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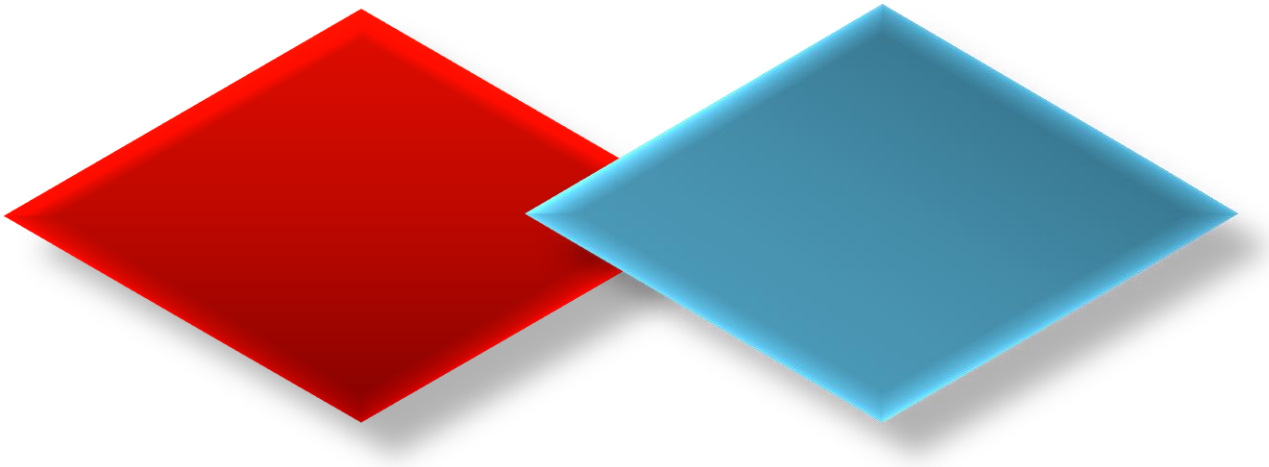

Implementing Design Thinking Through a Pilot Project

Exploring Challenges Linked to Fast-paced Learning

Master of Science Thesis
in the Management and Economics of Innovation Programme

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Cover:

[An illustration of the double diamond of convergence,
and divergence, made by Berglind Ragnarsdottir]

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Abstract

Design Thinking (DT) has been suggested as a way for organizations to become more innovative and recently it has started to spread as a popular management idea that organizations have been implementing into their operations. Even though DT has gained attraction over the past few years there is still a lack of understanding of the concept, as it is poorly conceptualized and investigated in organizational settings. Little is known about what problems that arise in companies when it is implemented, and this lack of knowledge may lead to failed implementation efforts. In this research a single case study was conducted at a Swedish software company, Centiro, in order to investigate the use of a pilot project to introduce DT in a company, as a way of learning a new management idea for further implementation. This was done through an abductive research approach, including a theoretical review of previous literature, as well as observations and interviews at Centiro. The study identified three main areas that presented challenges in regards to the implementation of a new management idea.

The study was a good learning opportunity for Centiro which started the pilot project with a great learning attitude. Three main areas were researched and the results will provide a good guidance in Centiro's further implementation efforts of DT.

First, lack of training in DT methods led to a shallow understanding of DT, as well as a lack of practical experience both among participants and facilitators can contribute to a limited use. If underlying values are neglected and activities linked to DT are performed on a superficial level only it can be questioned if DT was really used.

Second, diversity was found to be important since individuals could contribute with various skills in different part of a DT process. It is clear that different individuals can experience the same event but have completely different views towards it and those different views can be equally correct and valuable to an organization. Therefore, creating teams based on the results from a thinking profile test can help ensuring that both convergent and divergent work is catered for.

Third, three arears were identified that can contribute to problems arising in a fast paced pilot project set up. These are, underestimating the need for time and proper training, underestimating the role of effective leadership and facilitation, underestimating the importance of going into the task with the aim of learning rather than performing. Finally, not providing the time needed to test, fail and iterate becomes a paradox since it can be questioned whether the work done is DT at all. The fast pace of the pilot project thus contradicts the aim of learning DT, the very idea of performing the pilot project in the first place.

***Keywords**: Design Thinking, management idea, facilitation, speed-learning, implementation traps, diversity*

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1 Introduction

1.1 Background

Staying competitive in a rapidly growing industry is a challenge organizations are facing all over the world. One of the challenges is to figure out how to compete successfully in the constantly changing global market. Innovation is one of the key factors companies need to focus on to sustain a competitive advantage (O'Connor, 2008; Grant, 2013; Carlgren, 2013). This is irrespective of the origin, development or implementation of the innovation. It is crucial for organizations to continue to innovate or they will risk being left behind in the race for competitive advantage (Kalb, 2013).

One approach suggested as a way for companies of becoming more innovative is Design Thinking (DT) (Brown, 2009). DT has emerged as a multidisciplinary human-centered approach to innovation based on the way designers think and work (Brown, 2008, 2009; Martin, 2009; Johansson-Sköldberg et al, 2013). DT is becoming widespread as a management idea and is promising improvements on innovation (Brown, 2008; Martin, 2009; Carlgren et al., 2014). Management ideas, such as DT, tend to have a certain vagueness and ambiguity (Giroux, 2006), which allows individuals to align them with their individual goals and the means of achieving them (Rauth, 2015). This interpretability is one of the reasons some management ideas have become so widely popular amongst practitioners (Ansari et.al., 2014; Benders and van Veen, 2001; Giroux, 2006).

This interpretability creates a risk that nuances of meaning of the management idea are left out of the implementation (Johansson-Sköldberg et al., 2013) and further, allows for very diverse implementation which can lead to implementation that can be considered ceremonial and does not have any real effect on the organization (Meyer and Rowan, 1977; Rauth, 2015). It is argued that when a new concept is introduced too fast, there is a risk that the employees do not see the value of the new concept and become reluctant to change. Thus the implementation efforts may backfire, hindering a successful implementation (Schmiedgen et al., 2015).

Even though DT has been popular over the past years there is still a lack of understanding of the concept and it is poorly conceptualized and investigated in organizational settings (Carlgren, 2013) and what problems arise in companies when it is implemented. However there is some exploratory research underway (Carlgren et al., 2016; Schmiedgen et al., 2015) showing that DT entails a number of challenges, some of which are similar to those any company will face that tries to work with innovation in a more systematic way. However, Carlgren et al. (2016) also argue that some challenges seem inherent to the concept itself, indicating that it might be difficult to introduce in an organization – compared to other popular concepts such as Lean

Product Development - as well as difficult to learn considering the existing worker competence base in a typical technology-oriented firm.

One crucial aspect of implementing a new management idea is how to make individuals and teams in the organization learn the new concept (Druskat and Keyes, 2000; Shani et al., 2009). One risk is that the company demands measurable results early on, putting a high amount of strain on the individuals learning the new concept (Schmiedgen et al., 2015). One approach is to use pilot projects as a way of testing the new way of working on a small scale and in a protected setting (Turner, 2005).

1.2 Purpose and Research Question

The purpose of this thesis is to investigate the use of a pilot project to introduce DT in a company, as a way of learning a new management idea for further implementation. To explore the purpose, three research questions have been formulated:

- *To what extent are teams actually using DT in such a pilot project?*
- *How do individuals with different thinking profiles cope with a DT process?*
- *What problems can arise from a fast-paced pilot-project set-up?*

The research builds on the single case study of Centiro, a Swedish software company that recently decided to implement DT into their operations. As part of their implementation journey, an experiment was carried out in the form of a pilot project that was carried out in a short period of time. For this experiment teams were formed within the company based on the results of thinking profiles test conducted on the employees. During the pilot project these teams tried using DT, with the purpose of learning and evaluating the usefulness of the concept in their own context. During the experiment, the writers of this thesis conducted an observation study to investigate the initial steps of implementation of a new management idea, in this case DT, into an organization. For the purpose of this thesis the teams were studied throughout the pilot-project by means of observations, interviews and questionnaire data. The thesis contributes to a discussion of how a fast-paced implementation of a management concept may hinder both learning and sustainable change, as well as the discussion of how firms may implement DT.

1.3 Case Organization

The organization that is the setting of this research is Centiro Solutions, located in Borås, Sweden. The company specializes in creating logistic software solutions for their customers with a focus on transport management, e-commerce, fulfillment, service delivery, returns management and supply chain visibility. Being a privately owned company with around 120 employees, founded in 1998, they are now serving customers in over 100 countries (Centiro, 2016).

2 Literature review

2.1 Design Thinking

2.1.1 Background

Rauth (2015) has defined management ideas as spoken or written discourses that propose and justify a technology or approach to manage different parts of an organization. He states that as discourses they consist of textual elements that can be grouped into two dimensions, rhetorical and technological. The rhetorical dimension consists of the label, a central claim, superiority claims, threats and warrants. The seven technological dimension consists of principles, practices, techniques and implementation instructions and warnings (Rauth, 2015).

DT has emerged as a multidisciplinary human-centered approach to innovation based on the way designers think and work (Brown, 2008, 2009; Martin, 2009; Johansson-Sköldberg et al, 2013). Rauth's (2015) definition of management ideas supports that DT can be considered as a management idea and can therefore be implemented as such within an organization. DT as a management idea is becoming more widespread and is promising improvements on innovation (Brown, 2008; Martin, 2009; Carlgren et al., 2014). However, management ideas, such as DT, tend to have a certain vagueness and ambiguity (Giroux, 2006), which allows individuals to align it with their individual goals and the means of achieving them (Rauth, 2015). This interpretability is one of the reasons some management ideas have become so widely popular amongst practitioners (Ansari et.al., 2014; Benders and van Veen, 2001; Giroux, 2006).

DT has been defined in numerous ways. The reason for the multiple definitions can be a consequence of how wide the concept is, both in theoretical and practical sense. The interpretability of the method is another reason for the ongoing discussion on the definition (Schmiedgen et al., 2015, Rauth, 2015). Hassi and Laakso (2011) point out that searching for a definition does not produce a concise description of what the concept consists of. Further, they claim that there are two discourses within the discussion on DT that differ. Johansson-Sköldberg et al. (2013) define those discourses as designerly thinking and design thinking. They define the nature of designerly thinking as the academic construction of the professional designer's practice (practical skills and competence) and theoretical reflections around how to interpret and characterize this non-verbal competence of the designers. They claim that designerly thinking links theory and practice from a design perspective, and is accordingly rooted in the academic field of design. They reserve the term of design thinking for the discourse where design practice and competence are used beyond the design context, for and with people without a scholarly background in design, particularly in management. Their view is that design thinking then becomes a simplified version of designerly thinking or a way of describing a designer's methods

that is integrated into an academic or practical management discourse. The design thinking discourse introduced by Johansson-Sköldberg et al. (2013) will be used as the focus here onward.

However, DT has been criticized in the design research community (Johansson-Sköldberg et al., 2013; Jahnke, 2013). The management discourse of DT has been accused of presenting the concept of DT as something that is straightforward to implement and will create value in any setting (Carlgren, 2013). The same discourse has also been criticized for claiming to take inspiration from how designers think and work, and therefore generalizing the competences of all designers (Kimbell, 2012). Another critique on DT according to Johansson-Sköldberg et al. (2013) is the focus on tools, which are presented as a toolbox one can pick and choose from regardless of skill and in the meanwhile leaving out the knowledge needed to use these tools (Johansson-Sköldberg et al., 2013; Carlgren, 2013). It is argued that this crucial knowledge and competences, to make sense of the tools, requires years of training and is embodied in designers (Johansson-Sköldberg et al., 2013).

2.1.1.1 The process

According to Carlgren (2016) DT is often described as a process where multidisciplinary teams apply a set of design practices to any innovation challenge or problem that needs to be solved. Liedtka (2015) has reviewed how the leading consultants in the design space, practice DT. Those include educators like the Rotman School at the University of Toronto, the Darden School at the University of Virginia and Stanford Design School, as well as industry actors like IDEO and Continuum. She also identifies that despite each of them using different terminology, the review reveals a widely shared view of the DT process. According to Liedtka (2015) this widely shared view involves three stages of the process. The first stage is an initial exploratory phase with focus on data gathering meant to identify user needs and define the problem. The second stage is idea generation and the third stage is prototyping and testing. These three stages can be closely related to the three phases of need finding, brainstorming, prototyping described by Seidel and Fixson (2013).

The design thinking process of this research will be guided by the method introduced by Stanford Design School (Figure 1). With the user's needs in mind, the process first defines the problem and then implements the solution. It emphasizes need finding, understanding, creating, thinking, and doing in the five steps of the process; empathize, define, ideate, prototype and test (d.School, 2012).

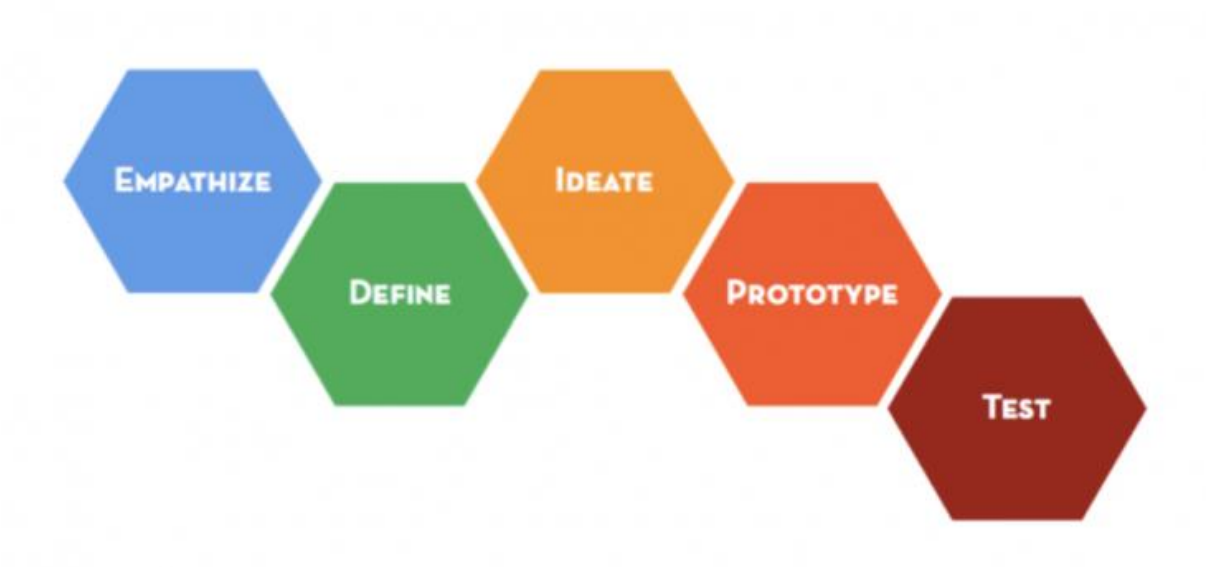

Figure 1: Design Thinking process (d.School, 2012)

2.1.1.2 DT as a divergent and convergent process

The DT process has also been associated with the "double diamond" design process model (Design Council, 2005) divided into four distinct phases; discover, define, develop and deliver. It maps the divergent and convergent stages of the design process, showing the different modes of thinking that designers use. Efeoglu et al. (2013) who use the terms problem space and solution space to conceptualize the DT process, explain divergent thinking as the ability to find many possible answers or opinion to a particular problem and convergent thinking as the ability to utilize methods, patterns, clusters, concepts or framework to bring the elements and outputs of divergent thinking together in a meaningful way. Convergence and divergence will be defined and discussed later in this section.

Lubart (2001) has identified the creative process as the sequence of thoughts and action leading to a novel, adaptive product. In earlier literature the concepts of divergence and convergence have been associated with the creative process (Lubart, 2001; Tschimmel, 2011) and DeCusatis (2008) has demonstrated a connection or similarities between the aspects of the "creative process" and the "breakthrough thinking process". He claims that each step of the creative process requires unique mental skills, and that most individuals prefer some skills above others. The breakthrough thinking process model has four steps; clarify, ideate, develop and implement (FourSight, 2014). This model has then some similarities with the DT process and the double diamond design process model with regard to divergent and convergent thinking; hose connections and similarities are demonstrated in Figure 2

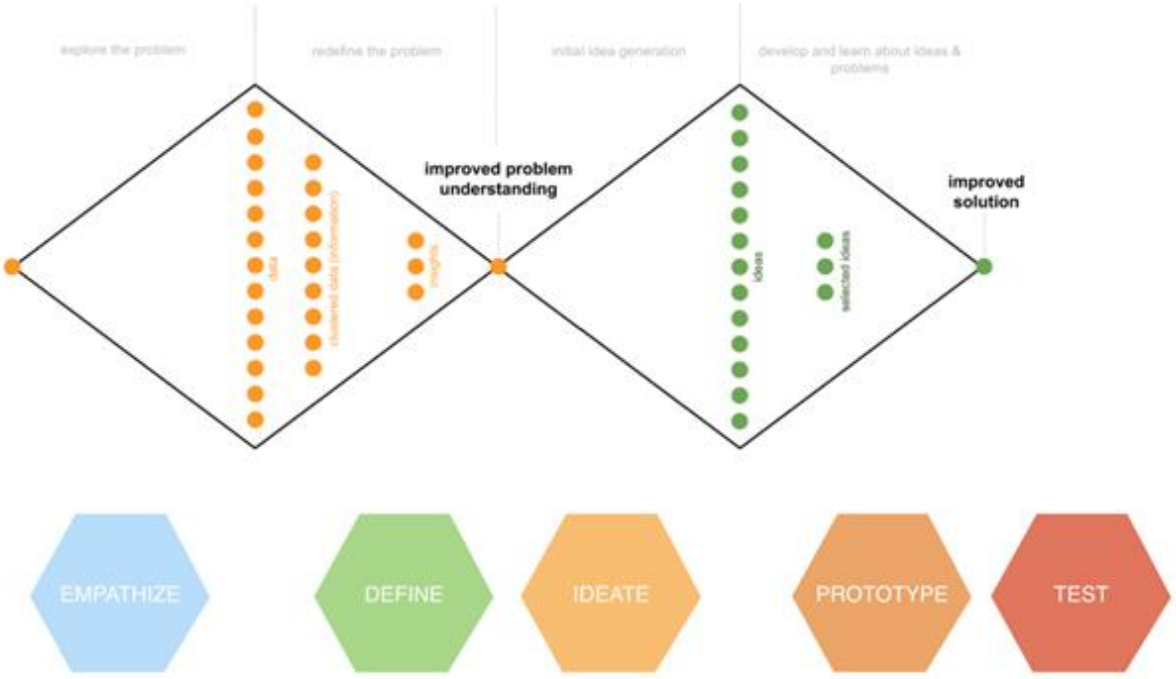

Figure 2: Design thinking process related to the double diamond (Carlgren, 2016)

2.1.1.3 Central themes in DT

Efeoglu et al. (2013) characterize the use of DT (in order of importance) as; human-centricity, collaboration and teamwork, interdisciplinary teams, ideation and experimentation and time boxing. On the other hand based on ethnographic research of large firms claiming to use DT, Carlgren et al. (2016) have identified five themes characterizing the use of DT; user focus, problem framing, visualization, experimentation and diversity. The characteristics of DT used in this research will be based on the framework introduced by Carlgren et al. (2016) which can be seen in Framework 1. It frames DT as a concept both in idea and enactment, where each characterizing theme can be associated with specific principles/mindsets, practices and techniques that are embodied and enacted differently in a local settings and sometimes manifested as a process, sometimes not (Carlgren, 2016).

Themes	Principles/Mindsets	Practices	Techniques
User focus	• Empathic • Curious • Non-judgemental • Social	• Seek to understand latent needs and pain points of users (empathize) and let this understanding guide all work • Use a qualitative, context specific approach in user research. • Involve users in ideation, prototyping, testing	• Ethnographic research • Informal meetings with customers • Accumulate user stories and anecdotes • Journey mapping, empathy map, persona • User feedback sessions
Problem framing	• Unconstrained thinking • Comfortable with complexity and ambiguity • Open to the unexpected	• Challenge and reframe the initial problem to expand both problem and solution space • Synthesis of research insights: finding patterns, framestorming (ideation to find alternative problem formulations)	• 'How-might-we-questions' • 'Five why' • 'The problem statement' (Point Of View), 'painstorm', 'FOG' (fact, opinion, guess)
Visualization	• Thinking through doing • Bias towards action	• Make ideas and insights visual and tangible to externalize knowledge, communicate and create new ideas • Visually structure data • Make rough representations • Provide experiences to enable understanding	• Creation of rough physical mock-ups by using e.g. paper, card-board, glue and foam, Lego, or any available artefacts • Sketching, storyboarding • Storytelling, role-play, video • Writing 'ugly code', wireframes
Experimentation	• Curious and creative • Playful and humoristic • Optimistic and energetic • Learning-oriented • Eager to share	• Work iteratively (divergent, convergent) • Converge based on a diverse set of ideas • Prototype quickly and often to learn • Test solutions quickly and often: share prototypes with users and colleagues • Fail often and fail soon	• Brainstorming techniques • Creation of flexible and physical space that supports experimentation and visualization
Diversity	• Integrative thinking • Open to differences in personality type/background • Democratic spirit	• Create diverse teams and let everyone's opinion count • Collaborate with external entities • Seek diverse perspectives and inspirations (variety of fields, broad research) • Take a holistic perspective into account	• Personality tests • Conscious recruitment • Analogies, study visits • '360° research': white space analysis, benchmarking, past failure and success, pattern recognition, demographics, etc.

Framework 1: Framework of idea and enactment of DT, introduced by Carlgren et al (2016)

Dunne and Martin (2006) stress the importance of creativity and innovation in contemporary businesses. They claim that the user centered focus is important because of the organizational tendencies to project own rationalizations and beliefs onto the user instead of isolating their needs and interests. According to Carlgren et al. (2016) the user focus theme refers to empathy building, deep user understanding and user involvement. According to Dunne and Martin (2006) it is therefore essential in the design process to develop a clear understanding through user interaction and study of users as early as possible. Wölbling et al. (2012) state that the true problem to address is often deeply hidden and the difference of how designers tend to allow themselves to search for it while organizations quickly assume they already understand the problem and their customers need. And that the result of this is that many solutions that are created are in fact created for the wrong problem and therefore, they fail. They describe the importance of searching for hidden insights into the problem at hand in order to create meaningful products and services. Further they describe how the uncertainty that innovation entails contrasts the business world and how DT helps to bridge this gap (Wölbling et al., 2012). This summarizes quite clearly the difference between understanding and assuming user's problems and needs, and the importance of the user centeredness aspect of design thinking. The problem framing theme refers to how interviewees relate to the problem at hand give insights into the problem in order to widen it and reframe instead of trying to solve it (Carlgren et al., 2016). Different techniques are used in order to achieve this, e.g. ethnographic research, informal meetings, collecting stories and journey mapping (Carlgren et al., 2016).

The user focus theme refers to active involvement of users in various stages of the process, idea generation, prototyping and validation of ideas as Carlgren et al. (2016) mention. They also categorize user feedback session as one of the techniques used for the user focus theme of DT. Wölbling et al. (2012) state that the purpose of prototypes is to gain quick feedback from potential users on ideas, but the obtained feedback must be interpreted with care as not all feedback is useful. The iterative nature of DT is therefore valuable on this stage, the ability to go back and gain a deeper understanding or find something that was passed in earlier stages of problem framing (Wölbling et al., 2012).

The visualization theme of DT refers to visual representation by making ideas tangible in a simple way (Carlgren et al., 2016). It can be low-resolutions representations or mock-ups of ideas or solutions, and can be either physical or enacted through storytelling or roleplay (Carlgren et al., 2016), mostly for providing further understanding and joint creation of the ideas. Another theme of DT is experimentation and iteration which mostly refers to moving between divergent and convergent ways of thinking while testing and trying things out in an iterative way (Carlgren et al., 2016). Yet another theme is diversity, which includes collaboration in diverse teams and the participation of outsiders who can provide perspectives that can be valuable throughout the process (Carlgren et al., 2016).

2.2 Team Diversity

2.2.1 Introduction to diverse teams

According to Katzenbach and Smith (1993) a team is defined as a small group of people that have skills complementary to one another and are committed to a common purpose for which they hold themselves mutually accountable. Cohen and Bailey (1997) say that a team in an organizational setting is a collection of individuals, who are interdependent in their assignments, and share responsibility for outcomes, while Katzenbach and Smith (1993) claim that members share performance goals and develop a common approach to the problem at hand, and, that the contribution of the team as a whole is greater than the sum of the individual contribution of team members. Further, Shani et al. (2009) state that teams allow for more rapid response to a continuously changing business environment. According to them, teams and teamwork is being championed as a way of replacing inflexible dehumanized, bureaucratic mechanisms with a more humanistic approach. Shani et al. (2009) define teams as a group of people who have to produce one-time output such as new product or service to be marketed by the company.

According to Shani et al. (2009) there are six factors that affect group development and performance (Shani et al., 2009). These are Diversity, Leadership, Context, Structure, Purpose, and Processes. Clearly defined goals are critical for effective group performance (Shani et al., 2009). They also state that the task and project characteristics of the group determine its performance and explain that they include the required activities, interactions, timeframe and deadlines.

2.2.2 Diversity

Stewart (2006) points out that the composition of a group is based on the characteristics of individual team members. However, he also states that the composition can be approached in different ways. One way is to examine the aggregated characteristics to assess if the inclusion of certain individuals with abilities and desirable disposition improves the team performance. While another is to look at how diversity of individual characteristics relate to team outcomes. In this particular research the focus will be similar to the latter approach, how diversity of team members affects team outcome.

Katzenbach and Smith (1993) state that it has been proven that teams outperform individuals, especially when diverse experience, judgement and skills can improve the results. They also state that the team members' background and knowledge can be helpful regarding quick and intelligent responses to complex challenges such as the need for innovation. Cohen and Bailey (1997) mention that teams with greater diversity evaluate their effectiveness more positively. The explanations range from better use of the knowledge of the team members to better cooperation and communication with external groups, also that skill heterogeneity have relationship to manager ratings of performance, productivity and employee satisfaction (Cohen and Bailey, 1997).

According to Shani et al. (2009), teams will be composed of variety of strengths because each individual is unique. They go on to say that this diversity can be an advantage for a well-integrated team, assuming there is built-in mutual respect for the inherent differences, and that teams can take advantage of this by organizing around particular strengths.

Shani et al. (2009) identifies that not all people can be treated the same way and individuals need to be fostered in order to make them grow as people and employees. Sparks et al. (2015) say that it is important to emphasize the team's identity over the identity of the individuals that comprise the team, however there is an importance in emphasizing every member of the team, making them equally important and a vital function of the teamwork (Sparks et al, 2015).

2.2.3 Convergent and divergent thinking styles

Dibella (2011) claims that understanding the learning capability of individuals requires more than just testing for IQ, arguing that learning and intelligence are multi-dimensional concepts that cannot be determined with a single measure. They explain that reliance on single measures simplifies reality but, more critically, devalues ways of learning and forms of intelligence that deviate from social norms. It can therefore be valuable to understand how different individuals can contribute within different phases of the innovation processes.

Kelley (2005) introduced the ten faces of innovation where ten different personas can impact the performance of an innovation team differently. They are divided into the learning personas, the organizing personas and the building personas. The learning personas are constantly seeking information to grow and expand their knowledge, the organizing personas fight for the process of moving ideas forward within the organization and the building personas apply insight from the learning personas and channel the empowerment from the organizing personas to make innovation happen (Kelley, 2005).

As shown, a DT process can be described as a series of diverging and converging phases (Efeoglu et al., 2013), similar to previous work on creative processes (Lubart, 2001; Tschimmel, 2011). It is therefore of interest to understand how individuals cope with divergence and convergence, and how this may affect teamwork. Oxford dictionary of psychology (2014) defines convergence and divergence as cognitive styles. It states that it is defined by two radically different modes of thinking. Convergent thinking is described as a tendency to focus on a specific solution, a process that involves taking a lot of different aspects into consideration. Further the definition states that convergent people are often logical and reality oriented and tend to base their conclusions on what they know and have learned. This description of convergence fits with the organizing persona of Kelley's (2005) ten phases of innovation. Divergent thinking, on the other hand, is described as an ability to fluently produce many novel ideas to a problem and divergent people like working with problems that do not have a unique solution. (Oxford Dictionary of Psychology, 2014). The definition of divergence can be connected to Kelley's (2005) learning persona.

Divergence is often used in the same sense as creativity (Oxford Dictionary of Psychology, 2014; Kim, 2006; Myszkowski et al., 2015). However, according to Kim (2006) and Myszkowski et al. (2015) creativity does not only involve fluency of ideas but also a converging process of narrowing down and consciously choosing the most creative solution. Shani et al. (2009) define creativity as an individual's ability to take bits and pieces of seemingly unrelated information and synthesize the pieces into a new understanding or a novel, useful idea. Further Kelley's (2005) building persona can therefore be considered an important link between convergence and divergence in order to drive the creative process. Furthermore, when researching the five big

personalities, conscientiousness, agreeableness, neuroticism, openness and extraversion, Myszkowski et al. (2015) identified a correlation between agreeableness and convergence and also between openness and divergence. This suggests that convergent thinkers should be able to find more ideas to solve managerial problems than divergent thinkers, and that divergent thinkers should be able to elaborate more creative solution to managerial problems than convergent thinkers would be able to (Myszkowski et al., 2015). Therefore it can be assumed that in order to create a successful innovation team, the team needs to consist of both divergent and convergent thinkers.

2.2.4 The FourSight thinking profiles

DeCusatis (2008) states that one approach to building innovation teams in a more structured way involves measuring team members' preferences and balancing the team accordingly. He claims that since every individual's personality differs, their supporting metrics are completely subjective. He describes the "breakthrough thinking process" building on a studies within creativity and the creative process and similar to the double diamond process (DeCusatis, 2008; Lubart, 2001). The "FourSight breakthrough thinking profile" is built on a theory by Gerard J. Puccio, which explains the correlation between individual behavior and creative problem solving preferences (FourSight, 2014; Bratsberg, 2012).

The FourSight thinking profile test is presented as an innovative way to measure people's preferences for the essential components of the innovation process (FourSight, 2014) and is built on instruments that measure thinking skills alone. Therefore it differs from other instruments that measure personality type/temperament and cognitive thinking (DeCusatis, 2008). Also, the breakthrough thinking process is comprised of series of discrete, repeatable steps that people engage in regularly in various circumstances. Breakthrough thinking is a blend of insight, imagination, analysis and action and is meant for improved innovation processes (FourSight, 2014). The more scalable or the greater the impact of breakthrough thinking, the more innovative people and teams can be (DeCusatis, 2008).

Below the four different thinking profiles according to the FourSight thinking profile will be described as presented by promoters of the FourSight. The test describes four main preferences and then many different combinations of them (FourSight, 2014). In this chapter four different learning styles will be described and connected with the concepts of convergence and divergence.

Clarifiers

Clarifiers are described as focused and methodical and like to gather information and get to the core of the problem at hand before trying to solve it. They are organized and orderly and enjoy looking at details by researching, investigating and look for information to get as clear understanding of the problem as possible They need order and want to know all the facts, figures, history and details of a situation. Further, to be able to work in a diverse team they need to come to terms with some level of uncertainties and ambiguity. They tend to take a straightforward and methodical approach and move forward very carefully with the process and making sure they don't miss out on anything important. They also tend to be overly cautious and get too caught up in historical approaches to challenges. Further they are sometimes considered too realistic and are often able to identify obstacles and areas that have not been well thought out (FourSight, 2014).

Because of clarifiers' need for gathering information and considering many different aspect of the information that is available when making a decision, as well as their preference towards history, facts and logic, clarifiers can be considered convergent thinkers.

Ideators

Ideators are described as playful and social and highly fluent idea generators. They like to think in as broad a sense as they can. Ideators are usually imaginative, adventurous and flexible and like generating concepts and ideas that are more abstract than others consider usual. They are visionaries who are most comfortable understanding the big picture and utilizing their imagination to the fullest. They need room to be playful, constant stimulation, variety and change. To be able to work in a diverse team ideators must be able to offer more concrete descriptions of their ideas and realize that not all ideas can be conceptualized. Ideators tend to draw attention to themselves and others sometimes consider them too abstract. They are less concerned with details and are able to see many possible solutions to the same situation, but may move quickly between ideas without seeing them through (FourSight, 2014).

Because of the ideators' playfulness and fluency of producing many ideas, they can be considered divergent thinkers.

Developers

Developers are described as liking to refine ideas and hone their thinking as they are reflective and structured. They like to focus on the potential solution, all of its aspects, strengths and weaknesses. They are cautious while they strive for perfection. Transforming an idea from its initial form into a finely crafted solution delights the developer, as well as thinking of implementation steps. They need time to consider and evaluate their options and develop their ideas but must be careful not to make their

teammates impatient by lingering on one solution or aspect of it. Also by being too criticizing they might find flaws in other's ideas and therefore not being open to other worthy alternatives. Because of the focus of analyzing, comparing and choosing the final solution they may get stuck in striving for developing the perfect one. This might result in getting locked into one approach or get in the way of moving the idea to action (FourSight, 2014).

Because of developers' analyzing nature, cautiousness and their tendency to dive into strengths and weakness of the solution developers can be considered convergent thinkers.

Implementers

Implementers are described as persistent and determined and like to focus on taking action on ideas. They obtain the most energy from seeing ideas develop into tangible outcomes as they are decisive and action-oriented. They like to get things done and are constantly trying to drive the next idea to implementation. They need timely responses to their ideas to be able to iterate according to feedback as they tend to move quickly when they get closer to implementation. They want control and the feeling that others are moving on the same pace to not get annoyed by lack of progress within the team, but must be careful of not being too assertive. This focus tends to make them react too rapidly and oversell their ideas in the process. They must be careful not to rush the innovation process by being reluctant to other's ideas and listen to feedback that might actually improve the results. By committing too soon to one idea, they might leave more powerful ideas undiscovered (FourSight, 2014).

It is challenging to classify implementers as either divergent or convergent because they seem to have tendencies towards both even though convergence seems to be the more dominant cognitive style for them. Further, their role as implementer is to act after the creative process has been performed and does therefore not require a classification for the purpose of this thesis.

Integrators

Integrators are described as a mix of all the four learning styles mentioned above. Their energies stay rather steady as they focus on the facts, identify the challenge to address, entertain a plethora of ideas, refine those ideas and finally put them into practice. Therefore they can be very flexible throughout the whole process and assist whenever requires. They can be excellent team players who find it easy to work with any other profile because of the ease to put themselves in the others' shoes. However, they must be cautious not to become followers when others have strong preferences, but remember to diagnose the situation for themselves and work accordingly (FourSight, 2014).

Integrators cannot be categorized into convergent or divergent based on their learning style but can be rather considered a link between the two.

2.3 Learning in teams

2.3.1 Team learning and creativity

According to Druskat and Keyes (2000) team learning can be viewed as a dimension of team effectiveness. The definition of team learning is very close to organizational learning. Druskat and Kayes (2000) define team learning as the acquisition and sharing of unique knowledge and information. Shani et al., (2009) say that team learning is the team's capacity to increase and improve knowledge, skills and competencies and includes an internal ability to learn from experience, assimilate new ideas and translate them into action. Further Druskat and Keyes (2000) claim that when the team's task is complex, a focus on team learning can improve team's decisions making and the effectiveness of task strategies that are implemented.

Another factor of team dynamics is creativity. And as Lawson and Samson (2001) put it, creative time is one of the components that creates culture and climate for innovation success. According to Carmeli and Paulus (2014) team creativity is a process where team members jointly engage in ideation, discovery of and the search for new solutions based on the exchange of perspectives, information and thoughts. Further they claim that in order for the team to function effectively on the creative tasks it is crucial for them to be highly motivated and effectively exchanging ideas and information. Shani et al. (2009) suggest that one of the key for team creativity is consensus. According to them the process of consensus refers to arriving at a decision that all members of the group are willing to support and no team member opposes. Further they claim that the decision is not necessarily a unanimous choice, but is acceptable to all the group members. This process, according to Shani et al. (2009), seems to enhance the opportunity for creativity, innovation, and high-quality decisions because the group spends a significant amount of time working through alternative solutions until reaching a solution that everyone finds acceptable. In order to achieve this some guidance might be helpful.

2.3.2 Team leadership and facilitation

Carmeli and Paulus (2014) suggest that leaders should exert limited control over their team. This is based on Amabile´s (1988), conclusion that teams are able to work optimally when they are allowed considerable autonomy. However, according to Carmeli and Paulus (2014), some teams are considered to be underperforming, in both decision making, and creative tasks and thus some degree of leadership guidance might be necessary for the teams' realization of their full diverse cognitive potential (Nakui, Paulus and van der Zee, 2011; Paulus, 2008).

Leaders play the important role of providing the team with both the task and relational context to enable it to perform effectively (Burke et al., 2006). In that sense, the leaders that tend to be most effective when it comes to creativity, are those who set expectations for creativity, create an environment that is supportive and where people

sense psychological safety, energy and vitality, positive mood and creative self-efficacy, and also initiate structure for the team work, set clear deadlines and closely monitor the performance (Paulus et al., 2011; Hulsheger et al., 2009; Reiter-Palmon & Illies, 2004; Zaccaro, Rittman & Marks, 2001). A leader can be able to stimulate intellectual interest in entrepreneurship endeavor or science without it leading to production of novel ideas according to Carmeli and Paulus. (2014). However they also state that when teams engage in ideation processes, they need a leader who can facilitate activities in such a way that the team can utilize all the potential of their diverse skills and cognitive repertoire. The key impact of this ideational facilitation is bound to happen during team meetings (Dunbar, 1997).

Baruah and Paulus (2009) claim that what is needed for team creativity and ideation is a leadership that also encourages team members to effectively combine their skills and knowledge that would not have been possible otherwise, not only motivates them to be creative. In continuation they also claim that

> *"…a scientific team in which group members learn from each other and gain deeper understanding of a phenomenon is more likely to lead to breakthroughs than one in which each simply plays their assigned role without trying to enhance their understanding of the perspectives of the other group members. (Baruah and Paulus, 2009)*

Adams et al. (2007) state that every team project requires meetings because it provides a forum for exchanging information, validating work products, creatively develop deliverables or solutions, making decisions or even learning how to work together in a better way as a team. They also claim that meetings are regardless intended to achieve some results for the project at hand and that effective facilitation and meeting facilitation skills can help make that happen. Facilitating a project meeting doesn't mean dictating or directing outcomes or making everyone have the same opinions as the leader. It is about enabling and guiding (Adams et al., 2007).

However, every meeting is not the same. According to Adams et al. (2007) they can differ in objectives, deliverables and expectations as well as complexity and tone, therefore facilitators can't expect to be effective for every sort of meeting as everyone differ in how comfortable they feel about a meeting in regards to individual experiences and preferences. They state that there are three levels of facilitator ability: novice, skilled and expert. Novice facilitators are individuals who are fairly new to facilitation, who understand basic mechanics of scheduling and agendas but are inexperienced or untrained in group dynamics or more advanced facilitation techniques (Adams et al., 2007). Skilled facilitators have more solid meeting capabilities and the competences to confidently lead when confronted with unexpected issues or roadblocks, they have probably been trained somehow in facilitating or gained experience through a longer time period (Adams et al., 2007). Expert facilitators possess specialized knowledge and/or experience in addition to the advanced facilitator skills (Adams et al., 2007). Expert facilitators are superior to skilled facilitators because of the ability to use their

specialized knowledge in such fields as coaching, psychology, team development, or quality processes and tools (Adams et al., 2007). Therefore, he claims that matching the facilitation skills with the meeting needs is a factor worth considering. A categorization of the needs according to Adams et al. (2007) is: information exchange is suitable for novice to skilled facilitators, while creative development and decision making require skilled to expert facilitation. Coaching, like when the facilitator is expected to teach a new method e.g. DT, is then considered a task for an expert facilitator.

2.4 Learning a new management idea

2.4.1 Introduction

Shani et al (2009) claim that the development of a sustainable organization and workplace is strongly related to the ability to develop the organizational capability to change. They consider change management and business development a challenging managerial task. The reason for this, according to them, is that only few organizational development and change programs are successful in transforming, and even harder, sustaining the reinvented processes. The methods in which organizations are managed are one of the aspects that can be developed. These methods, or management ideas, should support the organization's operations at each time and therefore when the organization grows they can be adjusted accordingly (Rauth, 2015). Quinn (1993) explains how organizational development cannot be done without an understanding on both the world of business and the world of human relationships. At the same time, Shani et al. (2009), claim that organizational development and change is aimed at influencing human interactions to help organizations in guiding their evolution in the right direction. Also to enhance the cultural elements that are considered critical to maintain the desired outcome and effectiveness (Shani et al., 2009,). Additionally they explain that organizational learning is considered a key factor in achieving and sustaining success. Argote (2013) claims that organizational learning can be defined as a change in knowledge that can be acquired through experience. Further she explains that knowledge can be described as either the organization's knowledge and facts as well as the organization's skills and routines (Argote, 2013). The importance of learning in organization is made even higher when Dibella (2011), claims that organizations can be viewed as learning portfolios where learning should be considered an innate aspect of all organizations and when Schein (1993) explains how the increased speed of society and information flow was making learning a necessity rather than a choice. This can be considered even more relevant for today's society.

One kind of organizational development is implementation of a new management idea, something which can be challenging (Shani et al., 2009). Rauth (2015) has illustrated five stages of the implementation of management ideas by building on adaptation theories by Rogers (2003) and Birkinshaw et al., (2008). These five stages are;

1. Creation of a need through voicing of an organizational problem
2. Matching an organizational problem with a management idea
3. The organization tries the management idea through experimentation
4. Clarification and theorization of the management idea in relation to the organizational context
5. A management idea becomes an integral part of the organization.

To reword the process: finding what the organization needs, finding a management idea that solves that need, trying the management idea out through experimentation, adjusting the management idea to the organization; then the organization can be considered to have learned and developed. Further, according to Leavy (2005), some of the most well-known innovate companies share these four culture setting principles, which he considers fundamental to their success; a) Placing of people and ideas at the heart of the management philosophy. b) Giving people room to grow, to try things and learn from their mistakes. c) Building a strong sense of openness, trust and community across the organization, and d) Facilitating the internal mobility of talent.

2.4.2 Learning a new concept

Rauth's (2015) definition of management ideas supports that DT can be considered as a management idea and can therefore be implemented as such within an organization. Meanwhile, Schmiedgen et al., (2015) have identified that DT as a concept has various ways of entering an organization and there is no standard path in the implementation. They claim that there are multiple learning channels that have been used in implementation of DT, where some seek professional training at educational institutions while other use self-help literature and teach themselves the concept. Then there are those who seek advice from external coaches, agencies and consultancies and even those who access an institutionalized innovation program in their organization with own internal coaches (Schmiedgen et al., 2015). Seidel and Fixson (2013) implicate that a successful implementation of DT relies on coupling formal methods and reflexive team practices according to team composition and phase of development, where formal methods is the DT process discussed in chapter 2.1.1.1

Fixson (2009) claims, that if innovation is understood as a process of inventing, developing and commercializing new products and services, then it can perhaps be taught. DT as an approach to innovation, therefore fits within this claim. However, Schmiedgen et al. (2015) also claim there is a downside to the miscellaneous education offerings of DT, as there are lots of different actors, offerings and sources

asking for attention and authority on interpretation. On the one hand they state that the accessibility to DT has increased, but on the other hand, the different views on what DT is makes learning it challenging. Therefore it can be hard for beginners to recognize the quality of all the different trainings as there is no existing standard, resulting in multiple versions of the understanding of DT (Schmiedgen et al., 2015; Rauth, 2015).

According to Schmiedgen et al. (2015), for the successful diffusion of DT in an organization the purpose of leadership should be to first nurture the appropriate behaviors, principles and structural changes. They then state that in return and with management acknowledges and support, it might enable the necessary autonomy to allow DT to diffuse the organization. Schmiedgen et al. (2015) also describe a number of reasons for the discontinuation of DT within an organization. The strongest theme according to Schmiedgen et al. (2015) is DT being handled as a one-off affair, meaning no efforts for organizational embedding were carried out and were not treated as a real knowledge transfer. They also identify lack of management support and failed diffusion and implementation where DT gets introduced in an isolated manner where it could then be affected by an organizational structure and culture that is not prepared to give it a chance to show its potential.

2.4.3 The pilot project as a vehicle for learning and change

Uncertainty is a factor that is often considered to greatly impact innovation. Also, uncertainties are costly (Kline and Rosenberg, 1986). Pal et al. (2008) mention that since implementation of new technology has many uncertainties careful consideration should be made before committing to full implementation. Further, Glass (1997) states that if a new technology or method is explored in an unobstructed, experimental setting, the best approach to the use of it can be explored and no harm can be done if it does not work. Turner (2005) claims that the pilot project or pilot study will help to reduce uncertainty about the method by which the product will be delivered or about the product to be delivered by the project or program by generating additional data or information.

Turner (2005) defines a pilot project or a pilot study as an element of work that is undertaken as part of a bigger program or project to reduce uncertainty or risk associated with a change. According to him it takes place as part of a project or program to undertake research, introduce strategic change or innovation, not as part of routine operations. Further, Glass (1997) states that a pilot study is perhaps the best approach to determine which technologies for productivity and quality are worth implementing in the organization. Pilot studies have also been claimed helpful in customer-centric technology projects, where users' feedback is critical to analyze by the organization that will own the project if implemented (Pal et al. 2008). Therefore, pilot projects offer an opportunity to determine if implementation of a new method is suitable while it's being tested, and at the same time reduce uncertainty and therefore resources required

On the other hand, there are number of limitations to pilot projects that should be recognized. According to van Teijlingen and Hundley (2001) these limitations can include the possibility of making inaccurate predictions or assumptions based on the pilot data, problems arising from contaminations and problems arising from funding. Also, Mason and Zuercher (1995), mention that pilot projects can be time-consuming, frustrating and fraught with unanticipated problems, but still it is better to deal with them before investing time, money and the effort necessary for a full study.

Turner (2005) mentions that organizational learning is somewhat a side effect of conducting a pilot study. Pal et al. (2008) claim that the importance of capturing the experience, both positive and negative, and lessons learned during a pilot project can contribute to the learning. And, according to Turner (2005) this learning can be how to mitigate risk, how to reduce uncertainty in product or process of a project and on resource requirement. Furthermore it enables learning of what will work and what not in new product development as well as testing the efficacy of a research instrument, where the training of the research staff is a possible reason for conducting such pilot study (Turner, 2005). Therefore, pilot projects can be vital to establishing transparency with the purpose of generating data to assist with learning or knowledge management in organizations

2.4.4 Barriers to learning

Shani et al. (2009) claim that it is as important to know what "turns people off" as to know what "turns them on" therefore it is important to understand not only how things are learned but also what hinders learning. According to Bartsch et al. (2013) it is a major challenge for project-based organizations to learn across project boundaries by making project-level knowledge available to the organization as a whole. Meanwhile, Longenecker (2010) addresses few factors that has been identified as barriers to learning during periods of rapid organizational change and transition.

One of these factors is time pressure: the learning practices are pushed aside for the more urgent or pressing work activities. Another is when people are unaware of the need for learning or don't know what they don't know: a lack of awareness can lead to serious problems if managers are unaware of a learning deficiency, especially during fast paced changes in responsibilities, technologies and/or processes (Longenecker, 2010). A third factor refers to little or no performance feedback or coaching: real learning requires feedback and ideally coaching on how to improve performance. Longenecker (2010) argues that lack of such factors can inhibit and limit correcting performance deficiencies and learning how to operate in a rapidly changing environment. Also lack of self-reflection and assessment is yet another factor hindering learning: not taking the time needed to self-reflect and for personal appraisal is an easy trap to fall into when time is limited which can result in countless learning problems (Longenecker, 2010). Further Bartsch et al. (2013) claim that social ties between project team members outside the project is an important driver of learning and

innovation, implying that teambuilding efforts do not only affect the outcome of the project but also the learning derived from it.

Fulop and Rifkin (1997) state that one aspect that is often ignored in literature and practice on learning in organizations is the expression of fear (Fulop and Rifkin, 1997). They claim that expressed fear might either propel collective learning, inhibit learning or in some cases have mixed or insignificant impact.

Whether, and what type of, learning occurs depends not only on the nature of our individual fear but also, and perhaps more significantly, on the processes of interpretation, filtering, and sanitizing of representations of that fear and other fears stimulated in the organization. (Fulop and Rifkin, 1997).

3 Methodology

3.1 Research Strategy

One of the most essential decisions a researcher has to make when conducting a research is whether the research should be of an inductive, or deductive nature. An inductive approach implies that that the researchers collect data which then are analyzed by identifying patterns on which theories are based. A deductive approach, on the other hand, involves the researchers proposing new hypotheses based on prior research results and theories and then collecting data to see if the hypotheses are supported or rebutted (Bryman and Bell, 2011).

Yet, in many instances research is seldom purely inductive or deductive. As new insights are revealed, either from theory or practice, the research will go back and forth between inductive and deductive phases, between theory and practice: an abductive approach (Dubois & Gadde, 2002). This is what happened in this study as well. Characteristic of an abductive approach are being open to new paths that arose in the research process, and once a deeper understanding was gained it was discovered that some underlying phenomena were more interesting than the initial research questions. The analysis thus shifted focus, and new streams of literature had to be considered before conclusions were reached.

At the case company, senior management had decided to carry out a pilot project to learn and test DT consisting of four phases, each covered through specific workshops. Temporary pilot project teams were carefully put together with a focus on the thinking profiles of chosen employees in an attempt to ensure diversity, something the company wanted to put focus on in their DT endeavor.

The purpose was to investigate the use of a pilot project to introduce DT in a firm, as a way of learning a new management idea for further implementation in a relatively short time. Two of the research questions (1 and 2) were deductive in nature, dealing with to what extent DT was used in the project, as well as how individuals of different thinking profiles would cope with a DT process. Here data collection was informed by literature describing DT as a concept, as well as literature on thinking profiles. However, while the initial focus was on linking the different thinking profiles with various aspects of DT, soon it was discovered that the setup and time restrictions of the projects caused problems in the implementation, giving rise to research question 3; “What problems can arise from a fast-paced pilot-project set-up?” as well as the overall purpose was inductive in nature, exploring traps related to the “speedy implementation” of a new concept.

In order to monitor the progress of the teams, as well as understanding contextual factors, an exploratory approach as well as mixed methods data collection were chosen.

3.1.1 Role of the researcher

Observation is a data collection method (Baker, 2006). It is quite complex as it requires the researcher to play a number of roles as well as to use a number of techniques to collect data (Baker, 2006). Additionally, the researcher must remember his/her role, despite the level of involvement, and remain detached enough to collect and analyze data that is relevant to the problem under investigation (Baker, 2006).

The researchers took an ethnographic approach as observers-as-participants according to Easterby-Smith et al. (2012) and Baker (2006). This means that they were not direct participants in the teams, they were observing, but with their prior knowledge and experience with DT they were able to answer questions and give some level of support if/when it was wanted. They also asked some questions to gain further understanding if necessary. All the projects were conducted in Swedish which is not the researchers' native language. That created some distance and detachment between the projects and the researchers, while still allowing the researcher to observe dynamic, activity level etc.

3.2 Research Design

In order to monitor the progress of the pilot project, the research was designed to fit the various phases of the project, as well as gathering background data. While Centiro's project set-up is described in detail in section 4, Figure 3 illustrates how project related data-collection was planned in accordance with the company's DT process. Table 1 gives an overview of the different activities carried out by the researchers in different phases of the study.

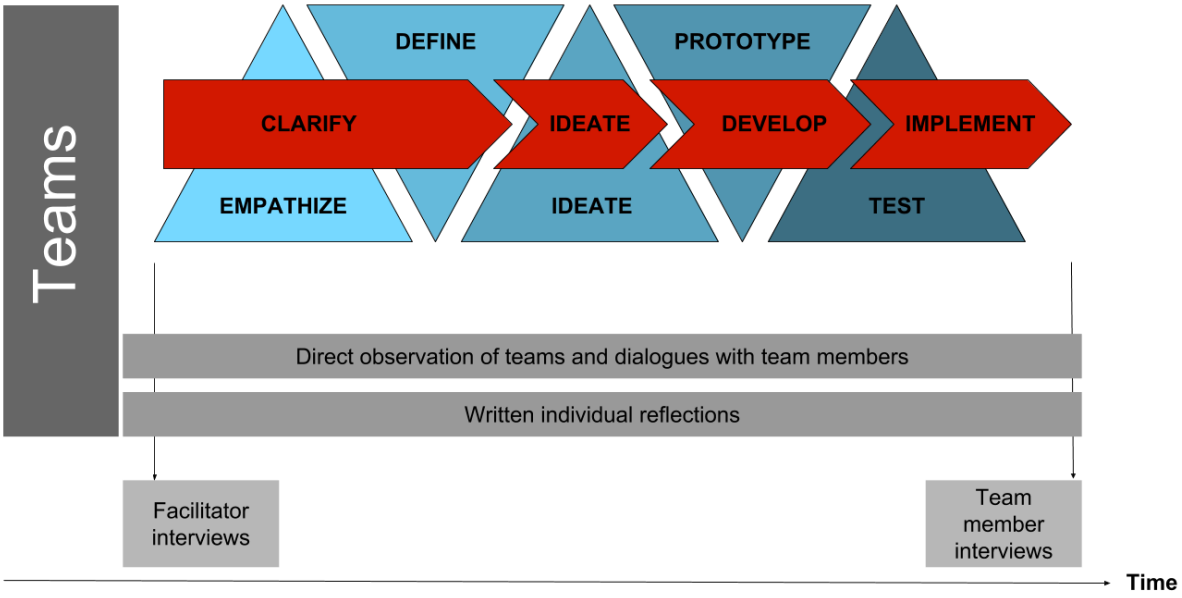

Figure 3: Illustration of the research design

Table 1: Activities in different phases of the research

Pre-phase	Interviewed company employees, such as sector managers,to get a thorough understanding of the company, daily operations, struggles and culture. Gathered information on how the team members were chosen, what was the expected results of the DT process, within each sector, and the company as a whole. Interviewed team facilitators to get an understanding of how they saw their role and their expectations of the projects. Also to learn about their training and their view of the team composition. Started and followed the DT process with the teams. The researchers' role was to observe as well as provide support on the process if necessary.
Phase 1	Interviewed team facilitators to get an understanding of how they saw their role and their expectations to the projects. Also to learn about their training and their view on the team composition.
Phase 2	Started and followed the DT process with the teams. The researchers' role was to observe as well as provide support on the process if necessary.
Phase 3	Final interviews with team members were conducted and the collected data was analyzed and discussed.

3.2.1 Data Collection

In this research a qualitative method (Bryman & Bell, 2011) was chosen where data was collected through qualitative interviews, logs and field notes and an online form the participants filled out with reflective questions of qualitative nature.

Before the projects started the researchers were introduced to the company, its development, success and struggles through semi-structured interviews with six senior employees in the company: two delivery managers, one marketing expert, one key account manager, one HR business partner, one application specialist and the CFO. Semi-structured interviews are guided open interviews. With more open questions interviews tend to have higher degree of confidentiality as the answers of the interviewees have tendencies to be more personal (Easterby-Smith et al, 2012). During these interviews both researchers asked questions and took notes. Since the goal was mainly to get an understanding of the company in order to frame the setting the project would be carried out in, the exact answers were not needed for the project.

After having familiarized themselves with the company the researchers supervised a "wallet exercise" (d.School, 2012)[1] with the facilitators. This was done in order to reacquaint the facilitators with the DT tools and process because some time passed from their training and the beginning of the projects. Then the researchers interviewed the facilitators in the pairs they would be working in. These interviews were semi-structured the objective of which was to gain an understanding of the aspirations and expectations the facilitators had towards the projects. Furthermore those interviews gave valuable insight into their views of the projects, their role within the teams as well as insight into their training. Before the first interviews the researchers asked if they could record the conversations but were informed of a company policy that prohibits recording of meetings in the company. Therefore no interviews were recorded during the research. However, later in the process a recording of the interviews would have been useful due to the abductive nature of the research, which lead to the insight that data considered irrelevant at one point could have been proven valuable at another.

Data was collected throughout the whole DT process which will be explained thoroughly in section 4. Direct observation of the team work was conducted during the whole period. To document the observation, the researchers used the most common type of data collection technique according to Polit and Hungler (1987), logs and field notes. During each workshop, notes were made on observations of the progress of the project and behavior of the different participants in a bullet point form. After each workshop this data was reflected upon jointly.

Further after each workshop an online form was sent to the participants where they were asked to reflect on various aspects of the workshop, its activities, facilitation and teamwork (Appendix 1 and Appendix 2). Further a final reflection form was sent to the participants. There were two interview checkpoints with a pre-decided focus and questions but some dialogues and conversations with participants was conducted throughout the whole process. The online forms included closed as well as open questions where the participants were required to put their answers in words, sentences or paragraphs. The participants were required to provide answers in these form using their name. This was done in order to make it possible to trace the answers back to the thinking profiles.

Two sets of interview rounds were conducted. In the first round, the facilitators were interviewed in pairs before the projects started. Four interviews were conducted 30 minutes each. The interviews were informal and semi-structured. These interviews were carried out in a conversation between both researchers and the facilitators and both researchers took notes during the interview. The notes were reflected upon afterwards.

[1] Standard exercise to introduce DT to beginners

In the second round twelve participants were interviewed, three from each team, resulting in approximately half the team members. The participants were chosen specifically. An attempt was made to choose a good mixture of thinking profile and level of participation according to observation logs. Further the individual reflections were examined in order to get a mixture of participants with deep and shallow reflections. These interviews were also semi-structured but more formal than the first round. The researchers had managed to get to know the participants quite well at this time and therefore felt that more formality and structure was needed during the interviews. One researcher carried out the interview while the other one took notes. The objective of these interviews was to gain deeper insights into the participants' experiences.

The researchers also conducted a literature review before, and after the duration of the projects in order to gain more thorough understanding and for comparison between the researchers' observations and the developed theory.

The quantity of the data collection and method used is summarized in Table 2

Table 2: Data collection

Data collection method	Quantity
Pre-phase interviews	7
Facilitator interviews	4 (2 people in each)
Observations	42 hours of workshops over 4 weeks (4 teams)
Follow up interviews	12

For the analysis, a grounded theory approach (Bryman and Bell, 2003) was adopted. Grounded theory is the most commonly used method for analyzing qualitative data and is defined as theory that is derived from data that has been systematically gathered and analyzed (Bryman and Bell, 2003). It was chosen because this method is useful when analyzing complex, rich data which is difficult to find analytic paths through (Bryman and Bell, 2003). According to Bryman and Bell (2003), the researcher must guard against being captivated by the richness of the data and fail to give the data a wider significance than only for the case being researched.

The data was analyzed using open and axial coding (Strauss and Corbin, 1998), where the open coding consisted of qualitative data from the individual reflections being written in the format of notes color coded in terms of positive and negative aspects and marked with phases of the DT process and thinking profiles. The axial coding consisted of an iterative process of gathering and grouping the notes. This was done based on themes and trends found in the data. First the grouping of notes was done and

compared between teams, then between different phases of the project and then between the different thinking profile. Finally the facilitators and attitudes the participants had regarding facilitation were analyzed specifically. In the context of this study, each team could be considered a case, and both a within-case and cross-case analysis was performed (Eisenhardt and Graebner, 2007). In order to understand the role of the thinking profiles, an analysis was conducted on how individuals within each thinking profile coped with each phase of the project, what was mutual and what was different and why. Then to understand to what extent DT was used, both within-case and cross-case analysis was conducted. At last to understand implementation traps comparison of project related tasks and upfront intentions was analyzed.

According to LeCompte and Goetz (1982) the value of scientific research is partially dependent on the individual researchers' ability to demonstrate the credibility of their findings. LeCompte's and Goetz's framework, involving external and internal reliability and validity is however not suitable for qualitative research since it provides a very positivistic view on the quality of research. Therefore if we look shortly into the quality of research based on the criteria usually applied to quantitative research it becomes clear that it is not applicable for this research. 1) External reliability: The external reliability has to do with replicability of the research or study. Bryman and Bell (2003) suggest that external reliability as it is described by LeCompte and Goetz (1982) is relatively low in qualitative research due to the fact that it is impossible to "freeze" a social setting. 2) Internal reliability: The internal reliability has to do with inter-observer consistency or whether the researchers agreed upon what they saw and/or heard. Based on this definition and the description of the steps and measures taken we consider the internal reliability of this research to be relatively high. 3) Internal validity: The internal validity has to do with the match between the researchers' observations and the developed theory. According to Bryman and Bell (2003) the internal validity is the strength of most qualitative research especially in observation research because of the long time spent in the setting which they claim that ensures a high level of consistency between the concepts and observations. 4) External validity: The external validity of the research is to determine to which degree the findings can be generalized across social settings. Bryman and Bell (2003) suggest that this represents the biggest threat to qualitative research because of the tendency to use small samples and case studies.

However, the ambition of this research was not to provide any generalization but rather to gain insight into how new management ideas are implemented and to create an opportunity for future research. Therefore Bryman and Bell (2003) discuss a more constructivist view that is more suitable to judge the quality of qualitative research that takes into account that social phenomena cannot be described as an absolute truth, but are in a constant state of revision. They discuss two primary criteria that can be used to judge qualitative research; Trustworthiness and authenticity, and that trustworthiness is compiled of four criteria that match a criterion in quantitative

research: 1) Dependability: instead of focusing on replicability, dependability has to do with that the researchers adopt auditing approach and keep records of all phases of the project. 2) Confirmability: has to do with objectivity and efforts in making sure bias is avoided 3) Credibility: entails making sure that research is carried out in good practice and that the results are submitted to the social world that was being studied and 4) Transferability: instead of focusing on generalizability transferability focuses on that the findings can be transferred to some other context or the same context at a different time.

This research is believed to be relatively high in all of these criteria and therefore the quality of the research is considered high.

Further, Bryman and Bell (2003) discuss the criteria of authenticity as a way to judge the quality of qualitative research. They suggest that the authenticity criteria raise a set of issues that concern the wider political impact of the research. According to Bryman and Bell (2003) the authenticity criteria are thought provoking but have not been influential. Furthermore they are believed to be connected to action research where emphasis is on practical outcomes and will therefore not be used to evaluate the quality of this research.

4 Empirical findings

4.1 Organisation

Centiro Solutions was founded in 1998 and is located in Borås, Sweden. Their main purpose is to design logistic management software with people in mind. The software helps the customer differentiate by creating higher customer satisfaction and lowering operation cost. The company is currently in a growth phase of the industry life-cycle curve and is striving for ways to win the race against their competitors and their current target is to make sure they can maximize capabilities and profits before they go on to the maturity phase of the life-cycle curve.

The company's success has led to a rapid growth, and in the last three years the number of employees has increased by nearly 40% and the growth is predicted to continue for 2016 and onwards. In order to ensure that the company will be able to continue serving their growing customer base. This transformation from a small company to a medium to large sized company has made them identify a need for change in their operations. Centiro has prided themselves on offering a very customizable solution and they want to continue that but are looking for ways to make some aspects of their operations more scalable and standardized.

Their culture is energetic and open, they're willing to soak in all the information they can get to become better and solve problems for their customers. But still they feel that they can improve on the innovation front. The innovation efforts currently being done within the company is too solution focused and often their efforts do not solve the core problem. Therefore they want to boost their innovation capabilities and overcome the obstacles of implementing new ideas and methods.

Job satisfaction is very high amongst their employees, and the company has received various awards over the last years, i.e. for being one of the best workplaces in Europe, and recently the CEO was chosen as one of the three best leaders in Sweden.

4.1.1 Company structure

The company is structured as a holarchy. Holarchy is a company structure where the company is divided into sectors where each individual sector is considered a whole but is also a part of a bigger whole. It is designed for high performance, collaboration and innovation and is considered easily scalable (Greenfield, 2015; Monarth, 2014). The company is divided into five sectors that work within the core operations of the company, Logistics & Industry, Retail, Ecosystem, R&D and Shared Services. In each sector there are four to six teams with five to eight people in each team. The teams are comprised of a cross section of specialists. A delivery manager is responsible for the deliveries of each sector while the teams are leaderless, every member is equally responsible for the results and success of his or hers work and the teams.

Currently teams work individually for their customers and try to solve any problem that rises as fast as possible. This aspect is one of the things that their customers are extremely satisfied with. However the employees have identified that some problems are being solved too fast and without consideration of the cause of the problem. Therefore, the solutions provided can be considered a patch which leads to more problems to be solved since the core problem is being ignored.

4.2 Pilot Project for Implementation of Design Thinking

4.2.1 Preface

The company made the decision of implementing DT into their operations after the CEO got introduced to the methodology during his executive MBA studies at Harvard Business School. It was decided to conduct a pilot project where diverse teams would be formed based on results of an online thinking profile test. The teams would get the task of solving an internal company problem. This was done in order to familiarize the employees to working in a new way and to give them a chance to test the method with as little risk and resources as possible.

The company's employees were tested with an online personality test, FourSight, which evaluates various ways of thinking of individuals. The results made it possible to create diverse teams that consisted of people that, should be able to use their competences in different phase of the creative process. This test and the possible outcome has been described in further detail in chapter 2.2.4.

Four teams were formed based on the results of this test, one within each operating sector of the company. The delivery managers of the sectors, who are responsible for personal development of employees in their sectors, chose individuals from their sector to participate in the DT projects based on the different thinking profiles. As well as their knowledge of the employees' aspiration to develop as an employee and willingness to participate, learn and help with implementation of the new methodology. It was determined by Centiro that all teams should consist of two integrators to facilitate the projects. This decision was based on that integrators should have preferences to all four thinking profiles and therefore should be able to identify with all the different participants. This was not possible in all sectors and therefore in two of the teams either one or both of the facilitators were not integrators, still, their scores were very close to an integrating score. They were chosen for this task specifically by the delivery manager in their sector for different reasons. Along with the facilitators each team should include four team members, one from each thinking profile. This was however not possible in all the sectors and therefore the team buildup does vary. Team combinations are described in Table 3

Table 3: Composition of teams, facilitators are marked with (F).

Team A	Team B	Team C	Team D
Integrator (F)	Integrator (F)	Developer (F)	Analyst[2] (F)
Integrator (F)	Integrator (F)	Implementer (F)	Integrator (F)
Clarifier	Clarifier	Clarifier	Developer
Developer	Clarifier	Developer	Clarifier
Ideator	Driver[3]	Implementer	Driver[2]
Implementer	Implementer	Implementer	Ideator

In total there were 24 participants. Thereof five had integrator thinking profiles, four had a preference towards clarifying, two with a preference towards ideation, four with a preference towards developing and three with a preference towards implementation. Further three participants had preferences towards two different thinking. The thinking profiles are described in chapter 2.2.4

4.2.2 Training

A two day introductory workshop was held for the participants chosen to facilitate the teams. This workshop was conducted by the company's CEO and included an introduction to the DT process and a fixed set of tools that could be used in solving the problems the teams would be given. To familiarize the researchers with the facilitators and because three weeks had passed between the introductory workshop and the start of the projects the researchers performed a "wallet exercise" workshop with the facilitators to reacquaint them with DT. The wallet exercise is a short workshop where the DT process used to find innovative ways to replace the wallet.

The appointed team facilitators were responsible for introducing DT to the rest of their team. Some of the facilitators then decided to use the wallet exercise in the first workshop, along with some learning material they got at the introductory workshop that was held by the CEO to introduce DT to their team and get the participants familiarized with the process and tools. The teams were then mostly trained through learning by doing throughout the project.

[2] Analyst has a preference to both Clarifier and Developer
[3] Driver has a preference to both Ideator and Implementer

4.3 Observations of the teams

4.3.1 The process

The DT process, from Stanford Design School, used in this research consists of five different stages. Empathize, define, ideate, develop and test. The breakthrough thinking process that Centiro used, is connected to the creative process and consists of four phases. Clarify, ideate, develop and implement and the Figure 4below shows how the processes overlap each other. The clarifying phase includes both the empathize and define phase, while ideate is similar for both processes. Develop includes both prototyping and some testing while implementing goes on a little further than the test phase.

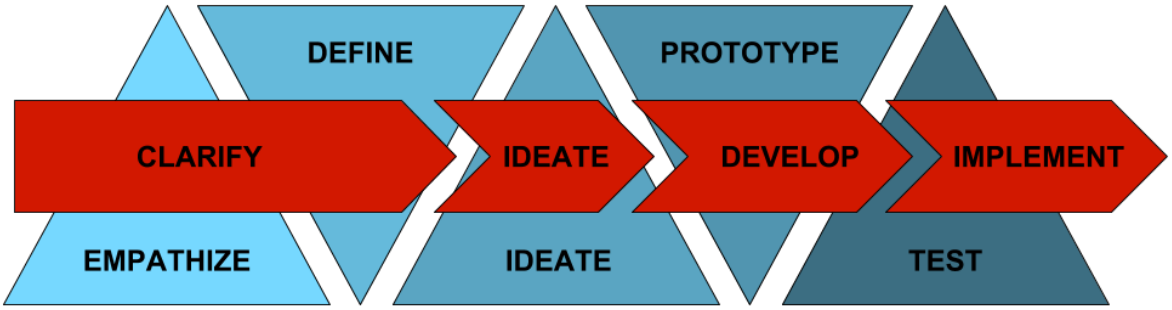

Figure 4: Connection between the d.School design thinking process and the breakthrough thinking process

4.3.2 The projects

The task given to the teams was to solve an internal problem from another sector. All the problems were something that the sectors had failed to solve themselves for some time. By working on another sector's problem, the teams were set into a consulting role. Looking at the problem with fresh eyes and without any preconceived notion gave the teams an outside perspective on the problem which was expected to make them able to produce more innovative solutions. The purpose was to deliver a prototype for a solution of the problem at the company conference.

The projects were conducted through four, half day long, workshops, corresponding to the process steps. The facilitators in each team set up the workshops for their team, created a timeline for the workshops and set up milestones prior to the projects beginning. In each workshop they started by introducing the phase or the steps of the project and then started working using what had been introduced to them by the CEO. And then the team started working according to the directions. The facilitators

documented the progress by photographing information and post-it's that had been put on walls or whiteboards. The facilitator role during the projects varied between teams. Some facilitators took an active participating role within the projects while others participated only as facilitators and tried to support their team in the project.

4.3.3 Workshops

4.3.3.1 Workshop 1 - Clarify (Empathize and Define)

In the first team meetings the facilitators gave a very short introduction on the concept of DT, why this pilot project was being conducted and what the goal was. They introduced four different phases that matched the four different thinking profiles that the projects would be divided into. The first step in the process that was used in the projects was clarifying. This step combines the empathize and define phase of the DT process.

During the introduction they introduced the concept of abstract thinking. And, used the explanation that; "to go into the abstract, was to go in the area of flying horses". These terms, going into the abstract, and flying horses was used throughout the process and individual reflections as representation of creativity.

Before starting working with the problem the facilitators used different methods to familiarize the participant with the process. Three of the teams used the wallet exercise that the facilitators had done previously, while one team sufficed with presenting the process.

After the teams had been familiarized with the process the problems were introduced. Each team was presented with three different problems they could choose from. The teams were given a short problem statement and therefore had to make a decision based on very limited knowledge of the problems. After choosing which problem they would try to solve, they started the first step of the process. During the whole process each activity or tool was introduced shortly before the team started using it.

To empathize, and understand the different challenges the user has, the teams interviewed people at the sectors they were solving a problem for. The interviews differed between teams. Some teams called people into their meetings and interviewed them together in more of a discussion, while others went out to the people they wanted to talk with and had more structured interviews in smaller groups within the team. The interviews were most often around fifteen minutes long and each team interviewed around two to six people in the sector they were solving the problem for.

To make sense of the data collected in the interviews the teams created journey map where each participant wrote on post-its all the different steps of the process they thought were involved in the problem they were trying to solve. Then the participants either put all the post-its up on a whiteboard or discussed what they had written down.

This was done in order for the team to be able come to a consensus about a complete journey map of the process involved in their problem. Finally they looked at the journey map and identified the pain points within it. I.e. what they had found to be the real challenges the users were having when interviewing them. To define the problem and dig deeper the teams worked on identifying design principles. Those should be the attributes the solution needs to have to respond effectively to the pain points they had identified in the empathize phase. The teams had no specific tool or did not understand what was expected from identifying the design principles and therefore struggled somewhat with this part of the process.

4.3.3.2 Workshop 2 - Ideate

In the second workshop the facilitators introduced brainstorming and ideation. In some cases different tools for structured brainstorming were discussed but not used mostly because of lack of experience and knowledge.

In order to solve the problem at hand in accordance with the design principles the teams used brainstorming, where each participant wrote his/hers ideas down and then presented them to the team. This was either done on a whiteboard or in a discussion.

Similar ideas were then grouped together. There was not a lot of iteration during brainstorming, they did not really build on each other's ideas only cluster them. To choose the final solution, some teams used an Action Priority Matrix to compare effort and impact of the ideas, and eventually came to consensus on which ideas they would choose to take further through the process.

4.3.3.3 Workshop 3 - Develop (Prototype and Test)

In the third workshop the teams had decided the direction of their solution and started to create a prototype in order to be able to test it on users. All the teams came up with a software solution to the problem, even though some did not feel a software solved the problem they were dealing with. It can be because it is not so much outside their current knowledge.

To develop the solution the teams used prototyping. The level of detail and advancement differed quite much between the teams. Some were very technical and digital while others only used post-its, paper and the whiteboard. The teams had not gotten a lot of training in prototyping and therefore prototyping something other than a software solution, e.g. a process, seemed challenging to them.

The testing of the prototype was mostly through short feedback sessions with the users. Where the participants explained the features of the solutions and the user gave a short feedback on what worked and what might be altered. The level of iteration varied between teams. Some teams used the feedback sessions to get validation of their solution, while others tried to use it to improve their solution.

4.3.3.4 Workshop 4 - Iterate and Feedback

The fourth phase of the process used for the projects was an implement phase. During the research the solutions created in the projects were not implemented. Therefore the fourth workshop was not used for that phase. During the fourth workshop the prototypes were in some cases developed or iterations made based on the testing. Further, the teams prepared presentations of their projects.

4.3.4 Additional observations

During different parts of the projects the teams used post-its which created a great opportunity for visualization of the problem. It was mostly used to create a collective journey map as well as clustering ideas through brainstorming. However, not all the teams captured the value of this aspect of the work.

In the teams not all participants were able to attend all workshops. This was not considered a problem by the participants and often the absentees joined via Skype. This however did create some challenges regardless of whether the absentees were able to join via Skype or not. They needed to be caught up with the rest of the team next time, and during the Skype session connection sometimes failed and those joining via Skype were not able to actively participate on the same level as if they would have been present. The camera needed to be adjusted regularly and the sound quality was not perfect causing disturbances during the meetings.

5 Analysis

5.1 Analysis of Different Phases of the Process

5.1.1 Empathize

After the first meetings, all the participants seemed very positive regarding the new method. They liked being challenged to think differently and claimed that they liked not jumping directly to a solution. They found the tools of interviewing, journey mapping and identifying pain points helpful and easy to use to break apart and structure problems, as well as to see the problems in a wider context. According to the personal reflections most of the team-members felt good and engaged in the teamwork. They felt positive towards working with the new method, and about the projects in general. However, some felt stressed and pressured because of other work related responsibilities.

In the first phase of the project there were a lot of similarities between the teams. All the teams agreed that the facilitator training was lacking. They needed further understanding of the method and what was expected in each phase. Almost every team member and facilitator mentioned that in the individual reflection. The facilitators felt insecure on how to proceed and unable to transfer their knowledge on DT to their team due to lack of experience. The team members seemed to realize that and according to observation notes they seemed to need more support to be able to understand the DT process. In their reflections they expressed that they felt that the process was rushed. One team member reflected that he had done some research on his own that helped him.

The teams in general were positive towards the interviewing phase, even though one team member expressed that (s)he was used to working with computers only and felt that the interviewing was a little outside of his/her comfort-zone. Most, however, liked getting information from their colleagues to frame the issue and understand the concept. They found this phase relatively easy to work with. However, the researchers observed that the quality and quantity of the interviews varied between teams. The teams had no real guide on how to conduct the interviews and some came to the researchers to look for guidance. Some teams did interviewing in pairs where one took notes and the other person talked. In other cases interviewees were called into the workshop where the team as a whole asked questions. None of the teams prepared for the interviews or decided properly what to ask, even though it was observed that individual team members took initiative to write down what they wanted to ask based on unstructured discussion in the teams. On one occasion the interviewee took over the interview and had PowerPoint slides to explain his/her problem. In other cases the participants split up into pairs and conducted a short interview with a coworker from the sector that were dealing with the problem at hand while others conducted a group

interview where the whole team interviewed one or two at the same time. However all teams saw the benefits from empathizing and getting the user perspective to clearly define the problem at hand.

Even though the interview phase was considered helpful and a very useful tool to sort out information the observations showed that due to familiarity to the people and tasks in question they were not taken that seriously. The interviewers did not have to ask any questions about the technical side of the problems because operations between sectors are similar and therefore they had previous knowledge of many aspects of the problems. Further some stated that due to a similar problem within his/her sector (s)he had difficulties moving away from the problem and thinking completely free.

The teamwork in the first phase was considered good. The teams worked well together and were considered open minded and taking the task seriously. Some minor conflicts occurred regarding how to frame problems but they were easily solved. Both from observations and personal reflections, it is obvious that the level of team involvement varied between teams. The reason for this was not easily identified neither in reflections nor observation notes. In one team a team member expressed that (s)he felt that not everybody could state their opinions whilst in another it was stated that the atmosphere was open and all opinions were considered equal. The observations showed that the teams where facilitators took a more leading role within the group instead of participating directly in the task the discussion seems to have been more forced in the sense that the participants seemed more unwilling to state their mind. But where the facilitators did not see themselves as leaders but only facilitating participants the discussion ran more freely. This was ongoing throughout the whole project.

5.1.2 Define

In the second phase the structured method of creating a journey map was considered easy and a great way to understand the whole picture. The participants all had various views of the process and problem and were able to put them together into a common journey map with a wider range of perspectives of the problem. The teams all agreed on this. It was considered an easy clear method and a great starting point for the project. They felt that the information gathered in the interviews was a good foundation. One participant noted that (s)he would have liked to observe and try as well as ask questions to gain a deeper understanding. Even though all teams considered this an easy task the level of easement varied a bit. According to observation this depended a lot on the quality of interviews. The teams that did more structured interviews found it easier to journey map. Further some confusion occurred in one team when all the individuals created their own journey map instead of using their notes to create a common journey map, this was however easily solved. Overall it was perceived a helpful tool to be able to continue with the process, if the journey map was detailed it was easier to define the related pain points.

When it came to identifying pain points participants identified that this was really where they understood how to make use of the user perspective. The teams all agreed that this too was an easy process, like the journey mapping and that they had everything they needed to identify the pain points. Even though the pain point identification was considered easy some participants had problems trying to define them into specifics after they had been identified. Some participants however found some aspects of the process more challenging, like prioritizing the pain points and making sure they had all the pain points. Some stated that the most challenging thing about the pain points was to prevent information spillover when compiling the information they had and narrowing it down from the journey map, meaning being able to summarize the most valuable information and leaving those less valuable behind.

Defining design principles was really the first time in the process where the teams had problems. The purpose of the design principles was to find the attributes the solution needs to have to respond effectively to the identified pain points. It was observed that the facilitators did not really understand the concept and the researchers were not able to give any support since this was the first time they had heard about it because their previous experience with the DT process did not include the concept. According to the reflections after the session no participant considered this easy. It was described as; not easy, difficult, or even the hardest part. Participants found it difficult to find relevant or well defined design principles, and also to summarize or name the design principles they identified. Further one participants stated that (s)he found it hard to know if the principles they defined really were the cause for the problem they were trying to solve. The researchers observed that this would have be a great time to go back and ask the user for opinions but the lack of experience and training made the teams miss this opportunity. However some participants in the teams that understood the concept really recognized why this was a useful tool and how it helped validate their ideas, that it created great discussion and helped put everybody on the same page in regards to what they wanted to achieve by creating these goals that they could explore how to solve.

All participants expressed good feelings but some stated that they had some confusions regarding the process and were not sure on how to proceed. They liked the fact that these early steps of a project which often are resolved with a lot of meeting time had been broken into different steps which could all be finished in an effective manner even though one participant described the process at this stage as being messy and unstructured due to lack of training and experience. They identified that it was a great way to get all the perspectives included and that the visualization process helped a lot even though it was to a relatively little extent. Further some of them stated that the process helped them identify aspects of the problem they would have missed otherwise but still they found it difficult not being able to jump to a solution right away.

In this second phase of the project the teams came to their first real obstacle. Still the team satisfaction was relatively high and the teamwork was considered to be going well despite of lack of training. The participation varied a bit between teams. It was observed that some people seemed really uncomfortable with moving away from the solution and when their teammates were unwilling to discuss the solution they stayed quiet during parts of this process. This was also reflected upon in the individual reflections where it was noted that some people had solution orientated personalities and had troubles not discussing possible solutions in this early stage of the process. Further it was said to affect the team negatively that some of the participants did not really have the time to be there.

These two first steps of the project, empathize and define were done in the same workshop and observations showed a lot less difference in participation in these first phases than in the other.

5.1.3 Ideate

In this phase all teams except one had high energy levels. In the observation of the team that reported low energy, the participants claimed to have very shallow understanding of the concepts they were working with due to little training and the team seemed to have frustrations with not getting the support they needed from the facilitators. This was then also reflected upon in the individual reflections for that team, where one team member stated that this session was not as fun as the other sessions. One team had problems when they felt that the DT process was not applicable to their problem. However, the observations explained the cause of this problem to be the fact that the facilitators were introduced to a very fixed set of tools in their training so it was not the process that wasn't applicable but the tools that were available to them at that time. Or it could maybe have been due to lack of leadership training, they did not know how to unlock people or activate those who were more quiet.

Regarding the process the reflections showed very different opinions. Many did not like or dislike anything in particular but found it difficult to think in a new way and mentioned that the method was messy and confusing. Still a lot of ideas came to light and the process was described as pushing people forward, to force people to open up and those who think narrowly to listen to other people's ideas. The alternative was considered to get lost in discussion while other participants felt the progress was good after the phase. One reflected that in the beginning of the meeting they had design principles but only two hours later they had come up with over 30 new ideas and narrowed it down to a viable solution to work with. Another team had some technical problems in this phase that in the observation notes was shown to affect the energy levels but that was however not the case according to the reflections. Even though technical issues and people being absent was mentioned as a dislike.

The brainstorming process was something most participants had very strong opinions about. It was considered either very easy or very difficult. Further they felt that having a limited time to come up with ideas and putting them all up on the board was very effective and generated more ideas than they ever would have been able to come up with through discussion. For most participants the most difficult part was trying to come up with abstract or innovative ideas. Even though one participant really enjoyed that (s)he could come up with ideas that were not possible to implement, this was considered extremely challenging by the rest. In one team there were frustrations that they thought that their solution was not innovative enough and in observation notes it was pointed out that this might be because of the talk about flying horses. This had lead them to believe that their solution should be very creative or "*rocket science*" as one participant framed it. Lack of advanced or novice ideas made the team feel like they had failed in some way even though they had come up with an innovative viable solution to their problem. Or expectations of how it "*should be*" were not met. The participants liked building upon existing solutions and each other's ideas but often felt that the time constraint was too tight. One participant noted that later in the process (s)he had wanted to add ideas but felt strange about it when they had moved on in the process, which correlates to observation notes about teams feeling uncomfortable taking a step back.

When the teams were starting to narrow down from brainstorming the teams had two different tools to work with, Action Priority Matrix and Systematic Inventive Thinking (SIT), but none of the teams really used SIT due to lack of understanding of the tool. In the reflections two of the facilitators point out that they wished they had better understanding of the tool because they believed it would have been helpful. Action Priority Matrix was used by all four teams with very mixed results. The participants either found it very useful to create a common bases on how to evaluate and filter down ideas, easy to use and effective whilst another described it as difficult to work and disliked using it. In observation notes for one of the teams it was pointed out that the facilitators did not have understanding of the tool or know how to apply it and that created frustrations within the team.

When choosing the final solution some of the most controversial opinions came to light. I.e. one participant reflected that: "*I'm sure that some of the ideas would have been killed too soon if we had not allowed ourselves to go up in the abstract*" while another one, in the same team, stated: "*I felt that our group were a bit too stuck in a concrete solution too early in the process. I don't think we really went up to the abstract side at any time.*" The teams also had some problems with those who were very unwilling to change. Some participants had very early on taken a liking to a specific solution and did not want to discuss anything else. It became very obvious in this phase. Further some participants reported difficulties with filtering their idea and taking it down to the concrete again. While others explained how they had not managed to get out of the concrete to begin with. And, furthermore some reported ease in choosing

the right solution to work with while other described difficulties in that step. Controversial opinions were also expressed when discussing the user perspective. Some teams complained that they did not have the competences to take make a final assessment while others embraced that they were able to discuss their solution with the user to get final feedback.

The fact that the teams had preconceived notion of the problems and the tools available seemed to hinder creativity to some point, according to observation notes. Being aware of the in-house software and being so familiar with the current situation restricted the creative way of thinking. This was also reflected upon in the individual reflections.

In this phase it became obvious that the team dynamics were changing as the participants were getting more comfortable working with each other. This was noted in observations. According to the individual reflections most teams were functioning well even though some participants had been missing. The main frustration was regarding having to get them caught up at the beginning of next meeting, and that the activity level varied a bit between team members. One of the teams was having more problems than the other and that affected the energy level of the whole team. There were two main reasons for their problems. One was that the members in this team were more frustrated than others about the facilitators' lack of knowledge and the other reason was that one team member was sceptic regarding the process and questioned it a lot.

5.1.4 Prototype

When moving into this final phase, energy levels had somewhat lowered. The participants were seeing the end of the projects getting closer and seemed to be feeling pressured to finish and the need to succeed before having to present their projects. The process was considered a bit messy and some participants felt like some steps had been missing which aligns with that the facilitators claimed to not have enough training in the last steps of the process. Most participants didn't dislike anything and liked seeing all the work finally turn into something real. However, they felt that the final steps dragged out and that the process was not effective which may also be because of lower energy level of the participants.

Most participants really liked the prototyping phase and liked creating something tangible that was derived of all the work and discussion they had conducted. However, within the teams there were some conflicts on how technical, detailed and complete the prototype should be. Most teams created a software solution and found it relatively easy and similar to what they had experience with. However they did in some cases get very focused on creating a working prototype. They were effective in bouncing ideas off of each other instead of going to the user for validation or a chance to improve or adjust the solution. The teams had different views on whether the solutions solved the initial pain points or not. One of the teams did not find it easy to relate their final

solution to their initial pain points while other teams felt like the well-defined pain points in the beginning eased the discussion in the prototyping stage. Getting the final validation was not an effective process for all the teams. Some teams managed to involve the user while other did not have the time to do that in this final stage and complained about having to "*play the guessing game*". For those who did, observation notes state that the user perspective was rather used for validation of the solution rather than an opportunity to evolve and iterate it. This was confirmed by two participants' reflection, that said the team was protective of their idea and did not iterate after the testing. Still one of their team members stated that it had been evolved based on the feedback they got.

The participants considered the teamwork during this last phase was very good, they reported no major conflicts in any of the teams and it was clear that they were all happy with the final result of the project.

5.2 Analysis of Team Experiences

The teams consisted of participants with different thinking profiles. Each team was mixed (see Table 3) in order to create diverse teams which was one of the aspects of the research.

5.2.1 Team A

Team A started out very well but their main frustrations had to do with the pace of the project. They struggled with defining the design principles so by the end of their first meeting they were already brainstorming solutions. After that the whole process became very hurried. A lot of their reflections had to do with a feeling of having missed out on some steps or feeling that something was wrong, but the hurried pace they were in stopped them from taking a step back to really see what was wrong.

The facilitators started with a very brief introduction on the process and the team seemed to have a hard time grasping the concept. It seemed like this team expected more leadership and guidance from their facilitators than the other teams. In their reflection they discussed topics like how the conversation was missing guidance, and that the discussion was not controlled well enough by the facilitators etc. Often they were not sure what to do or the purpose of the tools they were using which indicates that the introduction of the process was to brief.

Team A's main struggles showed up in the end steps. The facilitators had not given them enough guidance about the last steps and they themselves were often quite unsure on how to proceed. This lead to a lengthy discussion and made the team have trouble getting to a final conclusion before they could start prototyping. Which they then did in an advanced way.

5.2.2 Team B

For team B the positivity towards the project varied from the beginning. The vision and expectations were very heterogeneous and that had impact on the process. Even though the team worked well together and everybody contributed it was clear for the observers that the mismatched expectations was affecting the team spirit. This was also the theme throughout the team's individual reflections. Both one of the facilitators and all of the team members addressed the issue of facilitator training and how lack of knowledge of the facilitators was a negative thing for the team. One of the facilitators expressed this a couple of times in his/hers reflections, i.e. how hard it was to answer challenging questions without knowing the answer. The lack of knowledge about the process made the facilitators too mindful of it. Instead of focusing on the task at hand each time they kept discussing next steps making the discussion very confusing.

When observing, it was obvious that the facilitators in this team did not really consider themselves a part of the team and took a more leading role in the process than the other facilitators did. This team expectations towards the facilitator competencies seemed higher than in the other teams and the fact that they did not have all the answers lead to frustrations in the ideation phase. The frustrations were mainly directed towards the facilitators but were grounded in the inconclusive information about the methods they were using and the need for understanding why certain methods and steps were done and what the results were supposed to give them.

However as stated earlier the team really enjoyed working together and liked working with people they didn’t know. Further they stated that in spite of their differences and conflicts the process and methods always helped them to come to a consensus and a common understanding and that the process pushed them forward and did not allow them to get stuck in pointless discussion or arguments.

5.2.3 Team C

Team C felt more calm than the other teams to the observers. They started their project later than the other teams, and were really busy with their own work responsibilities. The participants in team C all brought their work computers to the meetings and were intermittently participating in the projects and working on their own tasks. Thus it was very seldom where all the team was participating at once. This made the atmosphere heavy at times and affected the work effectiveness. However, this did not seem to bother them and they claimed to really enjoy working together. They felt that the methods allowed them to collaborate at a higher level than with their conventional ways. Both within the team as well as with the sector they were solving a problem for.

The problem team C was supposed to solve, was quite relatable to them as they had experience with a similar thing in their own sector which made them narrow down early and in their reflections they claimed to have had difficulties thinking freely and not go into current solutions because of this.

In this team the facilitators placed themselves completely along with the team, the only facilitating role they had in the teamwork was to explain next steps and then they participated as any other team member. They explained that they were not experts and the facilitators in team C were those who sought out most support from the researchers.

This team had the least diverse thinking profiles but neither the observation notes nor the individual reflections showed any specific struggles in the stages where thinking profiles were missing. The main struggle was in steering the team into working together and have all the team members focused at the same time.

5.2.4 Team D

This team worked in a different way than all the other teams. They had shorter meetings and met more frequently, which was decided by the facilitators due to the lack of time available for the team members to participate. They were very happy with the teamwork in general. The team cooperated and team members were very efficient in stepping up when someone's energy level went down or if something was lacking. For team D, most meetings were missing some people that often joined via Skype. This was the factor that created most frustrations regarding teamwork within the team. The technological side of the long distance participation often hindered the creative process, because participants that joined via those media did not see what the other saw and often the connection was cut off. This made it confusing and created a valley between the team members. Because of this confusion the absentees still needed to be caught up next time regardless of whether they were present via Skype or not and the technology complications took a toll on the team's energy level.

For team D they were quite distracted with the difference and similarities in personalities. In the first meeting the facilitators had asked them to bring their thinking profiles and in the reflections this was often brought up as the reason for their interactions, e.g. either difference in thinking profile or the fact that the team consisted mainly of experienced programmers and software developers with a similar role within the organization. This was mentioned on many occasions i.e. the team members had almost a ready solution when they came to the second meeting because that is how all of them work currently, hear a problem and solve it, those people then all claimed it very valuable to learn to take a step back from the solution.

Further they expressed that the methods gave them an even playing field, even though some participants were very technological and others not at all they could use the methods to work together and were able to address many things they would not have with their conventional methods.

5.3 Analysis of the Thinking Profiles

For the purpose of this research only the four main preferences of the Foursight thinking profile test will be used for the analysis. The two thinking profiles that have a combined preference towards two of the main preferences were analyzed with both of their preferences. Further, the integrator, which has a relatively even preference towards all four learning styles will be explained separately and used in analysis because of their special role within the projects.

5.3.1 Clarifiers

The observations for the first part of the project, did not reveal any obvious preferences amongst the participants. The reason for this may have been that when the projects were starting all the participants were excited to work with the new method. However when looking through the individual reflections those with a preference for clarifying all participants reported enjoying the first parts of the project. They liked breaking apart the problem, sorting out the problem and the clarifiers in teams that interviewed people as a team had frustrations with not being able to dig deep enough in the interviews.

In the define and ideate phases there was a clear trend towards liking the stages that involved getting a wider perspective like journey mapping and brainstorming. But then a clear dislike trend when it came to having to prioritize and choosing what to leave behind, like when defining the design principles and narrowing down after brainstorming. Further more than one clarifier expressed frustrations when some things did not fit in or if something had to be left unsolved.

For clarifiers there were not any trends detectable in the data regarding the prototyping phase. Their reflections showed very scattered views and the observations did not either provide any valuable insights.

5.3.2 Ideator

The Ideators did not seem to have any specific likes or dislikes towards the work in the empathize phase. In the reflections they did not mention anything they liked specifically or many specific things they did not like. However they seemed to really like the idea of design principles. Even though they thought it was very challenging to create them and make sure all the perspectives that had been collected were included they thought it was reassuring to have a common goal that could be used to validate their ideas.

All the ideators seemed to be very aware of their thinking profile which may distort the findings in the ideation phase. When observing the ideation phase was clear that the ideators in the groups felt really comfortable. They were extremely eager to express their suggestions and took leadership during the brainstorming sessions. One ideator

explained how (s)he liked this phase because it forced those who thought narrowly to open up and listen to other people's perspectives. This was also the red thread through their reflections. They claimed they liked brainstorming, that they found it easy and that it was fun to generate ideas and easy to come up with many ideas.

Even though the ideators seemed to really enjoy the ideation or brainstorming phase they still had frustrations. They felt that the team lacked competences to grasp what was going on with the process. They wanted more time to come up with ideas and that the rest of the team was too stuck in the reality and current solutions and that they were unwilling to go into the abstract. Further they found it difficult to move on from the brainstorming and eliminate ideas. In one team an ideator claimed that the team never went into the abstract his/her team member stated that they had troubles coming down from the abstract.

Again in the prototyping phase, it was obvious that the ideators liked brainstorming and discussing possible ways to prototype their solution and had the same problems with narrowing down as they had in the ideation. However when reading through their reflections they were not aware of that these activities included similar steps as before, like coming up with ideas for the prototype. But the observations revealed increased activity level among the ideators during the ideation of the prototype. And, their reflections showed similar level of enjoyment and excitement as in the ideation phase of the project as a whole.

5.3.3 Developer

Most of the developers that participated in the projects did not do the individual reflections which makes a deeper analysis of their experience hard.

The developers did not seem to have any preference either for or against the empathize phase. The developers seemed to have relatively high frustrations regarding lack of facilitation and liked interviewing.

In the define phase the developers seemed to have a preference towards narrowing down. In their individual reflections showed that they had positive comments towards narrowing down to a problem and performing the more structured activities such as journey mapping. However they claimed that the process of creating design principles was frustrating, due to lack of structure. One reflected that it was difficult to know whether the principles really were focused to the main problem.

The developers seemed to like the ideation phase and they were able to produce a lot of ideas in brainstorming. However they seemed to have a problem taking a step back from the problem and sometimes they seemed a little too eager to choose a final solution. In the individual reflection one developer claimed that it was difficult to not

think about their own experience but focus on what they had heard in interviews. And, another stated that they were impressed by being able to get from design principles to a solution in under two hours. While prototyping they seemed to have the same preference towards brainstorming and creating a solution.

5.3.4 Implementer

Reading through the implementers reflections it is clear that they have problems with lack of structure. In the first phase of the project they really liked the structured parts that were easy to follow such as journey mapping and pain points that gave them a focus point and a clear picture of what to do next. Their frustrations became clear in the more unstructured parts of the project. They felt that the initial problem statement was unclear and disliked making assumptions and not knowing completely what to do or how to do it.

When moving into the ideation phase this became even clearer. In the brainstorming it was observed the implementers stepped forward and tried to bring structure to an otherwise unstructured process. In the reflections the implementers focused on the effectiveness of creating many ideas to choose from. The implementers found it extremely hard to be abstract and found it hard to think about solutions without regarding whether they were realistic or not. But still, they appreciated the opportunity to be allowed to think abstract.

In the prototype phase the implementers wanted to spend a lot of time developing and perfecting the solution they had come up with. They claimed to like to see the discussion turn into something real. During observation it was clear that some participants that had stayed rather frustrated and passive through the whole process suddenly became more active.

The implementers' frustrations, during the prototyping phase, involved not getting enough useful feedback on the prototype to make it better. Further they claimed that the other team members did not want to adjust the prototype to fit the need of the user and that their teammates being too protective towards their solution.

5.4 Analysis of the Facilitation

5.4.1 Integrator thinking profile

When reading through the integrators' reflections it seems like they do not have any strong opinions towards anything. They claim to like many different parts of the project and not really disliking anything besides some things that were difficult regarding the facilitation itself, e.g. how to proceed, how to answer challenging question etc.. This lacking of a preference made the integrators able to focus more on the process side of the project than the other participants. Instead of diving into the steps they were doing they became very focused on making sure that every step was done and that it was

done correctly. Observation notes reveal the same thing. That the integrators often were a little overwhelmed by all the different opinions flying around the room and seemed unclear on what direction to take. They seemed to have a problem finding their own voice within the team.

Further, the integrators seemed at times, almost uncomfortable taking part in the conversation and therefore they took a managing role to avoid getting stuck in the middle. Even though the researchers had explained to them before they started that their input would be very valuable because of their understanding to see all the different point of views within the team. However, it was observed that instead of taking an active role in supporting and criticizing they often took on the role of the supportive cheerleader, and did not dispute or take a stand when the discussion got heated. Furthermore their reflections showed that the steps they felt most negative towards or most challenging were those who include narrowing down and eliminate ideas or solutions, which supports this even further.

The integrators were quite inclined to act like they had all the answers and seemed very uncomfortable with uncertainty on their own behalf. They also were extremely hesitant to look for outside guidance or advice from the researchers. The fact that they came across like knowing all the answers and then maybe being pushed into a corner when their knowledge was challenged with hard questions, created some friction and distrust within the team. When being asked about the facilitators, the teams that had integrating facilitators were more inclined to criticize their performance than in the teams with non-integrating facilitators.

Their integrator's reflections show a lot deeper understanding of what went wrong and why, then for all the other participants. Instead of only reflecting on which parts of the project they liked, disliked or felt challenging or easy the facilitator had insights, like that the team would have killed some good ideas if they had not allowed themselves to be in the abstract. And, that the process is useful because using it versus using conventional methods is the difference between assuming you understand the task and actually understanding it.

5.4.2 Non-integrating facilitators

There was a clear difference between the facilitating style of the integrators and the facilitators that had other thinking profile. Even though the non-integrating facilitators also focused on the process, like they were supposed to do, they also took a much more active, participating role within the projects. The facilitators that had a thinking profile with a preference towards one or two thinking profiles seemed more comfortable with expressing their opinions and taking a stand. They also seemed more relaxed about uncertainties and felt less inclined to having to know all the answers.

This was even more evident in team D where one facilitator was an integrator and the other one had a different thinking profile. There, the difference was a lot more noticeable because of how differently the facilitators approached the role within the team. Further the non-integrating facilitators were much more willing to seek outside feedback on their performance and also more willing to ask questions both during the process and before workshop sessions.

5.4.3 How teams viewed the facilitation

The lack of training in facilitation was most evident in the beginning and end stages of the project. In the beginning, when trying to explain the challenge and process to the other participants the facilitators had with them a set of slides to support their introduction. However, during observations it became clear that their understanding was quite shallow and that most of them were rather fixed on using phrases they had picked up during their workshop but without the appropriate support they were almost meaningless to the other participants. This includes "*being in the abstract*", "*working in a new way*" and "*flying horses*". Even though the meaning of these phrases were clear to the observers, who knew what the facilitators were trying to explain, this seemed to create a lot of confusion amongst the participants. The participants also had a lot of questions that the facilitators found difficult to answer. The reflections showed that the participants picked up on this because they made remarks regarding the facilitators being inexperienced, that they were unable to explain some aspects, and about their lack of experience and training in general. The facilitators themselves realized this as well, and in their reflections they admit that they could be more prepared and that they felt that it was hard to answer challenging questions.

It was observed through the whole process that some of the team members had problems staying on the task and were distracted by work on their personal computers that they brought with them to the meetings. In one occasion a team member even answered and resolved a customer phone call in the middle of a meeting. This could often been seen as the reason in low energy level for the whole team in the meetings and the observations showed clear difference in energy for the teams that brought their computer with them on one hand and those who left them at their desk on the other hand. The fact that people were missing and joining via Skype also had a negative impact on the spirit.

When the projects were coming to an end the facilitators were the ones most outspoken about their lack of training. This may have been because at that stage, a lot of time had passed since the training so they did not remember the training as well as in the beginning, or maybe not as much time went into explaining the final stages in the training. Or it could have been because of the experience of problems throughout the project so far. Whatever the reason was, this created some frustrations and confusion in the teams and dragged out discussion that could have been avoided.

Even though the matter of facilitation knowledge was most frequently discussed during the beginning and in the end, this subject was the only thing that was trending throughout the whole project in most teams. Like explained earlier the teams that had facilitators that put themselves in a more managing role within the teams they had more negative reflections towards this subject. But this was still something that the participants discussed very frequently. Furthermore, the participants also had frustrations towards lack of knowledge of specific tools used in the projects. And, felt that they should have been explained better and one participant even went as far as stating that no one knew how to do certain things within the process.

Moreover, the lack of leadership was more frequently mentioned in reflections by participants in the teams where integrators had the facilitating role. However in fact, lack of leadership was quite obvious during observations in all the teams. Even though leadership was missing in all the teams it only seemed to bother the participants in the teams where the facilitators acted as managers instead of participants in the projects. However it was quite clear that it had not been taken into account, neither in the choosing of facilitators, nor in the facilitator training, that the facilitators would need to provide leadership.

6 Discussion

6.1 The extent to which the teams actually used DT

Because DT can be considered a vague and ambiguous concept as described by Giroux (2006) it allows for certain interpretability when it is being implemented into an organization (Ansari et al., 2014; Benders and van Veen, 2001 and Giroux 2006). Further, the criticism of DT being introduced as a management discourse that can easily be implemented in any setting (Carlgren 2015). Because DT allows for a certain level of interpretability it can be adjusted to different company cultures. However this interpretability and criticism opens up the discussion of how much of work being done can be considered DT. The framework introduced by Carlgren et al. (2016) to describe DT will be used to discuss to what extent the characteristics of DT were actually used within the scope of this pilot project. Each theme will be analyzed with a focus on which crucial activities were done and which were not done, or done at a superficial level.

User focus

The teams carried out most of the activities within this theme of the framework, at least to some extent. One of the practices brought up by Carlgren et al. (2016) is extensive user research, using ethnographic methods. However, with less than two hours spent on conducting user research, it can hardly be called ethnography. Also with the interviewing varying in quality and quantity. Therefore the journey mapping was found helpful when the collected data from the interviews was valuable. Same can be said regarding the pain points which has similarities with aspects of a persona, mentioned in the framework. However some aspects of a persona were missing which can be related to the difficulties in defining design principles. The design principles involves identifying the attributes that the solution needs to have to respond effectively to the pain points. Design principles can be related to the ‘how might we questions’ and ‘point of view’ from the framework. Further, deciding upon the design principles was found to be quite a difficult task. However, the participants perceived it was even more difficult to know so early on if the attributes, the solution needed to respond effectively to the pain points, were correctly evaluated and chosen to be taken forward. Here validation through feedback, in order to know if the attributes were the correct ones to focus on, would have been relevant (Carlgren et al., 2016; Wölbling et al., 2012) instead of moving on, in doubt because of the pressure to finish on time. Teams that did not find it easy to relate their final solution to their initial pain point could trace that challenge back to their ill-defined pain points in the beginning. Or moving on without validation of their attributes through feedback and iteration. There was a difference in what way and how much the teams involved a user, but still it was a relatively little focus on the activities that involve user centricity throughout the whole project. In the cases where users were involved it was more often for validation than for valuable feedback, meant to be used for further iterations.

Problem framing

In this research the theme of problem framing is related to the process step “clarify” which grasped the “empathize” and “define” phases, which were combined into one workshop during the pilot project. However, even though information was easily accessible within the organization and willingness to share was high, still very few interviews were conducted and the empathize phase was extremely short. The limited data collection, as well as the attitude towards what data was necessary, also affected problem framing. It might be related to the tendencies of those conducting the interviews to believe that they knew more about the wants and needs of a user than the actual user does (Dunne and Martin, 2006). It may also be related to the fact that they were solving in-house problems and therefore had some preconceived notions which hindered reformulation the problem. Also while the first struggle for the teams was to define the design principles, it can be related to little focus on some techniques within the problem framing themes, such as ‘how might we’ questions and ‘point of view’. One team had a narrow view of Dt as being product-focused feeling that the DT process or method was not applicable to their problem, mainly because it was a process problem and not solvable with a single product. However, it is questionable whether the initial problem was challenged or reframed enough to expand both the problem and the solution space (Carlgren et al., 2016).

Visualization

There were many instances where the teams could have benefitted from using processes from visualization theme but chose not to, such as visually structure data, make rough representations and provide experiences to enable understanding (Carlgren et al, 2016). There were some efforts made to use visually structured data, e.g. by using post-its on the whiteboard e.g. during collective journey mapping and also during brainstorming where post-its were clustered when the teams were narrowing down to a solution. During the define phase many team members identified that the DT methods helped to get all the perspectives included and that the visualization practices helped a lot even though they only used a fraction of the techniques available. The fact that some people were absent or joining via skype made thinking through doing impossible for those individuals, at the same time as it made the work process more difficult for the whole team and hindered their creative process. Also, while prototyping, the teams went almost directly into workable, detailed prototypes, leaving behind many valuable practices and techniques . An example is making rough representations or providing experiences to enable understanding (Carlgren et al., 2016). This would make it possible for the user to test the prototype and provide valuable feedback for the team. This can be related to the criticism from Johansson-Sköldberg’s et al. (2013) on DT. The fact that the participants were not able to see the value of the visualization methods and did not understand how to use them could be linked to them being non-designers or lacking proper experience.

Experimentation

The lack of will to experiment during the projects can also be related back to the criticism from Johansson-Sköldberg's et al. (2013). The teams relied too heavily on tools and had problems thinking outside the box. The teams made some efforts with performing activities within the experimentation theme. They, however, missed some important practices like "fail often and fail soon", prototyping quickly and often to learn and test solutions quickly and often by sharing prototypes with users and colleagues (Carlgren et al., 2016). The teams tried to work iteratively throughout the project but missed some opportunities, for example while validating design principles and after the first ideation phase where one participant wanted to add ideas but felt strange taking a step back. The convergent phases, define and prototype/test, were a struggle for all the teams which could be related to lack of methods, patterns, clusters, concepts or framework necessary to bring the outputs together in a meaningful way (Efeoglu et al., 2013). There was a large focus on brainstorming and ideating and therefore divergence which also made it more difficult for the teams to converge. Even though the teams only used one technique for brainstorming, it was considered messy and confusing and either very easy or very difficult. There was a lack of creation of flexible and physical space that supported experimentation and visualization (Carlgren et al., 2016) but the teams still managed to create many ideas with what they were provided. During prototyping the teams were effective in brainstorming and ideation by bouncing ideas off of each other but they missed the opportunity of utilizing the user for validation and feedback. While prototyping could be a very valuable phase of the DT process it lacked feedback, iteration and willingness to alter the solution in this project, and therefore the benefits of the iterative nature of DT were not reaped (Wölbling et al., 2012).

Diversity

While the teams conducting the pilot project were diverse, the only focus of diversity were the different thinking profiles based on one personality test, this was considered the best way to obtain diversity because of the homogeniousity of the employees at Centiro. Therefore this theme lacked more conscious recruitment while combining the teams to get even more diversity that would be valuable to the project (Carlgren et al., 2016). An example of the lack in diversity was that all of the prototypes created were software solutions. This lack of diversity in solutions could be the result of lack of perspectives (Carmeli and Paulus, 2015). The participants all work at the same software developing organization that focuses on solving their customers problems using software development, and therefore they all seem to have the joint view of software being the natural end product and the most suitable way to solve problems. The process of consensus (Shani et al., 2009) is in this sense too easy because the group did in fact not spend significant amount of time working through alternative solutions but immediately agreed that the appropriate way to go would be developing software. A potentially good aspect of the chosen diversity was that the clarifiers

identified that the team did not dig deep enough during an interview session. They could then have spoken up about it to help their team, however due to a lack of knowledge and experience they did not in this case leaving the team with less data to work with. The same can be said about ideators who felt that their teammates lacked competences to grasp what was going on, were unwilling to go into the abstract, and in the process leaving them with too little time to come up with more valuable ideas for the team. Taking the holistic perspective into account could have been helpful (Carlgren et al., 2016) as well as more advanced and experienced leadership.

Effects of rushing DT

In the beginning phases of the projects there was evidence of the participants being positively biased towards DT. Everybody seemed excited to work with the new method and therefore no negative feelings towards it were expressed. This seemed to be the result of the participants having been “sold” the idea that this method would be great. This seems rooted in the concept of user focus; if organizations do not embrace critical thinking towards new ideas but rather push opinions and beliefs onto the user, they risk missing the opportunity to embrace the hidden insights from the user, like Wölbling et al. (2012) and Dunne and Martin (2006) discuss. This can therefore be applied both when adopting new methods and in new product development. By making the assumption of knowing what is important, discussion is hindered regarding the subject and consequently the benefits of the process of consensus (Shani et al., 2009) are lost. However, too little focus on suitable diffusion and implementation, lack of management support or DT being handled as a one-time thing can lead to discontinuation of the method within the organization before it has the ability to show its true potential and benefits for it (Schmiedgen et al., 2015). To implement with care a pilot project can prove helpful. It can be considered the third stage of the adaption of management ideas, where the organization tried the management idea through experimentation (Rauth, 2015; Rogers, 2003 and Birkinshaw et al.,2008). In this experiment, Centiro used the pilot project to try to examine whether this new way of working was worth adopting into the organization or not like Glass (1997) proposes, while promoting organizational learning, and reduce costs and uncertainties entailed in organizational development (Turner, 2005).

The pilot project conducted in this study was done in a very short period of time and therefore the participants image of what DT can be, is distorted. Furthermore, it missed many of the crucial aspects of DT and therefore it can be argued that the participants did not experience DT. In this case the concept of DT was the main focus of the experiment instead of people being placed at the heart of the management philosophy, like Leavy (2005) claims is important. The implementation of DT can be considered an adjustment of the organizational culture, e.g. by making processes more user centered. But, because the process was fast-paced the participants were not provided with the opportunity to experience all the aspects of DT or experience DT with more depth. The result of that can be that the method being implemented will be considered

less useful or unpractical which can lead to the evolution of the organization that will be guided in the wrong direction because the method, in this case DT, is not believed to maintain the desired outcome (Shani et al., 2009). This can happen even though the method possibly would have been able to maintain the desired outcome if it had been given enough time. By focusing on the process side only and not the human relation factor, the possibilities for organizational development were hindered (Quinn, 1993). One evidence of this was how the two first phases of the project, empathize and define were done in the same workshop which did not allow for the necessary trial and error and iterations. The participants were not given enough creative time and therefore the appropriate culture and climate for experimenting and learning the new approach was not created.

6.2 How different thinking profiles cope with a DT

The results were also analyzed with regard to the thinking profiles. Although there were too few individuals of each profile (about 4-6 of each) to be able to discuss correlations between thinking profile and behavior/preferences, some general tendencies could be seen.

As expected, most of the clarifiers showed clear convergent, clarifying tendencies. They were focused, methodical and liked gathering information to get to the core of the problem, which was in line with how they are described in FourSight (2014). Their frustrations regarding ideas not fitting in or unresolved connects to their tendency to be overly cautious (FourSight, 2014). However, in this research there was no evidence of the clarifiers being able to identify obstacles and areas that had not been thought out (FourSight, 2014).

The ideators showed clear divergent, ideation tendencies. All of them were highly fluent idea generators as described in FourSight (2014), and further they liked making sure all perspectives were included which fits with the ideator's desire to understand the big picture (FourSight, 2014). Also, some ideators enjoyed that others were pushed into their abstract world during brainstorming but sometimes felt that their teammates were not able to grasp the concept, which may imply that others felt that the ideators were too abstract as can be the case according to FourSight (2014). Further the ideators claimed they wanted more time to generate ideas, thus jumping from one idea to the next without seeing them through, which is also in line with FourSight (2014).

As stated before the ideators seemed highly aware of their thinking profile and in the reflections the researchers detected bias towards ideation. However, the observations also revealed increased activity level among the ideators during the ideation of the prototype. And, their reflections showed similar level of enjoyment and excitement as in the ideation phase of the project as a whole. Therefore, during prototyping, the activities that included ideation showed the same results without the bias in the reflections.

The developers showed clear convergent, developing tendencies. They liked gathering information and sought for structure as described in FourSight (2014), which is noticeable with their frustrations towards lack of facilitation and their satisfaction with using an effective process. Even though the developers had high fluency of idea generation, which is not expected by convergent thinker (Oxford Dictionary of Psychology, 2014) some had problems being abstract and had problems with generating ideas without thinking about their own experiences with the problem (FourSight, 2014).

The implementers showed the least typical tendencies towards their thinking profile, which may be explained by the fact that the implementation phase was not reached in the pilot projects.

Many of them had problems with the lack of structure in the beginning, and liked effectiveness and the structured activities that came afterwards which aligns with their view of wanting to see ideas evolve into tangible outcomes, and their desire to take action which is in line with how FourSight (2014) describes them. However according to theory the implementers has desire to take action and overselling ideas (FourSight, 2014), which implies that they should be comfortable with making assumptions. This was however not the case. Further they showed frustrations towards generating ideas without considering if they were realistic which supports that they have more convergent tendencies.

Furthermore, the implementers became more active during prototyping and it was obvious they enjoyed seeing ideas turn to reality, similar to what is described in FourSight (2014). However, some also showed atypical tendencies during prototyping because of their desire to iterate and get feedback, which does not align with the ideator jumping from one thing to another, being reluctant to improve and committing too soon to one idea.

The integrators' tendencies to like many different parts of the project and not really disliking any specific aspect or part of it aligns with them being able to be very flexible throughout the process which is in line with how they are described in FourSight (2014). They however noted more difficulties regarding facilitation than the non-integrating facilitators. By not taking a stand as facilitators when the discussion in the team got heated and avoiding criticizing and taking an active role in supporting, the integrators rather became followers when others have strong preferences as can be the case with this thinking profile according to FourSight (2014).

However the integrators' ability to see the whole picture makes their insights into the projects valuable. They can easily relate to all the other thinking profiles and each phase of the process as describe in FourSight (2014). On the other hand it is questionable if this factor alone makes them good facilitators when adopting a new method like in this case. The reason for that might be that they lack a certain

decisiveness that is needed to lead team to the right track because of the problem with finding their own voice within the team and they are uncomfortable with uncertainty (FourSight, 2014). On the contrary, the level of facilitation ability (Adams et al., 2007) also seems to be a major factor in that case.

Comparison of convergence and divergence

By looking at the DT process as series of divergent and convergent processes (Efeoglu et al., 2013) and using DeCusatis's (2008) connection between the creative process and the breakthrough thinking process. Some patterns can be identified between the convergent thinking styles on one hand, and the divergent ones on the other hand. Both of the convergent thinking profiles, clarifiers and developers, claimed to like the synthesis activities like journey mapping and pain point identification, however the different groups used different terms to describe why. Clarifiers claimed that it was widening while the developers described them as structured. This supports that these two groups are similar in the sense that they are both convergent but still have different thinking profiles. It is therefore important to take into account that because people perceive the same activity in different ways and can experience concepts, such as DT, very differently it can therefore be important to take into consideration the implications it has for aspects like facilitation and communication around DT.

The study revealed that the participants could have completely opposite views on the same aspect. An integrator in one team reflected that they were sure that some of the ideas would have been killed too soon if they had not allowed themselves to "go up in the abstract" while an ideator, in the same team, claimed that the team had never "gone up there" to begin with. This shows how two people that are experiencing the exact same thing but interpreting it completely different based on their view and way of thinking. Another example of this was when an implementer in one team reflected that the team was protective of their prototype and unwilling to iterate while the clarifier in the team expressed that it was easy to evolve the prototype based on the feedback they got. Therefore, diversity can be a strength since it is possible to combine all the different people with their strengths and weaknesses to cater for both divergent and convergent work, coping with ambiguity, evaluate the effectiveness more positively and provide more quick and intelligent responses to complex challenges (Katzenbach and Smith, 1993; Cohen and Bailey, 1997). However, diversity can also be a challenge because people perceive and communicate differently and therefore cannot be treated the same way and every team member needs to be emphasized as a vital function of the teamwork (Shani et al., 2009; Sparks et al., 2015).

6.3 Problems arising in a fast-paced pilot-project set-up?

Focus set on performance not learning

Centiro is a growing organization with the ambition to make processes more standardized while still maintaining a high service level to their customers. In order to achieve that they are in the process of testing and implementing new methods. The implicit ambition is to support organizational learning and development in order to create a sustainable organization and workplace in line with Shani et al (2009). The challenge however is to make that change sustainable. By adopting a new way of working they seek to add and change the knowledge within the organization, something which is argued to be a key factor in achieving and sustaining success (Shani et al., 2009). Yet, there seems to be a paradox in the learning of a new method to sustain change if the way you learn it has the opposite effect and further, if the method used actually promotes learning.

Even though Centiro had great intentions when initiating this experiment, they wanted to let individuals grow and learn from mistakes as is advocated by Leavy (2005) some aspects of how it would be achieved were unclear. The chance to try new things was certainly provided but the strict time constraint of four half-day workshops, neither allowed for individual growth nor did it support the learning of the method. Time pressure is one of the factor Longenecker (2010) addresses as a barrier to learning, because learning practices are pushed aside for more urgent or pressing work activities. This was observed on different occasion's trough out the projects. Further, due to the short time given the iterative nature of design thinking could not be experienced by the participants and therefore they could not learn how to use it. This is supported by Longenecker's (2010) notion of people not knowing what they do not know. Therefore, the company needs to be aware during their further implementation efforts of DT, that participants need to continue learning DT not only continue using it.

The introduction to DT and each phase was short, leading to superficial learning and work not being done in the way DT is usually portrayed. This was observed on several different occasions and has been discussed in detail in chapter 6.1. The study showed that the participants missed many of the most important aspects of DT during the process, yet they seemed fine with it because in their mind the outcome was the important thing.

When starting out these projects the aim that was discussed was to introduce the Design Thinking process and methods to the employees and get them familiar to working in a new way. When the teams had been put together this was however not clear to them and they perceived objective during the entire process was to deliver a viable solution and the methods were just a mean to get there. They felt a lot of pressure to perform and that the produced outcome of the projects was the aim but not the learning of the methods. This was observed on many different occasions e.g. when

the participants were disappointed in the novelty of their outcome and feeling pressure on presenting the result. This pressure seems to have resulted in fear of failure amongst the participants. And, as Fulop and Rifkin (1997) describe, fear can have significant impact on the result and collective learning. It is therefore important that organizations do not ignore the effect fear can have on participants in a project like this.

Looking at organizations as learning portfolios (Dibella 2011) puts an emphasis on how important learning really is to organizations and why that should be made a focal point when introducing a new management ideas into an organization. Further, as described by Druskat and Keyes (2000), a focus on team learning can improve decision making when the task is complex. Therefore, the focus on performing rather than learning may have led to lack of effectiveness in decision making.

Underestimating facilitator skills

The importance of effective facilitation and leadership in the teams seems to have been underestimated. The facilitators got a basic DT training but did not get any training in facilitation techniques and were not chosen specially on the base of their leadership skills. This can be considered as one of the reasons for lack of creativity within the teams, because even though the facilitators initiated structure for the team work and set clear deadlines they were not able to create an environment where people sensed vitality, positive mood and creative self-efficiency (Paulus et al., 2011; Hulsheger et al., 2009; Reiter-Palmon & Illies, 2004; Zaccaro, Rittman & Marks, 2001), and were not able to facilitate in such a way that the team members were able to utilize all the potential of their diverse skills and cognitive repertoire like Dunbar (1997) claims is important. Further, one of the barriers to learning, Longenecker (2010) has identified, refers to little or no performance feedback or coaching. This implies that the lack of facilitation and leadership in the teams hindered learning.

There was a great difference in how the facilitation was coordinated between the teams, where in some teams the facilitators took a more managing role and in others they participated in the projects. Further, the fact that the discussion seemed more coerced in teams where the facilitator took a managing role supports Carmeli's and Paulus (2014) idea that leaders should exert limited control over their team. However it has been argued that, even though teams often need limited control, they should be held mutually accountable to fulfill the purpose (Katzenbach and Smith 1993), in this case there was evidence that leadership was needed. With challenges like participants joining via skype or participants bringing their computers to meetings the facilitators could, and should have used their skills to guide their team (Adams et al., 2007) away from that kind of behavior in order for the teams to be able to reach their full potential which should be their role according to Nakui, Paulus and van der Zee, (2011) and Paulus (2008).

This need for leadership is understandable when looking at the task they were performing. Not only were the projects challenging and the task demanding, but the method being used, was also new to the participants. The task given to the facilitators was to facilitate and teach a creative development project and that requires a facilitator who is both skilled in the method being taught and experienced in facilitation (Adams et al., 2007); however the facilitators in this case were both novice (Adams et al., 2007) and had no training in leadership or facilitation.

Further, the lack of experience often made the facilitators lean heavily on the tools they were working with instead of focusing on the methods and important aspects of design thinking. Johansson-Sköldberg et al. (2013) describe the over reliance on tools and with better knowledge of the method and tools the facilitators should have been able to steer away from that behavior. However their limited knowledge of the tools made that strategy very ineffective and often lead them to discuss next steps when addressing insecurities in the tool they were working with or trying a more appropriate tool. This made the facilitators unable to enable the team to perform effectively like they should have according to (Burke et al., 2006). In the last steps of the process, when six weeks had passed from the initial facilitator training, and therefore the facilitators were even more unsure of the tools they were working with. Then they did not however have the option of leaning on future tools and therefore the discussion dragged out while the teams tried to figure out the correct way of completing their task. This also supports the criticism from Johansson-Sköldberg's et al. (2013) of how over reliance on tools in DT can affect the work negatively.

Some of the participants that had extremely valuable insights in their reflection had often seemed disengaged and passive during workshops. It is therefore important that facilitators make sure that the participants that do not voice their opinions get the opportunity to be heard, more experienced facilitators would have been helpful in making sure all participants would get the chance to voice their opinions like Adams et al., (2007) claimed to be one of their role. All of the prototypes created during the project were software solutions. This lack of team creativity can be the result of the lack of perspectives Carmeli and Paulus, (2015) discussed. The participants all work at the same software developing organization that focuses on solving their customers problems using software development, and therefore they all seem to have the joint view of software being the most suitable way to solve problems. The process of consensus (Shani et al., 2009) can, in this sense, be considered to have been too easy because the group did in fact not spend significant amount of time working through alternative solutions but immediately agreed that the appropriate way to go would be developing software. Here leadership guidance could also have been helpful in encouraging team members to effectively combine their skills. In this case facilitation was needed which according to Baruah and Paulus (2009) would have motivated them to be more creative, and further, to steer the team into exploring other possibilities as discussed by Nakui, Paulus and van der Zee (2011) and Paulus (2008).

7 Implications

7.1 Research

Researching the initial steps of adoption of DT in an organizational setting with a special focus on how diverse teams learn and use the process, how different individuals work in different phases of the process and the role of facilitation, lead to the discovery of some traps in speed-learning a management concept. In order to find if these problems are in fact the result of the setup, in this case a similar research with minor adjustments could give indications of whether the same problems arise. E.g. by altering the roles of thinking styles, creating a simpler task to solve, expanding the time or creating more homogenous teams. The effects of bias towards the thinking profiles could be tested in order to see if similar results would be acquired if the participants were not aware of their thinking profile.

Further research on what skills are necessary for people who will facilitate the implementation of DT is needed, and based on the results of how differently people view working with DT another factor worth researching is whether practicing DT is for everybody or if special characteristics are necessary for working with the method. As the pilot project at Centiro was a single case study it opens up for further research on prerequisites of adopting DT within a growing organization.

The DT process has been connected to divergence and convergence (Lubart, 2001; Tschimmel, 2011); however this research implies that some phases of the process can involve both divergence and convergence and that could be researched further. The prototyping phase that is generally considered convergent requires for example some level of divergence in the beginning when coming up with ideas for the prototype.

We discovered two factors that cannot be underestimated when implementing DT in an organization: the risks of underestimating facilitation/leadership skills, and the importance of going into the task with the aim of learning rather than performing. A third factor which has not been discussed here, teamwork, was left out. Understanding the effects of underestimating teamwork in the implementation of DT could be an interesting topic for further research.

7.2 Practice

The research also has some implications for practice. An increased focus on the facilitation ability in regards with leadership skills of facilitators could be a way to increase quality of learning DT. Also, even though thinking profiles can give clues to what kind of work individuals will enjoy, it does not change the fact that some people will have problems engaging in teamwork whatever the task is. Therefore, it is important not to underestimate the role of teamwork and teambuilding when implementing a new management concept.

Further research could be performed to discover what kind of people are more appropriate for working on design thinking and why. This is related to the question of whether DT is for everyone or not. DT can create an even playing field for people with various backgrounds to come together to work on a problem however if the proper learning environment is not provided and enough time given to learn and master the concept, implementation efforts will not prove to be successful. The kind of problems not being solvable by DT could be related to the fixed set of tools available to the teams for this pilot project, this is of course something that can be expanded and changed over time but still it is an aspect that is important to look into to make sure the tools are available when they are needed.

8 Conclusions

Centiro went into this experiment with a great learning attitude. They identified that DT could be a useful tool for them to solve problems but still they realized that it would need to be adjusted to their needs. Centiro is a very flexible and fast moving, company they release new products every three weeks and do not expect spending years finding solutions. This fast moving culture created a fast paced experiment. They expected to learn a lot from these initial steps and made plans on how to capture the learning from the process, e.g. by initiating this research. It was set up to investigate three main areas and currently they are working on further implementation efforts and have revised some of the methods in accordance with the findings of this research.

The first research question concerns to what extent teams were using DT in their pilot projects. To answer this question a definition is needed regarding what it means “to be using DT”. This thesis takes as a point of departure the framework introduced by Carlgren et al (2016), describing DT as a set of mindsets/principles, practices and techniques covering five main themes: user focus, problem framing, experimentation, visualization and diversity. Overall, the study showed limited use of all the themes of DT described by Carlgren et al (2016). Therefore it can be questioned whether what went on in the pilot projects can be considered DT at all. Participants were typically able to perform some of the less complex or straightforward activities within the different themes, like journey mapping, but often they did not understand some of the more complex activities such as defining design principles. The result of this was that many of the potential benefits of using DT were missed.

One of the main complaints before the pilot project was launched, and a reason for implementing DT, was that the company often solved the wrong problem for their customers. It was thus hoped that DT would contribute with better problem framing abilities, enabling the employees to better identify which problem needed to be solved. However, by underestimating the efforts needed to understand users as well as omitting the crucial step of validating concepts with the user, they were not able to reframe their problems properly and did in some cases not even identify the core problem. The time pressure the teams were under reinforced the problem, even though it is hard to identify whether the teams would have performed the activities better if they would have had more time. In the study it became evident that a lack of training in DT had led to a shallow understanding of DT, as well as a lack of practical experience both among participants and facilitators. Therefore it can be concluded that even though the teams used a DT process and some of the tools presented within the DT discourse, the work they actually performed cannot in fact be called Design Thinking.

The second research question was related to how individuals with different thinking profiles cope with DT. In the pilot projects a specific focus was set on diversity, since

it is possible to combine different people with their strengths and weaknesses to cater for both divergent and convergent work, in order to cope with ambiguity, evaluate the effectiveness more positively and provide more quick and intelligent responses to complex challenges. Individuals learn differently, and the results of this research show that the FourSight thinking profiles used at Centiro can give an indication of what activities of the DT process different individuals would appreciate and be able to perform. However, further research is needed in order to generalize this finding because of the limited number of participants. It was also found that participants' perceptions of the activities they were performing play an important role. It is clear that different individuals can experience the same event but have completely different views towards it and those different views can be equally correct and valuable to an organization.

When learning a new management idea such as DT, communication and effective facilitation play a vital role in making sure all viewpoints are addressed in all steps of the process in order to ensure the best possible outcome. With regards to facilitation it is important not to underestimate the skill level of the facilitator. At Centiro, the hypothesis was that the integrators' ability to understand and empathize with many different viewpoints would make them suitable as facilitators, but in the study it was found that if they do not have the proper skillset needed for facilitation it can be challenging to exploit this ability.

The third research question dealt with problems that may arise from a fast-paced pilot-project set-up. The study of Centiro's pilot projects that could be seen as a fast-paced attempt to implement DT indeed had some problems that taken together are so serious that they could result in a discontinuation of the method. First, in order to effectively implement a new management concept like DT, time and proper training must be provided in order to allow participants to understand the concept well enough to be able to perform all aspects of the process. Second, the role of effective leadership and facilitation cannot be underestimated. By having novice facilitators with limited skills in facilitation and method is one of the factors that is most likely to result in discontinuation for the wrong reasons. Learning a new method while using it can create some challenges and frustrations but can be overcome with effective facilitation. Third, underestimating the importance of going into the task with the aim of learning rather than performing can lead to participants feeling a too strong pressure to perform, which undermines effective learning and may lead to individual reluctance to the new approach. Finally, not providing the time needed to test, fail and iterate becomes a paradox since it can be questioned whether the work done is DT at all. The fast-pace of the pilot project thus contradicts the aim of learning DT; the very idea of performing the pilot project in the first place. Therefore it becomes clear that in order to continue implementation of DT, it is not enough to continue using the method but the participants must also continue learning how to use DT.

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Appendix 1. Individual reflections on DT activities

1. Team?
2. What is your name?
3. What did you do today?
4. How did you feel today?
5. What did you like?
6. What didn't you like?
7. What was easy?
8. What was not easy?
9. How did the team work together in this phase (what worked and what did not work)?

Appendix 2. Final reflection on DT activities

1. Team?
2. What is your name?
3. What is your work role at Centiro?
4. What is your educational background?
5. How was the experience for you? (please write a few sentences and state WHY it was that way)
6. Did you feel that the process was useful in solving the project you had? (in what ways did you find the process useful or not useful in solving the project, please give examples)
7. What did you like the most?
8. What did you dislike the most?
9. Which parts of the process do you think was easiest?
10. Which parts of the process do you think was hardest?
11. How did you feel the team worked together throughout the whole process?
12. Which tools that were introduced did you find useful and why?
13. Do you feel like the method could have been useful in other types of projects you have done previously at Centiro?
14. If yes, in what types of project could this method be useful and why?
15. Would you like to keep working with this method (as a whole or parts), and in which circumstances?