijksterhuis, Gilbert Silvius
Second edition

	(International Project Management Association, 2006)	of the user.
Method	Mainly rational and objective. Planning and analysis—thought precedes action. Sequential process. Analytical, deductive and inductive. Technician and facilitator. A method is a linear process	Iterative exploration of the design "space," where thinking and doing are intertwined. Emotional and rational at the same time, subjective. Adductive and inventive, thinking about future possibilities. Expert and collaborator. A method is an Iterative process.
Information-processing emphasis	Preference for objective formulations, especially verbal and quantitative. Emphasis on project documents, use of waterfall planning sheets, Product/Work Breakdown Structures, diagrams and tables. (International Project Management Association, 2006)	Preference for visual and spatial representations, which evoke both objective and subjective insights. Use of sketching and prototyping tools
Solution process	Ideally based on conscious, rational-logical reasoning process, which, over time, becomes formalized into a set of rules. Lead by organizing, planning and control	Solutions evolve as the result of interaction with users and the ongoing creation and refinement of possible solutions. Incorporates experience-based insights, judgment, and intuition. Comfortable with ambiguity and uncertainty.
Rationale	"Get it right." Reduce chances of failure though careful prior analysis	Use rapid experimentation and prototyping to learn from early, inexpensive "failures".
Outcome	Solution optimizes predefined criteria to arrive at "best" answer. Looking for 'correct' answers *"analyze, come up with the solution and implement the solution"* (International Project Management Association, 2006, p. 107). Concerned with ensuring things get done right (Atkinson et al. , 2006)	Obtain "better" answer. Process may expose additional problems and solutions. Failure is a part of the process. Concerned with thinking about whether the right things are done (Atkinson et al., 2006).

Source: Authors' construction

From the comparison of the Rational Analytic approach and the Design Thinking approach summarized in Table 2, it becomes clear that the 'Design Thinking Project Manager' differs on many aspects in his/her approach to project from the Rational Analytic Project Manager.

Conclusion

The study reported in this paper aimed to contribute to the missing link between Project Management and Design Thinking, by conceptually analyzing the concepts of Design Thinking and apply these to Project Management. The rationale for this study was the analogy we see between

PM World Journal
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

The Design Thinking Approach To Projects
by Eva Dijksterhuis, Gilbert Silvius
Second edition

'Type-4' projects, of which the objectives and/or the methods are not clearly defined and the goal is to achieve a beneficial change with value for users, and the design domain. Applying a Design Thinking approach to these type of projects, might therefore provide useful insights.

Based upon our analysis of the literature on Design Thinking, we found that one of the key characteristics in Design Thinking is the ability to create frames and to reframe a problematic situation in new and interesting ways. This 'reframing' of the problem and constraints contrasts the Rational Analytic approach that is dominant in Project Management, in which the start of a project usually has the form of the project manager receiving an assignment from the project sponsor or executive.

Nest to this difference in approach to the 'Problem formulation', our study found also differences in the 'Criteria' of the project result, the 'Methods' to achieve these, the emphasis in 'Information-processing', the 'Solution process', the 'Rationale' and the 'Outcome' of the project, when comparing the Design Thinking approach with a Rational Analytic approach (Table 2 summarizes these differences). This answered our research question: *How does the Design Thinking approach to project management differ from the Rational Analytic approach?*

The limitation of the study reported in this paper is that it is based upon an analysis of literature and a conceptual mapping. However, the conceptual framework of the differences between the Design Thinking approach and the Rational Analytic approach, developed in the study, provides a good foundation for empirical testing of the differences between the two approaches.

A logical follow-up question for further research would be *What aspects of the Design Thinking approach should be integrated into Project Management in order to contribute to the successful management of projects of which goals and methods are not completely clear at the start of the project?* It is this question that is central in our current study, that will be reported in later publications. This study will also include an empirical investigation into how project managers experienced the differences of a more Design Thinking approach to a project, compared to their natural more Rational Analytic approach.

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PM World *Journal*
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

The Design Thinking Approach To Projects
by Eva Dijksterhuis, Gilbert Silvius
Second edition

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PM World *Journal*
Vol. V, Issue VI – June 2016
www.pmworldjournal.net

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