design thinking

Factors Influencing the Current and Future Adoption of Design Thinking within Design-Thinking-Experienced Companies

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Abstract

Design Thinking (DT) has become a popular approach to innovation in academia as well as in the business world. Due to its human-centered focus and wide range of possible applications, it is regarded as a way of addressing today's challenges and turning them into opportunities. However, criticism has been growing concerning its definition, conceptualization, intention, application, and value. Moreover, DT has been declared a 'failure', and its imminent end has been predicted. It is recognized that after some years of application, DT has reached a point which allows and possibly demands coming to an interim conclusion to review the effectiveness, to learn, and to plan the next steps forward. In order for this to happen, it is necessary to understand the concept of DT from the perspective and experience of those who work with it and make use of it.

Therefore, this thesis aims at answering the question: What factors are influencing the current and future adoption of DT within DT-experienced companies? The objective of the thesis is to develop a propositional model which describes the key influences on DT and how these are, and hypothetically will, affect DT's future within companies. The model is constructed through qualitative research in the form of single elements of Grounded Theory Methodology in combination with Extreme Case Sampling.

The research of this thesis finds that the influence on the current and future adoption of DT within DT-experienced companies can be outlined as the handling of uncertainty with corresponding company involvement. The developed 'Uncertainty vs. Company Involvement Model' illustrates how 'Uncertainty' coexists with the concept of DT and either gains the upper hand or can be reduced. The vigorous effect of 'Uncertainty' depends on the degree of 'Company Involvement' which can prepare the business to get on top of uncertainty – deciding upon whether DT application is continued or dismissed. Both factors contain smaller and more specific ones.

Finally, this thesis' research shows that the future of DT is not yet decided. Depending on which steps are taken next, DT as a concept can either prevail or disappear. Speaking about a general 'failure' or proclaiming the end of DT is too early – that is proved by the companies which have implemented DT deeply in their organizations.

Key Words: Design Thinking; Innovation; Business; Grounded Theory; Extreme Case Sampling

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Chapter 1 – Introduction

"And let it be noted that there is no more delicate matter to take in hand, nor more dangerous to conduct, nor more doubtful in its success, than to set up as a leader in the introduction of changes." (Machiavelli, 1995, p.13)

Although Niccolò Machiavelli (1995) wrote this sentence almost 500 years ago in his often quoted book 'The Prince', its meaning is still valid today. Change can be frightening, risky, and difficult to achieve; especially when one belongs to the first ones to lead that change. Yet, today it is required everywhere. Fraser (2010) emphasizes that the rising economic instability around the world demands new approaches to tackle big challenges. Simultaneously, she argues, social values are changing and the demand for corporate social and environmental responsibilities is increasing. World markets have become available and accessible, opening new opportunities for commerce and trade but also increasing the competition among companies and employees (Fraser, 2010). As Fraser (2008) further stresses, new technologies have changed how people connect, live, work, and act together, and customers' expectations have become more sophisticated and specialized than ever. More and more business leaders have come to believe that Design Thinking (DT) can play a useful role in addressing those challenges and turning them into opportunities (Fraser, 2010).

This thesis takes a closer look at the utilization of DT within companies, trying to understand what drives its application, and what blocks it. In this chapter, the background of the research problem is explored to then specify the research statement as well as the research question and research objectives. Further, the importance of the conducted research is highlighted, and the scope of it is defined. This chapter concludes with an outlook on the thesis and a description of its structure.

1.1 Background of Research Problem

The term DT has become more and more present over the last years. Many authors (Brown, 2009; Neumeier, 2009; Martin, 2009; Boland and Collopy, 2004; Utterback et al., 2006; Verganti, 2009) contributed to the idea of leveraging the power of design for companies and other organizations. Some of them (Brown, 2009; Lockwood, 2010; Martin, 2009) promote DT as a new way of approaching things – be it products, services, processes, structures, or strategies. DT is promised to increase innovation at all levels in an organization.

Research papers about DT are discussed in international DT Research Symposia (The Design Group, 2012); in April 2012, the 9th meeting was held in England. Recently, in September 2012, the first

international DT conference, the so-called d.confestival (Hasso Plattner Institut Potsdam, 2012), took place in Germany. Focusing on best practices and future opportunities for DT, it brought together practitioners and researchers.

The Rotman School of Management of the University of Toronto (2012) hosts the 'DT Experts Speaker Series' and teaches DT to their students. The Hasso Plattner Institute (HPI) of Design at Stanford, the d.school (2012), offers classes and tracks about DT, as does its sister institution, the HPI School of DT (2012) in Potsdam, Germany. Also the University of St. Gallen (HSG) in Switzerland offers a course 'DT@HSG' (University of St. Gallen, 2005) as well as the WU Vienna University of Economics and Business which has embedded DT practices and teaching in their Institute for Entrepreneurship and Innovation (Klanner and Roiser, 2012).

International innovation and design consultancies like IDEO (2012), one of the first agencies promoting DT, conduct DT projects for and with multinational companies from various kinds of industries, such as Samsung, General Electrics (GE), Hewlett Packard (HP), Siemens, Lufthansa or Nike. IDEO (2012) also supports social innovations in third world countries and in the areas of education and health.

Global companies such as Procter & Gamble (P&G), GE, and SAP initially were strongly supported by either an innovation consultancy or in the latter case by the d.school; meanwhile, they have established their own internal DT programs and initiatives (Brown, 2009; Fehlau, 2012; Martin, 2009).

DT clearly seems to appeal to practitioners, students, and researchers. However, like any new idea or approach, DT has faced criticism (i.e., Norman, 2010; Verganti, 2009). Now, after a period of widespread application, interim conclusions are possible which in turn increase criticism (i.e., Hill, 2012; Newman, 2011). Especially in the opinion-forming blogosphere, DT has received withering assessments (i.e., Kroeter, 2007; Ling, 2010; Mootee, 2010; Walters, 2011). There is even talk of DT being "a failed experiment" – this statement is coming from a former advocate of DT (Nussbaum, 2011, n.p.[1]).

1.2 Problem Statement, Research Question and Objectives

As addressed before, DT as an alternative approach to innovation has experienced a rise in practice just as well as in academia. After some years of application DT has reached a point which allows and

[1] *Comment*: n.p. = no page

possibly demands coming to interim conclusions to review its effectiveness, to learn, and plan the next steps forward. In order for this to happen, however, it is necessary to understand the issue of DT from the perspective and experience of those who work with it. In this thesis, the mentioned perspective and experience is understood as the one of companies which have applied or still are applying DT for business purposes. Only if one deals with the influences on the current and future adoption of DT and what determines it within companies, does it become possible to understand the practical applications and implications of DT. Not until then it seems to be beneficial coming to an interim conclusion.

Because DT research barely exists so far, this thesis aims at understanding factors influencing the current and future adoption of DT within companies that have experienced the approach. Experience, in this case, includes the range from one to a large number of DT projects. Accordingly, the research question to be answered is:

What factors are affecting the current and future adoption of Design Thinking within Design-Thinking-experienced companies?

The objective of the thesis is to develop a propositional model which describes the key influences on DT and how these are, and hypothetically will, affect DT's future within companies.

The model is constructed through qualitative research in the form of single elements[2] of Grounded Theory Methodology[3] (GTM) in combination with Extreme Case Sampling (Patton, 2002; see *Chapter 3*). Juliet Corbin and Anselm Strauss (2008, p.55), the main influencers within GTM, understand theory as "a set of well-developed categories (themes, concepts) that are systematically interrelated through statements of relationship to form a theoretical framework that explains some phenomenon". This thesis aims at developing a theory, visualized as a model, in accordance with the meaning of the previously mentioned definition.

The goal is to gain information-rich insights and in-depth understanding about the issue in question and, therefore, this thesis does not put emphasis on generalizability, but rather has the ambition to retrieve valuable lessons from particular cases.

[2] *Comment*: 'Single elements' refer to the fact that some alterations to the original GTM approach had to be made. Reasons for that are mentioned at the respective passages.
[3] *Comment*: Inspired by the distinction between Grounded Theory and Grounded Theory Method made by Bryant and Charmaz (2007), I have adopted the term 'Grounded Theory Methodology' to refer to the methodology including methods used in the research process, whereas the term 'Grounded Theory' is understood as the result of applying that methodology and methods.

1.3 Importance of Research

As illustrated in *1.1,* DT has become ubiquitous in practice and research alike. However, insights about what determines a company's decision whether to keep going with DT or dismissing it are lacking. Books and journal articles on DT discuss broad concepts and case examples which rather stay at an overview-level; studies about the application of DT rarely exist (see literature used in *Chapter 2*). Since DT is currently facing a lot of critique, there is a possibility that this approach might soon be abandoned. Companies which have not applied DT yet might have become more reluctant towards it. For these reasons, it seems significant to take a closer look at the issue. It appears to be crucial to search for the causes which lead companies to support the approach or dismiss it and conduct that search on a practical level which others can relate to and learn from.

The research of this thesis is potentially important for:

… practitioners from companies who are considering adopting DT and are looking for guiding facts to be considered.

… practitioners from companies who have already applied DT and are either looking for confirmation or improvement of their practices.

… practitioners who teach or sell DT to companies and are looking for confirmation or refinement of their services.

… researchers and fellow students who are looking for information and impulses for their own research.

1.4 Scope of Research

In this thesis, companies are understood as any kind of business organization. As mentioned before, 'DT-experienced' companies are those who have executed one or more DT projects. This requirement is set to be able to receive in-depth information based on real experiences rather than from mere assumptions. Further restrictions in terms of size, industry or other business parameters are avoided. This decision results from the application of single elements of GTM which recommend starting research as broad as possible and taking as many conditions into account as possible (Corbin and Strauss, 2008); thereby all variables are treated as potential influences to the research problem.

When conducting research, sensitivity of the researcher is one of the core factors affecting the depth and richness of the outcome. A researcher's sensitivity can be trained to a certain level (Corbin and Strauss, 2008). It also can be eased through some aspects, one of them is language. Speaking the same mother tongue as the counterpart, enables dialogue partners to reach a certain depth of conversation and also grasp the underlying meaning in specific things said. As I am a novice in the field of research, it makes sense to simplify the process of research by such details as language. Also, as my native language is German, it made sense to conduct the research in German speaking countries. Further, my residence in Germany and Austria supports that decision. Due to limitations in time and resources, it is not possible to include Switzerland in the research.

In both countries design has a special standing. As Conran and Bayley (2008) show, in the history of design renowned German personalities can be found repeatedly: Hermann Muthesius as originator of modern architecture; the architect Peter Behrens, who became one of the leading representatives of modern industrial design when he created the corporate identity program of AEG in the beginning of the 20th century; Walter Gropius, who founded the Bauhaus, the most influential art school of all times, which is also associated with architect and designer Marcel Breuer and architect Mies van der Rohe. In Austria, Michael Thonet, famous for his bentwood furniture, and Adolf Loos with his philosophy of simplicity also wielded influence on the further development of design (Conran and Bayley, 2008). Today, many design institutions, such as the German Design Council (2012) or designaustria (2012), and a large number of design schools in both countries are promoting design research and contribute to the popularization of design within commerce and industry, cultural institutions and the public.

In both countries, DT also has been gaining increased attention through universities (i.e., WU in Vienna [Klanner and Roiser, 2012], HPI School of DT in Potsdam [2012]) and conferences (i.e., Design-Organization-Media Conference in Linz [DOM Research Lab, 2009], d.confestival in Potsdam [Hasso Plattner Institut Potsdam, 2012]). However, in Germany far more companies with DT experience can be found through internet research than in Austria. Nonetheless, both countries are equally considered in the sample search.

1.5 Structure of the Thesis

Regarding this chapter as the first one, *Chapter 2* contains the literature review about DT and aims at providing the theoretical foundation for the subsequent research. I thereby discuss the issue in terms of its roots within design, its definition and conception, and point out benefits as well as challenges

of DT. Moreover, I take a closer look at the critique of DT to round up the picture and underline the necessity of the research conducted.

Chapter 3 deals with the research design and methodology. The research philosophy is described, the methodology and methods used are explained, and the research sample is depicted.

In *Chapter 4*, the research results are presented by an in-depth analysis of the findings.

Finally, *Chapter 5* rounds up the thesis with the discussion of the findings in terms of their implications for DT, businesses, and the design discipline. Besides, it aims at giving recommendations for further research and relates the results to the literature review from *Chapter 2*. After then touching upon the limitations of the thesis, the chapter concludes with the main aspects of the thesis.

CHAPTER 2 – Theoretical Foundation

This chapter provides the theoretical foundation for this thesis' research. As the research question is fairly broad, an overview of all different aspects surrounding DT is given. Also, to enable the reader to fully comprehend and assess the research, its results, and implications, it aims at creating an all-encompassing picture of DT. Therefore, DT's single elements are pointed out and discussed in detail.

The first part seeks to understand DT from its roots to its concept as well as its benefits and challenges. The second part consists of DT critique in order to complement the picture of DT.

2.1 From Design to Design Thinking

This part deals with DT's roots in design and examines the DT term. Further, it addresses the different courses of action as well as the concept's components. The question of 'Who is a Design Thinker (DTer)?' is answered, and the benefits of the approach are highlighted.

2.1.1 What is Design?

"Design is to design a design to produce a design" – this definition of design by Heskett (2005, p.3) summarizes the different facets of the term in one simple sentence. It shows that 'design' can be understood as an activity, a process, and an outcome. Bazjanac (1974), dealing with architectural design, notes that the ancient perception of architecture primarily revolved around the concept of

beauty. It was concerned with principles such as order, symmetry, and harmony. In more recent views, he states, emphasis is put on design offering the 'best' solution to a stated problem. Due to its mantra of 'form follows function', Liedtka (2000) regards the foundation of the German 'Bauhaus' in 1919 as allegorical to this change in mindset.

A completely different angle on design was advocated for by the influential sociologist Herbert Simon (1996a) in his book 'The Sciences of the Artificial', which was first published in 1969. Simon (1996a, p.xii) argues that "engineering, medicine, business, architecture, and painting are concerned not with the necessary but with the contingent—not with how things are but with how they might be—in short, with design." He detaches design from being distinctive of a certain design profession, such as graphic design, engineering, or architecture, and declares it to be a core capacity of all other sciences. Heskett (2005, p.2) even goes one step further by regarding design as a general human capacity, "Design is one of the basic characteristics of what it is to be human, and an essential determinant of the quality of human life. It affects everyone in every detail of every aspect of what they do throughout each day. Very few aspects of the material environment are incapable of improvement in some significant way by greater attention being paid to their design."

Already from this short collection of stances on design, it can be inferred that there are various perspectives on the matter. Austin, Friis and Sullivan (2007) note that despite all the differences, most definitions of design consider the creation of something new and understand it as an aesthetic approach to solving a certain problem. They assume that the dividedness in definitions might stem from the fact that design never has experienced the transformation into a discipline, requiring a particular license model or qualification such as medicine or law. In these fields, standards and regulations have been constructed, and only those who obtain a rule-based certification can be associated with the respective profession. Although 'design' as a term enjoys a high degree of familiarity, it is, nevertheless, characterized by incongruities and fuzzy boundaries which prohibit the formulation of a clear definition (Heskett, 2005).

Also, the design process is described and practiced in many variations. Austin, Friis and Sullivan (2007) highlight that, on the one hand, highly subjective, intuitive processes of individuals can be found. On the other hand, there is a fixed set of activities practiced by a collaborative circle of different professions and based on a human-centered perspective (Austin, Friis and Sullivan, 2007). Yet, Liedtka and Mintzberg (2006) identified imbrications in the diverse processes of design. They claim them to be "synthetic, future-focused, hypothesis-driven, and opportunistic" (Liedtka and

Mintzberg, 2006, p.12). Boland and Collopy (2004, p.9) add “the lack of predetermined outcomes” to universally valid attributes of the design process.

Buchanan (1992, pp.9-10) selected four areas where design particularly appears – regardless , if it is worked on by professional designers or others who would not consider themselves designers:

- Symbolic and visual communications: graphic design, such as typography and advertising, book and magazine production, scientific illustration, photography, film, television, and computer display
- Material objects: form and visual appearance of everyday products, such as clothing, domestic objects, tools, instruments, machinery, and vehicles; the interpretation of the physical, psychological, social, and cultural relationships between products and human beings
- Activities and organized services: logistics, combining physical resources, instrumentalities, and human beings in efficient sequences and schedules to reach specified objectives; logical decision making and strategic planning; organic flow of experience in concrete situations, making such experiences more intelligent, meaningful, and satisfying
- Complex systems or environments for living, working, playing, and learning: systems engineering, architecture, and urban planning or the functional analysis of the parts of complex wholes and their subsequent integration in hierarchies

Buchanan’s list matches with the common assumption that everything which is created by humans can be called design, whether it is tangible or intangible. As already touched upon, the answer to the question of who is a designer seems to be unclear. According to Simon (1996b, p.111), “everyone designs who devises courses of action aimed at changing existing situations into preferred ones”. Utterback et al. (2006) assume that the fact of design outcomes not being solely created by designers is one reason why design seems so hard to identify. On the contrary, design disciplines have been endeavored to create specifications about the way designers work and in how far their procedures are distinctive (Kimbell, 2009). Lawson (2005, p.11) argues, “design is a highly complex and sophisticated skill. It is not a mystical ability given only to those with recondite powers but a skill which, for many, must be learned and practiced rather like the playing of a sport or a musical.”

With the presentation of those diverse perceptions of ‘design’, I do not aim at deciding on one specific view. I rather wish to provide an insight into what DT, at least regarding its term, is built on; namely, it is based on a relatively confusing construct of different interpretations and assumptions.

2.1.2 The Beginning of Design Thinking

In the 1980s and 1990s, design research brought forth a new subfield which was called DT (Kimbell, 2009). Especially Peter Rowe's (1987) book titled 'Design Thinking' established the term within the design community. In this context, DT was understood as happening in the mind of a professional designer. During the first decade of this century, the economy began to move from the economies of scale to the economies of choice (Nussbaum, 2004). This shift emphasized the rising importance of the customer experience, and with that, also the terms 'design' and 'DT' underwent a change.

Design suddenly was recognized to be applicable to all kinds of business matters, for example, organizational design or strategy and research design (Kimbell, 2009). "Design [was] rapidly moving from 'posters and toasters' to include processes, systems, and organizations" (Neumeier, 2009, p.13). Today, design has become central to product differentiation (Buchanan, 2004) and is regarded as an innovation strategy (Utterback et al., 2006). It helps identifying future scenarios, inventing products, and building strong customer relationships (Neumeier, 2009). Knowledge about the customers' needs, preferences, and habits have replaced technical progress and experiences from other industries and markets as the strongest influences of inspiring innovation (McCullagh, 2010). With that, DT has increasingly been regarded as an attribute which is not exclusive to professional designers, but can also be adopted by managers and other professions. This understanding of DT apparently represents a contrast to the pragmatic, linear, analytical thinking of businesses which according to Gianfranco Zaccai, CEO of the international design consultancy Design Continuum, has not achieved its intended results (Lockwood, 2010a). Solely relying on 'old' business processes does not seem to be sufficient anymore to tackle the complex, open-ended challenges of today.

In the following, the DT definition, its courses of action and components are examined more deeply.

2.1.3 The Design Thinking Definition

"DT means thinking as a designer would" (Martin, 2009, p.62), or more specifically, DT "is a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity." (Brown, 2008, p.86) Although Roger Martin, dean of the Rotman School of Management at the University of Toronto, and Tim Brown, CEO and president of the innovation consultancy IDEO, are often quoted sources concerning DT, their definitions are by far not the only ones in this field. Just as for design, there is no superior definition for DT. One can recognize two different, frequently appearing perspectives on the matter of DT (McCullagh, 2010; Melles, 2010):

- DT is teaching management and other disciplines how to think like designers (i.e., Martin, 2009; Brown, 2009; Lockwood, 2010c)
- DT describes the practices of professional designers (i.e., Lawson, 2005; Cross, 2011)

Badke-Schaub, Roozenburg and Cardoso (2010, p.40) regard the first perspective as the "new movement" of DT in contrast to the "traditional concept of DT", which is represented by the second perspective above. However, as already discussed in *2.1.1,* there is not one single approach that designers use; rather, there are plenty of different practices. A study by Carr et al. (2010), about the adoption of design methods and techniques in businesses, complements the picture of different perceptions about DT and confirms that the traditional and modern notions of DT still exist in parallel. The interviewed experts, at the intersection of business and design, either viewed DT to be dealing with how designers use techniques and methodologies taught in design schools to solve problems; or they understood DT as a distinctive way of solving any kind of business problem detached from the design function. These contrasts are related to another set of assumptions. On the one hand, managers who are trying to apply DT are said to be "likely to lower the quality and credibility of design in the organization" (Carr et al., 2010, p.62). On the other hand, "managers not only could become DTers, but should" (Carr et al., 2010, p.62) to enhance the innovative capability of the organization.

In order to include the core behind DT – consumer-centricity, future orientation and challenging the norm – and to avoid the ambiguity of the term, some users tend to create their own expressions, such as 'open thinking' or 'concept thinking' (Drews, 2009).

The discussion about DT does not only revolve around its connection to the design paradigm and the actors applying DT but also deals with its conception. In the literature, it is referred to as a discipline (Brown, 2008), process (Melles, 2010; Badke-Schaub, Daalhuizen and Roozenburg, 2011), method/methodology (Lindberg et al., 2010; Lockwood, 2010b; Brown, 2009), tool (Lockwood, 2010b; Clark and Smith, 2010), strategy (Verganti, 2009; Martin, 2009; Lockwood, 2010b; Utterback et al., 2006), paradigm (Dorst, 2011), or mindset (Martin, 2009; Boland and Collopy, 2004; Brown, 2009; Newman, 2011).

The disagreement about DT in terms of perspective, main actors, and conception has become apparent. The orientation of this thesis follows the 'new movement' of DT; thereby DT is not perceived as exclusive to designers but is considered to be applicable to other professions, as well. All its elements, though, are regarded as inspired by how some designers work. DT is understood as a

method, a specific approach, to innovation[4] which includes tools (described as 'components' in *2.1.5*), processes (depicted as 'courses of action' in *2.1.4*), and a certain mindset (explained in *2.1.5*). It is not regarded as a strategy or process itself, but rather as a method to also shape and create strategies and processes (Lindberg et al., 2010).

2.1.4 Courses of Action

Although it appears to be controversial whether DT is a process or not, when it comes to its practical application DT is often illustrated as a process. To deepen the comprehension of fundamentals about DT and the understanding of its practical application, different DT courses of action are presented in the following. Not only processes from theoretical literature are illustrated but also from universities and consultancies/agencies which apply DT within companies. This is because the research of this thesis focuses on companies which have applied DT with exactly these DT providers. I chose to depict the particular theoretical approaches by Martin (2009), Brown (2008), and Fraser (2010), because they are often quoted sources in general DT discussions.

Martin: The Knowledge Funnel

With his 'knowledge funnel', Roger Martin (2009, p.4) created a model for how various kinds of businesses can "advance knowledge and capture value" by solving deep-rooted problems. The driving force or "form of thought" (Martin, 2009, p.4) within the funnel is represented by DT. He proposes that the method enables movement along the different stages of mysteries[5], heuristics[6], and algorithms[7]. The well-known coffeehouse chain Starbucks[8] can be named as one example that successfully managed to move across the knowledge funnel and capture value from it. The founders tackled the mystery of daily coffee consumption. They developed the heuristic of a coffee shop with cozy atmosphere, serving coffee to drink at the coffee shop and serving coffee to go. Finally, with a distinct design for mugs and stores and a systematized way of making the coffee in front of the

[4] *Definition*: According to Schumpeter (2008, p.95), 'innovation' describes the "realization of new combinations" on condition of successful resonance of the market. His understanding of the term is adopted in this thesis.
[5] *Definition*: A mystery "takes an infinite variety of forms" (Martin, 2009, p.7) and contains of "things in our environment that excite our curiosity but elude our understanding" (Martin, 2009, p.9).
[6] *Definition*: A heuristic is "a rule of thumb that helps narrow the field of inquiry and work down the mystery to a manageable size" (Martin, 2009, p.8).
[7] *Definition*: An algorithm is a "fixed formula" (Martin, 2009, p.9), "an explicit, step-by-step procedure for solving a problem" (Martin, 2009, p.12).
[8] Comment: Starbucks did not actually connect their way of proceeding with the knowledge funnel and its components. However, in my opinion, in presents a good example about how the knowledge funnel can be understood.

customer, they created a fixed formula, an algorithm, which could be applied to their coffee shops around the world. After this first move across the knowledge funnel, new mysteries (i.e., supplying Starbucks coffee all day) have been approached and eventually turned into algorithms (i.e., packaged Starbucks coffee that can be bought in supermarkets).

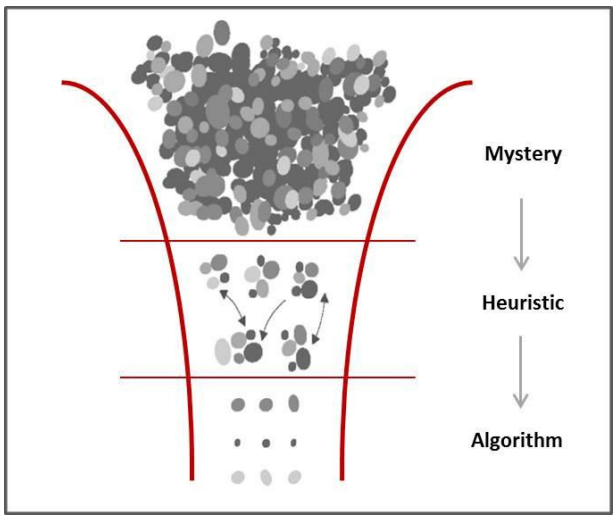

Figure 1: Knowledge Funnel (Martin, 2009, p.8)

DT plays a big part in contributing to incorporate mysteries, heuristics, and algorithms fully into the business. Martin (2009) sees the main task of DT in the balancing act of opposites. There is the contrast between exploration (which deals with the movement from one stage to another to search for new knowledge) and exploitation (which ensures the utilization of existing knowledge within a stage) (Martin, 2009). He connects this to the opposites of analytical mastery, driven by numbers and past data, and intuitive originality, resulting from knowing without reasoning. With its abductive[9] logic, DT sits in-between, searching for something that could be true, argues Martin. He, further, emphasizes that balance is achieved by continuously following the knowledge funnel in a cycling manner. Additionally, he explains that to be able to explore and exploit, the tension between validity (which aims at producing outcomes that meet a desired objective) and reliability (which goal it is to produce consistent, predictable outcomes) needs to be balanced accordingly. This involves the mixture of invention of business and the administration of business (Martin, 2009).

[9] *Definition*: Charles Sanders Peirce (1935, p.106) invented the term, thereby meaning "the process of forming explanatory hypotheses. It is the only logical operation which introduces any new idea." He assigns induction the characteristic of doing "nothing but determine a value and deduction merely [evolving] the necessary consequences of a pure hypothesis." He further explains that "deduction proves that something must be; induction shows that something actually is operative; abduction merely suggests that something may be" (Peirce, 1935, p.106).

Brown/IDEO: 3 Spaces of Innovation[10]

Tim Brown (2009, p.148) and his innovation consultancy IDEO emphasize that DT is "no longer a stylistic gesture thrown at a project just before it is handed off to marketing"; rather, it is to be brought in at the earliest stages and worked with to the latest stages.

Figure 2 shows three overlapping spaces of innovation in which DT is embedded. Brown (2008) calls the first space 'inspiration'. in which a problem or opportunity is recognized that triggers search for solutions. Insights are collected from all possible sources. The next step he identifies as the 'ideation' space, containing a process of generating, developing, and testing ideas. Basically, the respective insights are translated into ideas. The third space, 'implementation', brings the project to the market by developing the best ideas into a specific plan of action (Brown, 2008).

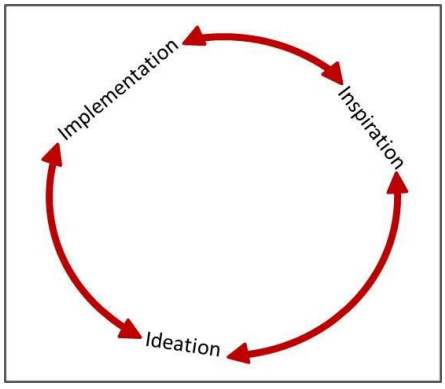

Figure 2: Three Spaces of Innovation (adapted from Brown, 2008)

Similar to Martin (2010), Brown (2009) connects DT with the necessity to switch between four mental states. On the one hand, the continuous movement between divergent and convergent thinking is required; whereas the former state aims at multiplying options to create choices, the latter helps deciding among the existing alternatives (Brown, 2009). On the other hand, he argues that interplay of analytical and synthetic thinking becomes necessary. By conducting interviews, using patents, pictures, or videos, problems are deconstructed in order to grasp them better. Then, pieces are put back together to create complete ideas and a coherent story (Brown, 2009).

Fraser: Three Gears of Business Design

With her 'Three Gears of Business Design', Heather Fraser (2010, p.37), the director of the Business Design Initiative at the Rotman School of Management, developed a "framework for iteration that

[10] *Comment*: A very similar approach is used by the German 'agency for innovative development' called Tiefenschaerfe (2012).

knits together user needs, powerful ideas, and enterprise success". *Figure 3* presents 'Gear 1' as developing 'deep user understanding'. At this stage, Fraser suggests that the customer and other stakeholders are examined, criteria for innovation are determined, and new opportunities for value creation are explored. 'Gear 2', or 'concept visualization', digs deeper into the discoveries from 'Gear 1' by applying prototyping and concept development also in multidisciplinary teams (Fraser, 2010). According to Fraser (2010), the third gear, 'strategic business design', determines the strategic perspective by combining the broad concepts with future scenarios, taking also operational and economical topics into account, and by creating the business model itself. This step is also supported by visualization of results, thereby more traditional methods such as financial analyses are complemented (Fraser, 2010).

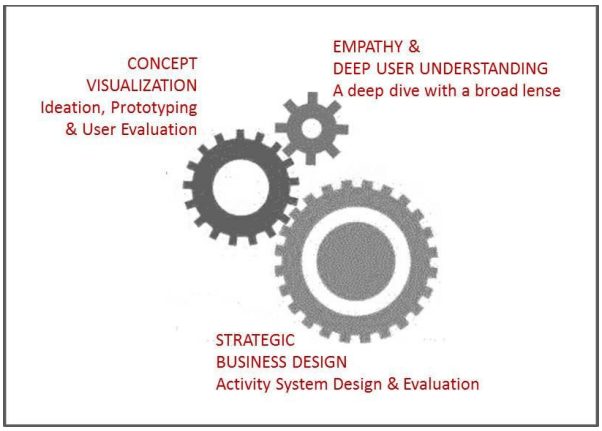

Figure 3: Three Gears of Business Design (Fraser, 2010, p.36)

University of St. Gallen (HSG): The Iterative Approach

The course DT@HSG does not only teach its students, but also provides a service to companies by letting their students realize DT projects for and with them (University of St. Gallen, 2005). While the students get hands-on DT experience for free, the companies receive user insights for a small financial contribution. The DT approach of the university involves a five-step-process (see *Figure 4*) (University of St. Gallen, 2005): First, '(re)define the problem' sets the agenda. It determines who the users are and what is of importance to them. Second, 'need-finding and instant expertise' is to observe the interests and habits of users to conclude their underlying needs. Third, 'brainstorm and ideation' represent the idea generation phase, which is highly interconnected with the fourth phase called 'prototype'. There, materials are used to rapidly construct physical presentations of the concepts. In the fifth phase, 'test', the prototypes are handed over to users to get feedback in the

form of actions and words. The five steps are iterated until satisfying outcomes are achieved (University of St. Gallen, 2005).

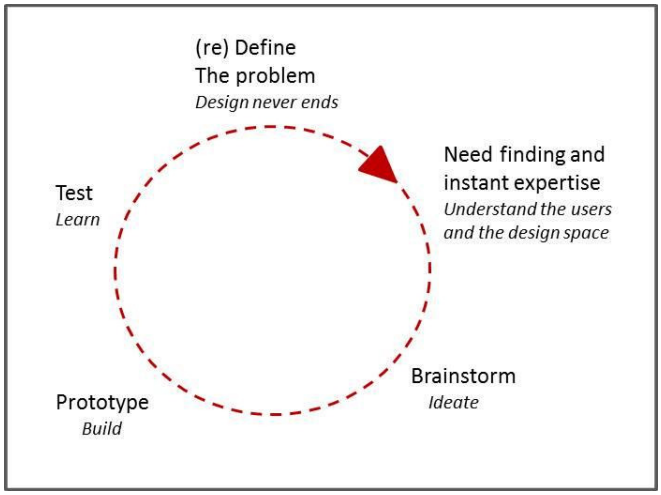

Figure 4: DT Approach at University of St. Gallen (University of St. Gallen, 2005, n.p.)

WU Vienna University of Economics and Business: Interdisciplinary DT[11]

Similar to the University of St. Gallen, the WU Vienna University of Economics and Business offers a course format that teaches DT to students by letting them solve problems for companies (Klanner and Roiser, 2012). They, however, apply a six-step-process, as illustrated in *Figure 5*.

Klanner and Roiser (2012) describe the approach as follows: Starting with 'understand', the search and problem definition takes place. It is followed by 'explore', where needs of the target group and its environment are analyzed through observations, interviews, scenario analysis, online and literature research. They depict the third step, 'aggregate', as the one which focuses on the identification of the innovation potential by synthesizing and prioritizing the results of the step before. This leads to 'ideate', where ideas are generated, evaluated, and conceptualized. They describe the fifth step, 'visualize', as serving prototyping of the possible solutions in the form of storyboards, storytelling, or physical prototypes. At the last stage, 'test', customers and project partners are invited to test and give feedback. The whole process is applied in iterative circles, giving the opportunity to repeat certain steps if necessary (Klanner and Roiser, 2012).

[11] *Comment*: The German strategic consultancy ingosu (2012) and the German innovation agency Dark Horse (2012) as well as the HPI School of DT in Potsdam (2012) apply DT in the same manner as the WU, with the only difference that they are using other terms for some stages.

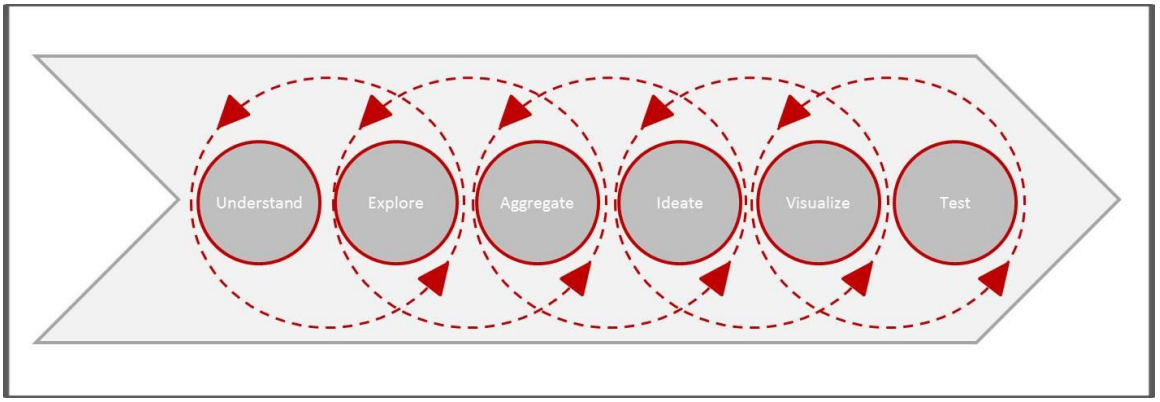

Figure 5: DT Approach at Vienna University of Economics and Business (Klanner and Roiser, 2012, p.1)

The five approaches to DT show similarities and differences. Due to a different metaphor for the act of concretizing obtained knowledge about customers' needs, Martin's (2009) knowledge funnel is the most distinct. Its logic, however, overlaps with the one of the other examples. The number of steps, gears, or spaces ranges from three to five; however, the only activity missing in most approaches is project implementation. Except from Brown's (2008), no other concept out of the five considers bringing the outcome to the market. The inspection of the different models provides information about central components and characteristics of DT, which are described in *2.1.5* and *2.1.6*.

2.1.5 Components

Implied by the similarities in the courses of action as well as the definitions discussed above, the core components of DT are presented in the following. They are listed in alphabetical order as there is no apparent reason to assume that one is more relevant than the other.

Aesthetics

Although often not explicitly mentioned in the discourse of DT, aesthetics play a major role in the background. There is talk about the goal of satisfying unknown, deeply rooted needs of the customers, addressing and simultaneously evoking and creating emotions. Neumeier (2009, p.70) argues that the necessity for "the sensual metaphorical power of beauty" increases with the technological development of culture. Aesthetics, he adds, "gives a toolbox for beautiful execution" (Neumeier, 2009, p.69).

Abductive, Inductive and Deductive Reasoning

There is agreement of abductive reasoning being a characteristic for design and DT. Both imagine and visualize what might become some future state and create a roadmap of how to achieve that desired state (Martin, 2009; Liedtka, 2000; Cross, 2011).

Dorst (2011), however, argues that the design process is a combination of different kinds of thinking: starting with a certain value that is wished to be achieved and then reasoning from the specific to the general (induction) to create a working principle. That again provides the foundation for abductive thinking to create a specific 'thing' which needs to be tested by reasoning from the general to the specific (deduction). By attaching the attribute of being hypothesis-driven to DT in the sense of creatively generating hypotheses to be tested and analytically conducting data for testing, Liedtka (2000) unintentionally confirms Dorst's (2011) assumption.

Cross (2011, p.28) even offers alternative terms for the same way of thinking. He proposes "productive reasoning", as the designer produces and composes a design, or "appositional reasoning", because the designer strives for an apposite, a suitable, solution to an existing problem.

No matter which and how many terms are used to describe it, the interplay of using data to establish and test hypotheses to create something new out of it needs to become clear as something inherent in DT.

Broad Scope

Brown (2009) declares the mission of DT to be the transformation of observations to insights and of insights to products and services. However, he does not stop there: DT also creates experiences, new organizational processes, and business models and works on social and ecological issues. Consequently, DT's scope can be regarded as rather broad. Buchanan (1992) links DT with Rittel's (1967, cited in Buchanan, 1992, p.15) idea of so-called 'wicked problems' which are a "class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing." Due to its flexible conceptualization, DT is said to be explicitly suitable to tackle such problems (Buchanan, 1992).

Constraints

The possible solution derived from applying DT is somewhat constrained by criteria for successful ideas, which were established by Brown (2009): The outcome has to be functionally realizable within a certain time frame (feasibility); it requires a fit within a sustainable business model (viability); and, equally, it needs to be wanted by the people it is made for (desirability).Therefore, projects should be started with a brief, containing a combination of freedom and constraint (Brown, 2009). Due to this component of DT, Liedtka (2000, p.19) describes the approach as "dialectical" as it sits in between conflicting demands and the restrictions of today's world.

Culture

Being able to work project-based, in interdisciplinary teams, and in iterative cycles, does require a certain mindset. Brown (2009) calls it the 'culture of innovation' which enables people to freely experiment and also take risks in a suitable social and spatial environment. He states that it is preferable to establish "a culture where it is better to ask forgiveness afterwards rather than permission before" (Brown, 2009, p.32). Neumeier (2009, p.21) adopts a similar direction by recommending to "develop a 'designful mind'" within a company. Additionally, he calls for a culture which ensures the quick absorption of knowledge in order for the organization to learn fast and be able to keep up with the pace of change.

Failure

One central part of DT is its perception of failure. Generally, failure is often accompanied by a negative connotation. The impulse to stop failure from occurring needs to be transformed into one which embraces failure as an opportunity (Fraser, 2010). DT gives permission to fail in order to enhance the learning process. Brown (2009, p.230) hands out the advice, "Fail early, fail often".

Iterative Cycles

As highlighted in the courses of action above, iteration is an substantial component of DT. Liedtka (2000) emphasizes that by repeatedly asking 'what if' and inferring 'if then', the problem in question is explored more deeply and more accurately. The repeating cycles of hypothesis generation and testing aim to lead to more sophisticated outcomes and greater refinement (Liedtka, 2000).

Holistic View

DT does not only focus on specifics but also tries to consider as many of a problem's facets as possible. Fraser (2010) calls for a certain mindfulness which enables sharp awareness of one's world, environment, and people. DT does not mean working on one product or service exclusively, but it rather takes different aspects into account such as strategic planning and communication (Vogel, 2010). Conclusively, DT searches for a holistic view, treating an overall coherent design as the end goal.

Human-Centricity

DT presents an alternative to technology-driven innovation by adapting a different focus (Woudhuysen, 2011). It is either associated with user- (Meinel and Leifer, 2012; McCullagh, 2010; Woudhuysen, 2011) or human-centricity (Newman, 2011; Melles, 2010; Brown, 2009; Badke-Schaub, Roozenburg and Cardoso, 2010). In coherence with DT's aspiration to provide an holistic view, the latter term seems to be more appropriate as it does not only take the customer into consideration but also all the other stakeholders which are affected by the project.

Being human-centered requires empathy ("standing in the shoes of others" [Brown, 2009, p.49]) to successfully observe ("watching what people do not do and listening to what people do not say" [Brown, 2009, p.43]) and derive valuable insights ("analysis of relation between people and products and people and people" [Brown, 2009, p.42]). Thereby all stakeholders need to be treated as active participants (Brown, 2009).

Interdisciplinary Teams

"The whole is greater than the sum of its parts." (Brown, 2009, p.56) Following this belief, DT is not achieved by one single person but by teams which work together in open-minded collaboration (Fraser, 2010). To enhance the creativity of the team and the richness of the outcome, the teams are orchestrated best with people from diverse backgrounds and interests. Brown (2009, p.27) suggests that in order to create more fruitful results, interdisciplinary teams should consist of "T-shaped people" who are experts in one area with affinity to other fields. Utterback et al. (2006) also are talking about stretching the teams to innovation networks, involving users, design firms and consultants. This idea is indirectly supported by Lockwood (2010c) when he notes that the most effective work is done by a combination of internal and external resources.

Project-Based Work

In alignment with interdisciplinary teams and innovation networks, a project-based structure becomes relevant. It enables the organization to flexibly and quickly react to diverse kinds of challenges (Martin, 2009).

Visualization and Rapid Prototyping

Brown (2009) argues that visualization and rapid prototyping help to concretize an idea, to quickly share it with others, and to receive feedback which leads to engaging in the next iterative loop. He proposes that literally everything that is available to clarify one's idea can be regarded as tools. Although the term DT inevitably puts emphasis on thinking, it is argued that thinking is not solely done inside the head. Boland and Collopy (2004) point out that especially designers seem to think with their hands and in the form of interaction with other people. Brown also regards it as possible to prototype and visualize intangibles, such as services and business models, with the help of storyboards, storytelling, design challenges, scenarios, or acting out (Brown, 2009).

2.1.6 Who is a Design Thinker?

Another equally important aspect of DT is to focus on the question: 'Who is a DTer?' Brown (2008, 2009) describes the DTer as someone who is supposed to realize innovation. Further, he claims that this person does not necessarily has to have a professional design background but rather needs to possess specific characteristics that enable him or her to apply DT.

The characteristics which mainly empower people to become DTers are listed in the following (Brown, 2008; Neumeier, 2009; Martin, 2009):

- Empathy – imagining and trying to understand the world and its people from different perspectives
- Integrative Thinking – not only relying on an analytical process which takes existing options into consideration but also integrating parts from seemingly unrelated issues by also following one's intuition
- Optimism and Idealism – believing in the success of new solutions, even if they might be contrary to what is known and familiar
- Experimentalism and Imagination– enjoying and celebrating the search for something new with their minds and hands

- Collaboration – being willing and able to work together with anthropologists, business people, sociologists, engineers and psychologists, in short with people from completely different backgrounds

With regards to professional designers, Cross (2004) states that expertise in design results from a combination of possessing talent and applying it dedicatedly. Further influences, he names, are motivation, concentration, and the willingness to work hard to improve one's performance. As the characteristics of DTers fit with most of the results of Cross' (2011) study of designers, one can assume that the same influences which qualify someone as an expert in design also apply to DTers.

All in all, the status of a DTer is not determined by a particular education or background. Rather it is defined by a person's capabilities which allow him or her to develop an understanding of the core values of DT and enable the person to act accordingly.

2.1.7 Benefits

The depiction of the courses of action and components of DT was aimed to paint a comprehensive picture of the approach. However, in order to underline its advantages distinctly, some clear points are to be made.

First, DT can achieve more than the design of products. It is conceptualized to help any profession solving various kinds of problems in innovative ways. For example, even though it might not be suitable to solve every kind of business problem, it offers the opportunity to tackle issues such as sustainability or the re-shaping of the economic system next to the creation of products and services (Drews, 2009).

Second, DT is applicable to the unknown. Managers usually use diverse techniques and methods to make choices – Boland and Collopy (2004) call it 'decision attitude'. They claim that the options to choose from exist in situations which are stable and in which appropriate solutions are well known. If, however, the situation changes and the existing parameters do not hold anymore – as it is the case nowadays – a new type of attitude is required which not only considers existing options. Boland and Collopy (2004) understand DT with its 'design attitude' as concerned with looking for the best answer possible at given skills and resources. This kind of attitude regards "each project as an opportunity for invention" (Boland and Collopy, 2004, p.9).

Third, DT allows a look into the future. As Drews' (2009) study shows, DT is appreciated for its ambition to take a look into the future and also invent this future by going "where no one has gone

before" (Drews, 2009, p.41). Its application helps to create scenarios of the future that are not necessarily connected to specific products or services. Rather, it helps to understand the future society in its whole or in regards to particular aspects such as living, working, or learning.

Fourth, DT application does not require exclusivity. Although DT allows a wide range of possible applications, it "can happily function alongside traditional business methods" (Drews, 2009, p.43). Clark and Smith (2010, p.55) also highlight its non-exclusive character by commenting that "it needs to be seen as another valuable tool to help shape business strategies and connect intentions to outcomes". Awareness about this attribute is particularly significant as it reduces reluctance to apply DT which can be caused by fearing strong dependence on the approach once implemented or because of a considerable expenditure of exit.

Fifth, DT can achieve raised awareness regarding the value of designers within companies. Often professional designers are only integrated at the far end of the innovation process, although their work can be regarded as helpful throughout all stages and also in strategic decisions (Raford, 2010). Even if DT is not limited to professional designers, it inevitably raises awareness about the role of designers due to its name and may be used as a vehicle to bring the value of designers up for discussion.

Conclusively, a lot of potential lies behind DT which needs to be recognized in the first place and transformed into action in the second. Certainly, there are always two sides of the same medal and DT is no exception. Challenges exist that might keep some organizations from even trying to use the approach; however, a closer look reveals that there are ways to face those challenges.

2.1.8 Challenges

To most organizations, the DT approach appears to be completely new. However, not in every case the attribute 'new' is perceived with a positive connotation. Sometimes it triggers fear of the unknown, reluctance to take actions, and avoidance of particular situations. In order to suppress these reactions and emotions, one needs to actively embrace the challenges that come along with the 'new' and find ways how to deal with them. The biggest challenges of DT are depicted in the following and suggestions of how to overcome them are presented.

One challenge is to initially getting started with DT and then continuing to establish it. In an interview Gianfranco Zaccai points out certain steps that need to be taken to successfully apply DT (Lockwood, 2010a). He states that it begins with "enlightened leadership" (Lockwood, 2010a, p.20) which he

regards as essential to lay the grounds for DT application and create a vision for it. Further, he claims that this step should be followed by the institutionalization of DT within the organization next to analytical thinking. He proposes that the strategy accompanying this step ideally is supported from within and outside the organization as it needs the internal champion, infrastructure, and vision for deep-rooted application and the external methodical knowledge. The requirements of the internal champion are high, as he or she needs to embody not just the analytical but also the intuitive side (Lockwood, 2010a). Neumeier (2009, p.88) sees another step before 'enlightened leadership', "While revolution must be led from the top, it rarely starts at the top". He thereby hints at a mixture of supportive leadership, on the one hand, and the initiation of the DT spirit by regular employees, on the other hand.

Another challenge is the fact that DT should be regarded as a long-time practice which requires a certain amount of effort to sustain it. It is not just crucial to establish the respective organizational framework as addressed above, but it actually needs to be practiced like a sport, as Drews (2009) describes it. Further, she stresses that DT needs to be internalized to develop some sort of gut feeling and intuition about it and to ultimately profit from its benefits. Successfully incorporating DT into organizations takes time and requires patience when waiting for first results (Drews, 2009). Considering this, companies can accelerate the process by letting people work with it on a regular basis instead of organizing one single workshop or project with externals (Lockwood, 2010a). Additionally, DT can be incorporated into projects concerning shorter-term, incremental ideas as well as longer-term, radical ones (Brown, 2009).

Also, an organization's longing for security can pose a challenge to overcome when aiming at using DT. Martin (2009) identifies the main obstacle to DT as the tendency of companies to stay at the current level at the knowledge funnel (see *2.1.4*) as it feels safer to harvest the profits of something already established than to dare trying something new. Moreover, he claims that heuristics are tend to be left to top-managers who at the same time have high pay checks to defend and are not necessarily interested in long-term, risky engagements. Especially larger companies, he believes, will give in to stakeholders who value reliability as validity-focused actions do not result in quick outcomes and might even fail at some points. To handle these challenges, Martin (2009) suggests three solutions: a project-oriented structure to move across the knowledge funnel effectively (nonetheless, maintaining a fixed structure for areas such as supply chain and finance); processes that foster innovation (especially financial planning and reward systems need to be adapted); and cultural norms that help reinforcing DT.

Highly interconnected with the need for security is a company's longing for measurability. Neumeier (2009) explains that managers require concrete numbers about costs, market size, revenues, and profits which are all unknown when an idea is new. In the end innovations get measured by their success on the market. However, in order to get an idea about its receptiveness, DT allows for obtaining feedback before many resources are spent (Neumeier, 2009). Although some might feel repulsive towards DT for that reason, Zaccai, for instance, says, "You know, that is kind of the essence of the value of design thinking: You start to value things you just cannot measure." (Lockwood, 2010a, p.20)

Generally, before establishing approaches to innovation, innovation itself "needs to be coded into the DNA of a company"(Brown, 2009, p.171). Only when valuing innovation, the benefits of DT have a chance to flourish and the perception of necessity to apply DT as well as the willingness to deal with its challenges can evolve.

2.2 Critique of Design Thinking

There is no thesis without an anti-thesis. One can imagine that especially when there is no real consensus about what something is, means, and contains – the observations above show that this is also true for DT – plenty of room for criticism exists. This section discusses different categories of criticism that have been raised in DT literature. Additionally, to also capture the most recent discussions about DT, it takes prominent voices of the blogosphere into consideration, a medium which has become a powerful tool in shaping opinions (Debatin, 2008; Myers, 2010).

The Definition

The critique about DT as a term has many dimensions. As *2.1.3* shows, there is no agreement about what DT means, where it begins, and where it ends. As Steven Kroeter (2007, n.p.) writes in the blog of the Design Observer Group, DT "could refer to architecture, fashion, graphic design, interior design, or product design; it could mean classical or modern or contemporary." Then he concludes, "It's imprecise at best and meaningless at worst." His argument hints at DT's connection to design which might be misleading. The issue of design is that there is no common understanding of the term either. Carr et al.'s (2010) study shows that many executives mistakenly regard design as the aesthetics of a physical object or treat it as the final step in the product development process. One of their interviewees even described it as "cake decoration" (Carr et al., 2010, p.63). In his personal blog 'innovation playground' Idris Mootee (2011), a business strategist and innovation specialist, underlines the discrepancy between design and DT by pointing out that DT taught at design schools

means something completely different than DT more commonly applied in companies. The researchers and authors Badke-Schaub, Daalhuizen and Roozenburg (2011) rather see the confusion about the term 'DT' rooted in the fact that the 'new' turn on DT (see *2.1.3*) simply neglects the core principles and outcomes from older DT research. In a blog entry on Core77, design and innovation expert Don Norman (2010) even criticizes that the term does not describe anything new as it has been practiced in every discipline all along.

The Conceptualization

Not just the definition but also the conceptualization of DT seems to cause confusion and provoke criticism. On the one side, DT is disapproved of for focusing on codified processes too deeply and because of that it is said to hamper creativity and intuition (McCullagh, 2010; Verganti, 2009); on the other side, it is criticized for not offering a concrete, repeatable process but 'only' a kind of mindset (Newman, 2011). The former opinion is also shared by Hill (2012). He claims that DT when squeezed into a process is a simplification which does not allow to fully comprehend how to practice divergent thinking or sketching. In her blog, the business and design journalist Helen Walters (2011b, n.p.) also supports the former position by stating that "a codified, repeatable, reusable practice contradicts the nature of innovation." Design Director Brian Ling (2010) agrees in his 'designsojourn' blog. He argues for a "creative chaos encouraged by an open design process" (Ling, 2010, n.p.) when looking for critical insights and valuable solutions. He concludes, "All of this got killed when the business mindset required DT to have structure, repeatability, and reliability." (Ling, 2010, n.p.) Further, DT is said to lack consideration of components which are critical to business, for example, the issue of costs and economics which is rarely mentioned in connection to DT (Woudhuysen, 2011). Hill (2012) also brings in another argument by remarking that applying DT for only a few projects is not enough. DT, he claims, needs to be fully integrated into the core of the company as that seems to be the only way long-term and lasting results of change can occur.

Criticism concerning the conceptualization of DT can also be found in regards to design practice. Badke-Schaub, Daalhuizen and Roozenburg (2011) note that, compared to design methodology, the new approach to DT is vaguer and lacks clear procedures as well as instructions on how to proceed or how to deal with particular requirements. In a post of the Rebel Academy Blog, which is led by creative entrepreneurs, Satsku VanAntwerp (2012, n.p.) subscribes to this opinion by stating, "Design Thinking is over-hyped and ignores the complexity of the design process."

The Intention

Another critical point is the intention behind the approach. Norman (2010), for instance, provocatively assumes that DT helps design or innovation agencies to get hired. He even refers to it as a "PR term for good, old-fashioned creative thinking" (Norman, 2010, n.p.). To him, DT is a myth which "is nonsense, but like all myths, it has a certain ring of plausibility although lacking any evidence" (Norman, 2010, n.p.). Mootee (2010, n.p.) also accuses management of simply having invented the next "wonderdrug" for businesses with the circularization of DT. In the blog of the Architect magazine, Mark Lamster (2010, n.p.) joins this debate by commenting in regards to DT that "every few years, the business world latches onto some new management paradigm that promises to reinvigorate corporate America". In addition, scenario planner, strategist, and policy adviser Noah Raford (2010, n.p.) believes that mainstream clients hop on the "DT train" for the wrong reasons: "because it is sexy, because they read about it in the HBR, because they see it mentioned in the management section of their local Barnes and Noble, because they're desperate for a quick fix, or because their higher ups have forced them to."

The Application

Another equally relevant aspect regarding DT is how to apply it. Although some people have concrete ideas about it (see *2.1.4*), there still does not seem to be consensus about its application. Mootee (2010), for instance, proposes ten different ways to see DT, going into completely different directions; they vary from acknowledging DT as an approach which emphazises "customer-centricity and empathy" to describing it as a "marketing slogan and tagline" (Mootee, 2010, n.p.). Walters (2011a, n.p.) poses other questions of which she claims the answers are still missing, "Who is responsible? Who executes it? How might it be implemented at scale?" Finally, she concludes, "The question of when DT is actually appropriate remains unanswered." (Walters, 2011b, n.p.)

The Value

One last aspect that attracts criticism of DT is the disagreement about its value. Design professor Roberto Verganti (2009), for example, questions DT's ability to create breakthrough innovations based on user-centricity. To him, the creation of radical innovations is achieved by a visionary leader and does not occur from interaction with customers. Hill (2012) also doubts DT's ability of enabling strategic change as he regards the right approach to it as still missing. Walters (2011a, n.p.) even dismisses DT as "a process just as six sigma" and points out that DT's success stories are mostly focused on one little project run by an international organization. The decreasing number in DT

success stories and the dissatisfying outcome of innovative results is also criticized by Newman (2011). To him, DT "was a disappointment, but it was never a means to an end. Instead, it was just the beginning of the design process." (Newman, 2011, p.45)

Although in the Co.Design blog business journalist and former advocate of DT Bruce Nussbaum (2011) acknowledges that humanistic design would not have been possible without DT, he criticizes that DT has brought more failures than successes as it was changed into a linear methodology, not being able to deliver more than incremental change. To him DT "is a failed experiment" (Nussbaum 2011, n.p.).

Norman (2010, n.p.) judges DT less strictly, "So, long live the phrase Design Thinking. It will help in the transformation of design from the world of form and style to that of function and structure. It will help spread the word that designers can add value to almost any problem, from healthcare to pollution, business strategy and company organization. When this transformation takes place, the term can be put away to die a natural death."

All in all, the critique about DT ranges from remarking smaller inconsistencies, such as the inaccuracy of the term, to withering assessments about its right to exist. Criticism has even reached the point where former advocates of DT now tend to object DT rather than support it. Although this might have other reasons than the failure of DT, for example, the promotion of a new, alternative concept, it still gives an indication of the existence of flaws – all the other fundamental criticism confirms that.

2.3 Interim Conclusion

In this thesis, DT is understood as a method, a specific approach, to innovation – inspired by how some designers work. This perception of DT offers fairly similar courses of action, mainly differing in their final phase – being either 'testing' or one step further 'implementation'. The various components described already hinted at the fact that the status of 'being a DTer' is predominantly defined by a person's capabilities. These allow him or her to develop an understanding of the core values of DT and enable the person to act accordingly. Benefits to be gained by applying DT include a wide range of application fields and the creation of future scenarios. Further, DT is said to help raising awareness about the role of designers within companies and to not require exclusivity as an approach. Simultaneously, challenges need to be tackled which come along with DT application: It requires enabling factors to initially get started with DT and then continue to establish the approach within the organization. Moreover, DT appears to pay off best when it is treated as a long-term

practice. DT also challenges a business' longing for security and measurability as it requires change and is looking for the new.

Similar to design, DT has the problem of having no universal frame. There is a lack of unity about definition and conceptualization. The disagreement concerning DT continues notably in terms of its value, intention, and application. Many critics deny DT's benefits which advocates promote just as well as the ability to tackle the challenges that come along with it. There is talk about the 'end' of DT; it is claimed a 'failure'. However, those remarks all stay on a generic level and do not explicitly concretize why it may end or in which areas it has actually failed. The intense promotion of DT, on the one side, and the rising critique, on the other side, almost demand to dig deeper into the issue. It elicits the urge to examine the stage where the current and future adoption of DT is decided: at the level of its actual users. There, one can find the answers to why DT is dismissed or supported. This thesis aims at exactly looking at this point by asking the question:

What factors are affecting the current and future adoption of Design Thinking within Design-Thinking-experienced companies?

By doing so, it is hoped to receive an answer about what factors surrounding DT can lead to failure, what can lead to success of the approach. In the following, the stage is set for exploring the actual research by introducing its research design.

CHAPTER 3 – Research Design and Methodology

"Research is formalized curiosity. It is poking and prying with a purpose." (Hurston, 1997, p.43) Transferring Hurston's quote (1997) into the context of this thesis, formalization can be understood as the methodology and methods to satisfy the curiosity behind a certain research problem or the 'purpose'. To justify its application, the choice of methodology should be guided by the characteristics of the research problem in question but also be influenced by the underlying assumptions of the author (Levy, 2006). These assumptions express the perception of reality, thereby exposing the theoretical perspective. They also inform epistemological questions, meaning what human knowledge is, what it implies, and what status is attached to it (Crotty, 1998).

Crotty (1998) identified four questions to specify a research design:

- What methods[12] are used?
- What methodology[13] guides the choice of methods?
- What theoretical perspective[14] underlies the respective methodology?
- What epistemology[15] supports this theoretical perspective?

There are several reasons why these four elements should be considered when writing a thesis. Crotty (1998) argues that they are not only the mentioned basis for justification regarding methodology and methods, but they also unveil the theoretical assumptions that determine the status of its findings. Further, the answers to these questions "ensure the soundness of the research and make its outcomes convincing" (Crotty, 1998, p.6).

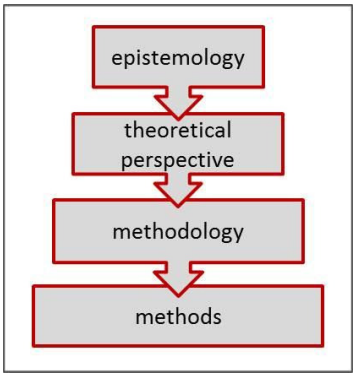

Figure 6: General Elements of a Research Design (Crotty, 1998, p.4)

In order to profit from the benefits of a detailed research description, this chapter is designed to clarify the research philosophy (including epistemology and theoretical perspective), the methodology, as well as the used methods in detail. These aspects are complemented by the presentation of the research sample. Crotty's (1998) four questions will be answered intentionally from bottom to top to establish a logic line of argumentation as visualized in *Figure 6*.

[12] *Definition*: "Methods: the techniques or procedures used to gather and analyze data related to some research question or hypothesis." (Crotty, 1998, p.3)
[13] *Definition*: "Methodology: the strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to desired outcomes." (Crotty, 1998, p.3)
[14] *Definition*: "Theoretical perspective: the philosophical stance informing the methodology and thus providing a context for the process and grounding its logic and criteria." (Crotty, 1998, p.3)
[15] *Definition*: "Epistemology: the theory of knowledge embedded in the theoretical perspective and thereby in the methodology." (Crotty, 1998, p.3)

3.1 Research Philosophy

What epistemology supports the theoretical perspective? (Crotty, 1998)

Starting with the basic assumptions, the nature of knowledge, "epistemology is driven by two main questions: 'What is knowledge?' and 'What can we know?'" (Greco, 1998, p.1). Naturally, many perspectives exist to answer these questions. This thesis is based on the firm belief that there is no objective truth to be discovered. I am profoundly convinced that an enormous number of variables constitute 'truth' and what is perceived as 'true' in one particular moment. For instance, some once defined the 'truth' about a stone as being a stone. Only because this definition is widely agreed upon, does not necessarily mean that it represents the objective truth. It rather shows that truth is constructed. To this end, I agree with Crotty (1998, pp.8-9) who claims that meaning emerges from people's involvement in various existing realities, "There is no meaning without a mind. Meaning is not discovered, but constructed." Consequently, one and the same phenomenon may be assigned a different truth and meaning by different people.

In epistemological terms this conception corresponds to Constructivism/Constructionism[16] (see *Figure 7*). "Constructivists assume that (1) the researcher is a part of what he or she sees, not apart from it; (2) facts and values are connected, not separate; and (3) views are multiple and interpretative, not singular and self-evident" (Charmaz and Henwood, 2008, p.245).

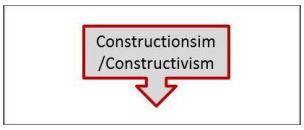

Figure 7: Epistemology (adapted from Crotty, 1998)

What theoretical perspective underlies the respective methodology? (Crotty, 1998)

The theoretical perspective is complementing the picture of the research philosophy which drives this thesis. It presents the "way of looking at the world and making sense of it" (Crotty, 1998, p.8) by answering the question, "'How do we know what we know?'" (Greco, 1998, p.1)

[16] *Comment:* The terms 'Constructivism' and 'Constructionism' are often used interchangeably (Patton, 2002). Crotty (1998, p.58), however, notes, "Whatever the terminology, the distinction itself is an important one. Constructivism taken in this sense points out the unique experience of each of us. […] On the other hand, social constructionism emphasizes the hold our culture has on us: it shapes the way in which we see things […] and gives us a quite definite view of the world." In this thesis the terms are used interchangeably; putting emphasis on their common understanding that knowledge is constructed, but still having the difference of the terms in mind.

Influenced by the epistemological theory, I adopted the philosophical stance of Interpretivism (see *Figure 8*).

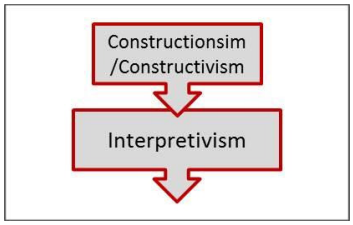

Figure 8: Theoretical Perspective (adapted from Crotty, 1998)

The interpretivist approach "allows the focus of research to be on understanding what is happening in a given context. It includes consideration of multiple realities, different actors' perspectives, researcher involvement, taking account of the contexts of the phenomena under study, and the contextual understanding and interpretation of data." (Carson et al., 2001, p.5)

Instead of objective facts and statistics, Interpretivism is using a more personal approach to understand reality: 'to interpret' becomes the leading theme (Carson et al., 2001). In an interpretive view, researchers "must engage with and participate in" the world to be able to interpret and ultimately understand it (Locke, 2003, p.9).

In congruence to my belief in multiple existing truths, which are constructed by the individual and/or society, I consider everything what we know to be the result of our interpretations. When we read or hear something, the information is processed with the help of our existing knowledge and intuition about what is worth processing. The given information, therefore, is not only taken as it possibly was intended but put into context with what we already know. Someone else could perceive the same information differently, resulting in a different interpretation. Also, when conducting research and looking for deep insights, I believe that interpretation plays a big role because considering context adds richness to the information.

3.2 Methodology

After having presented the underlying research philosophy, this paragraph clarifies the use of methodology in the process of answering the research question:

What factors are affecting the current and future adoption of Design Thinking within Design-Thinking-experienced companies?

In what follows, the rationale behind the choice of methods and the specific forms in which those methods are utilized will be elaborated.

What methodology guides the choice of methods? (Crotty, 1998)

The methodology used in this thesis contains single elements of Grounded Theory Methodology (GTM; see *Figure 9*) in combination with Extreme Case Sampling (Patton, 2002). In the following, the background of GTM, what it means, and what it implies as well as the justification for its utilization in this thesis are presented. Extreme Case Sampling is discussed as one of the methods in *3.3.*

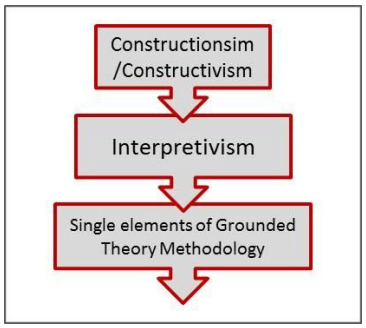

Figure 9: Methodology (adapted from Crotty, 1998)

The Background of GTM

GTM came into existence 47 years ago when Barney Glaser and Anselm Strauss published their book 'Awareness of Dying' in 1965, followed by 'The Discovery of Grounded Theory' in 1967 (Bryant and Charmaz, 2007). Although having established the foundation of GTM together, the two authors soon pursued different paths concerning the elaboration of the methodology. Whereas Glaser remained with the original thoughts, Strauss, then in collaboration with Juliet Corbin, moved into different directions. Thereupon, other authors (inter alia: Charmaz, 2006; Charmaz and Henwood, 2008; Bryant and Charmaz, 2007; Goulding, 2002; Locke, 2003) began to publish their own interpretations of GTM and ever since researchers have been flexibly and selectively adapting its practices, altering GTM by including other methodological resources (Locke, 2003). Currently, GTM "is the most widely used and popular qualitative research method across a wide range of disciplines and subject areas" (Bryant and Charmaz, 2007, p.1).

Originally developed as a methodology for sociologists, GTM has been adopted within the fields of "psychology, anthropology, nursing, social work, education and more recently management. As with any general methodology, grounded theory's actual use in practice has varied widely with the specifics of the area under study, its purpose and its focus." (Goulding, 2002, p.48)

The main aspects of GTM in this thesis are derived from Corbin and Strauss (2008) even though certain specifications are adopted from other authors (Bryant and Charmaz, 2007; Charmaz and Henwood, 2008; Goulding, 2002). Fendt and Sachs (2007) principally support such a procedure as they claim that the degree of rigorousness in GTM application should be adapted in regards to the preferences of the researcher and the complexity of the research problem. The particular reasons why adaptations have been made in this thesis unfold as the argumentation progresses.

What is GTM?

Strauss and Corbin (1998, p.275) define GTM as "a general methodology, a way of thinking about and conceptualizing data […] applicable to quantitative as well as qualitative studies". Clarke (2007, p.424) adds, "The very term 'grounded theory' means data- grounded theorizing." Precisely, GTM is focused on building theory rather than testing it (Corbin and Strauss, 2008).

Consequently, GTM can be regarded as a methodology with which the researcher is able to build theory derived from an iterative process of data collection and analysis. Corbin and Strauss (2008, p.106) explain theory building as "a process of going from raw data, thinking about that raw data, delineating concepts to stand for raw data, then making statements of relationship about those concepts linking them all together into a theoretical whole, and at every step along the way recording that analysis in memos."

Strauss (2003, p.198) claims that the logic of GTM research follows different kinds of inference, "Scientific theories require first of all that they be conceived, then elaborated, and checked out […] the terms that we prefer are induction, deduction, and verification". One concept that is not addressed in any of their texts is abductive[17] reasoning (Bryant and Charmaz, 2007).

Considering GTM's aspiration of tapping into relatively unknown research areas, abduction as a form of reasoning is not to be left aside. Therefore, I agree with authors like Charmaz and Henwood (2008). They argue that the application of GTM requires reliance on logic related to experience to create and validate all possible explanations.

According to Corbin and Strauss (2008), another significant characteristic of GTM is that it makes use of constant comparisons at each level of analysis. This is applied in order to develop more and more abstract concepts along the process to finally arrive at one main concept which contains the main messages (Corbin and Strauss, 2008). In this thesis, the main concept ought to eventually convey an

[17] *Comment*: More information about abduction: *2.1.5*

understanding about what is influencing the current and future adoption of DT within DT-experienced companies.

Justification for methodology

The methodological choice is grounded in two lines of argumentation. On the one hand, the selection of GTM as the guiding methodology is based on the research area and objective. As touched upon in *1.3*, it appears that no significant attention has been given to empirical research regarding factors which are indicatory for current and future adoption of DT. GTM offers a sensitive yet rigorous methodology for the investigation of areas which are relatively unknown to the researcher and have been given rather superficial attention in the literature (Goulding, 2002; Jones and Alony, 2011). Therefore, it seems to be more beneficial in the case of DT to construct theory rather than test it; especially when the main objective of the thesis is to create a propositional model of the mentioned topic.

On the other hand, the choice for GTM is reasoned in my preferences and underlying research philosophy.

Being a relative novice in conducting research, I was looking for a challenging methodology with a fair degree of difficulty, while offering a strong aspect of guidance. GTM, as it was adopted by Strauss and Corbin (2008), has been given a procedural and rather formal form (Eriksson and Kovalainen, 2008) with a detailed and systematic method of analysis (Jones and Alony, 2011). Although it has been criticized especially for this characteristic, at the same time, it has gained its popularity from it (Bryant and Charmaz, 2007). “Some have termed it a cookbook approach, in which the authors discuss the ingredients, procedures, and outcomes in explicit detail, with clear instructions derived from decomposing complex activities into small-scale, simpler tasks (Bryant and Charmaz, 2007, p.12).”

Additionally, my constructivist, interpretivist research philosophy had an impact on the choice of methodology. While the practice of GTM has started with a positivistic stance in the era of Glaser and Strauss (Corbin and Strauss, 2008), over the decades it developed towards a more constructivist direction (Bryant and Charmaz, 2007; Charmaz, 2006; Clarke, 2007; Locke, 2003). Corbin and Strauss (2008, p.326) consider findings resulting from GTM as “constructed by the analyst from data” and Carson et al. (2001, p.6) add that it is “understood through ‘perceived’ knowledge”. Interpretive theories favor interdeterminancy and the display of patterns and connections rather than linear reasoning (Charmaz, 2006). GTM’s interplay of data generation and data analysis to build a construct

of relationships perfectly fits into that understanding. Further, Corbin and Strauss regard "truth [as] enacted and theories [as] interpretations made from given perspectives. […] Consequently, it is important to recognize that interpretations are temporally constrained. They should always be seen as provisional and subject to future elaboration, and it should be recognized that they are limited in time." (Goulding, 2002, p.43)

Due to particular reasons, the methodology and methods used in this thesis do not follow the ideas of Corbin and Strauss (2008) consequently. Limitations in regards to my research experience, time and financial resources have forced me to incorporate adaptations into the original standard (i.e., application of Extreme Case Sampling instead of Theoretical Sampling – see *3.3*). The modifications are mentioned in the respective passages.

3.3 Methods and the Research Process

This section describes the concrete techniques and procedures that are embedded in GTM and thereby answers the fourth of Crotty's (1998) research design questions.

What methods are used?

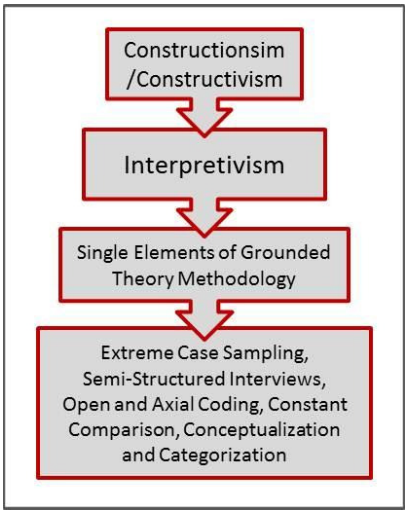

Figure 10: Methods (adapted from Crotty, 1998)

Figure 10 depicts the methods used in this thesis. However, to facilitate a clear understanding of which methods are used for which purpose, the process of building the final model is described, including its specific methods. Additionally, *Figure 11* visualizes this process.

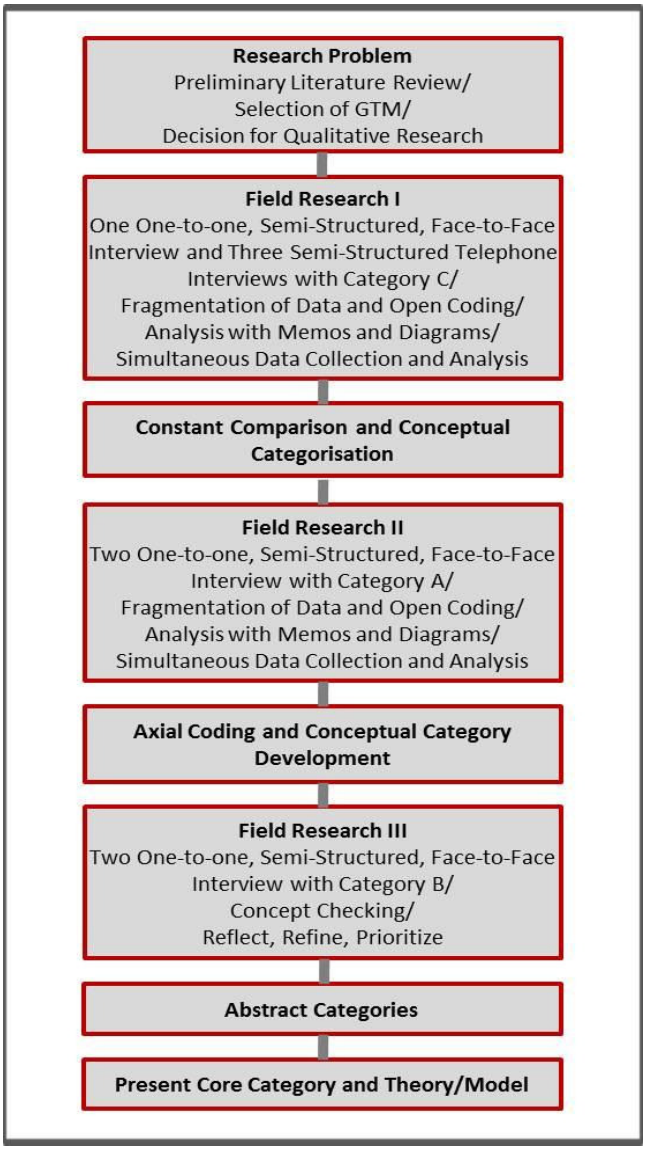

Figure 11: Research Process (adapted from Goulding, 2002)

Research Problem

The first step was the formulation of the research problem (see *1.2*), which in this case arose from a preliminary literature review. The selection of GTM as the methodological framework is already explained in *3.2* and, therefore, in its essentials not further discussed at this stage.

Although GTM originally intended to solely rely on the data acquired and avoid bias through extensive literature review, this restriction has been loosened for the sake of enhancing my theoretical sensitivity of and the prevention of redundance of the research direction (Corbin and Strauss, 2008). Goulding (2002, p.71) also states, “Reading is not forsaken during the initial stages – it is vital – but in a substantive field it is different from the research.”

In order to enhance my theoretical sensitivity, respective readings (see literature mentioned in *Chapter 2*) had been used as reference. Additionally, a master thesis' limitations in terms of time and resources required a more targeted approach than larger research projects – even if this bears the danger of bringing preconceptions and expectations into the field of research.

Further, researchers have their own disciplinary background which also influences the perspective from which the problem is investigated (Goulding, 2002). Consequently, my business background guided the research in a specific direction, "nobody starts with a totally blank sheet" (Goulding, 2002, p.55).

According to Crotty (1998), the decision for qualitative[18] or quantitative[19] research, or even both, is to be discussed at the level of methods.[20] As touched upon before, GTM can be supported by both research approaches. However, as the goal of this thesis contains the development of theory and is subject to time restrictions – therefore, not able to also include testing the theory extensively –, solely qualitative research was conducted. This decision was also reinforced by my curiosity to study the issue of DT in depth and make sense out of its complexity.

Field Research I

Qualitative GTM research may rest upon single or several sources of data, including observations, interviews, documents, biographies, videos, drawings, and many more (Goulding, 2002; Corbin and Strauss, 2008).

Again, due to the already addressed circumstances that restrict the research of this thesis, I chose one particular source of data: one-to-one interviews. As depicted in *Figure 11,* Field Research I consisted of one face-to-face interview on the company's premises and three telephone interviews. All four interviews were semi-structured and open-ended.

As stated by Corbetta (2003), semi-structured interviews follow an outline of topics that are to be covered; however, the order of questions as well as their wording can vary from interview to interview. The interviewer decides at his or her own discretion how to conduct the conversation,

[18] *Definition*: "Qualitative research is empirical research where the data are not in the form of numbers." (Punch, 2005, p.3)
[19] *Definition*: "Quantitative research is empirical research where the data are in the form of numbers." (Punch, 2005, p.3)
[20] *Comment*: Crotty (1998, p.15) argues that the choice for qualitative or quantitative (or both) research is not a matter of research philosophy, as, i.e., qualitative research has been used "in an utterly empiricist, positivist manner", whereas today it is part of many constructivist engagements.

which questions are appropriate, and which are words to choose; it is left to the interviewer in how far explanations are given and questions for clarification are asked (Corbetta, 2003). This particular type of interview was chosen as it allows yielding dense and detailed insights into the individual's experience. It leaves open to deviate from the initial topic in favor of other issues which might be more relevant and were not considered prior to the study (Goulding, 2002). It acknowledges that a completely unstructured interview with no predetermined content would have enhanced the effect of gaining authentic insights. However, this would have left me, a relatively inexperienced researcher, with no guidance. On the contrary, a structured approach of interviews would not have been valuable in regards to the research objectives as the predetermined content and form would have limited the variety of information (Corbetta, 2003).

Although face-to-face interviews are preferable due to the faster and better establishment of a relationship between interviewer and interviewee, I was not able to avoid conducting telephone interviews. This fact was accounted for by the varying locations of the interview partners in combination with my limited resources. The resulting restrictions in terms of traceability and richness of information are taken into account.

The face-to-face interviews were recorded with a voice tracer and then transcribed to enhance analysis. The telephone interviews were documented with detailed notes. All interviews were conducted in the interviewer's and interviewees' mother tongue, German, to enhance sensitivity and authenticity. Neither the transcriptions nor the notes are enclosed to this thesis. This is partly due to the time exposure which is linked to a proper, rule-oriented reprocessing and translation of interview transcriptions and notes and partly due to the classified content of the interviews that was only disclosed to illustrate explanations of the interviewees. If one requires further information about transcriptions and notes, I am to be contacted.

Table 1 shows the development of the outline of the semi-structured interviews. Whereas the topics of Interview 1 were chosen accordingly to findings of the literature review (Corbin and Strauss, 2008), those of Interview 2-4 were shaped by the analysis of the respectively preceding set of data[21].

[21] *Comment*: The reason for the sameness of topics in Interview 3 and 4 lies in the fact that the answers of the respectively preceding interview did not reveal any new areas of interest.

	Interview 1	Interview 2	Interview 3	Interview 4
Category	Category C	Category C	Category C	Category C
Type of Interview	One-to-one, Semi-Structured, Telephone Interview	One-to-one, Semi-Structured, Face-to-Face Interview	One-to-one, Semi-Structured, Telephone Interview	One-to-one, Semi-Structured, Telephone Interview
Topics	- Personal understanding of DT? - Company's application of DT? - Perceived requirements of DT application? - Measurement of Success of DT application? - Perceived value of innovation outcome? - Interviewee's role within company and within DT project(s)?	- Company's DT experience? - Information about project: ** Intention for DT application?* ** DT Topics?* ** Personal role within DT project(s)?* ** Internal and external participants?* ** Project sponsor?* ** Reasons for university as DT partner?* ** Measurement of Success of DT application?* - Perceptions after first attempt: ** Procession of created knowledge within company?* ** Procession of methodical/ DT knowledge?* ** Value of DT for company?* - DT in general: ** Personal understanding of DT?* ** Perceived organizational requirements for DT application?* ** Perceived applicability for DT?* ** Perceived value of innovation outcome?* - Future: ** Follow-up DT projects?* ** Strategic implementation of DT?*	Company's DT experience? - Information about project: ** Intention for DT application?* ** DT Topics?* ** Personal role within DT project(s)?* ** Internal and external participants?* ** Project sponsor?* ** Reasons for university as DT partner?* ** Measurement of Success of DT application?/ Factors for continuing DT application?* ** Realizability of results?* - Perceptions after first attempt: ** Procession of created knowledge within company?* ** Procession of methodical/ DT knowledge?* ** Value of DT for company?* - DT in general: ** Personal understanding of DT?* ** Perceived organizational requirements for DT application?* ** Perceived applicability for DT?* - Future: ** Follow-up DT projects?* ** Strategic implementation of DT?*	

	- Role of designers within company? - Interviewee's role within company?	- Role of designers within company? - Interviewee's role within company?

Table 1: Types and Topics of Category C Interviews

Unlike Corbin and Strauss (2008) who present Theoretical Sampling as a core method of GTM, I applied 'Extreme Case Sampling' (Patton, 2002). The extremes are defined by 'Category C' and 'Category A'. 'Category B' represents mid-range outcomes. The latter category was established to meet Corbin's and Strauss' (2008) requirement of verification of the findings (see *3.2*). The reasons and details of the application of Extreme Case Sampling as well as the description of the three categories and detailed illustration of the sample can be found in *3.4*.

Returning to the process of creating the final model and the description of methods in Field Research I (see *Figure 11*), the next step after having had conducted the first interview was the fragmentation of data and open coding.

The notes from Interview 1 were opened up to all theoretical potentials resting in them. Raw data was taken and brought to a conceptual level, resulting in codes (Corbin and Strauss, 2008). Charmaz and Henwood (2008, p.242) describe codes as being "short, analytic, and active". They stress that line-by-line coding encourages close scrutiny of the data and reduces the risk of pushing them into preconceived categories and existing theories. This procedure starts the transformation from description towards conceptual analysis (Charmaz and Henwood, 2008). Open codes are grouped and constantly compared to create so-called conceptual codes which put emphasis on meaning instead of quantitative values (Goulding, 2002). This process was highly influenced by my intuition as a researcher. Random examples of the open coding process and the transfer into concepts are presented in *Appendix 1* to illustrate how these steps were put into practice.

Additionally, memos were written; containing my thoughts as well as first analytical steps, such as the identification of preliminary concepts and their properties. They were also used to highlight possible gaps in data collection and outline relationships between concepts (Charmaz and Henwood, 2008). Moreover a diagram was used to visualize the concepts and their relationships (Corbin and Strauss, 2008).

The findings and insights from Interview 1 served as a starting point for the preparation of Interview 2, leading research in particular directions and creating the process of simultaneous data collection

and analysis. *Table 1* shows that the initial catalogue of topics to be discussed during the interview expanded due to insights gained in the previous interview. All the different steps were repeated after each interview from 1-4 – every time generating more data, codes, and concepts as well as condensing the analysis in new memos and diagrams.

Constant Comparison and Conceptual Development

Interview 1-4 each brought their own emphasis on meaning to the pool of codes and concepts which were constantly compared to weigh, order, and connect the different parts.

After having had conducted all interviews of Category C (see description in *3.4*), the consolidated concepts and their properties were clarified, described, and visualized in a diagram.

Field Research II

Field Research II was carried out in accordance with the procedures of Field Research I. This time, however, two companies of Category A were interviewed in face-to-face interviews on the companies' premises. The topics guiding the interviews were influenced by the questions and analytical findings of Interview 1-4. *Table 2* illustrates the topics discussed in Interview 5-7[22].

	Interview 5	**Interview 6**	**Interview 7**
Category	Category A	Category A	Category B
Type of Interview	One-to-one, Semi-Structured, Face-to-Face Interview	One-to-one, Semi-Structured, Face-to-Face Interview	One-to-one, Semi-Structured, Face-to-Face Interview
Topics	- DT at respective company ** Company's DT experience? (intention, number of projects, topics)* ** Company's way of DT application?* ** Internal and external participants?* ** Measurement of Success of DT application?* ** Reasons for continuing DT application?* ** Procession of created knowledge within company?* ** Procession of methodical/ DT knowledge?* ** Realizability of results?* ** Existence of DT person in charge?*		

[22] *Comment*: Similar to *Table 1*, the reason for the sameness of topics in Interview 5-6 lies in the fact that the answers of the respectively preceding interview did not reveal any new areas of interest. The purpose of Interview 7 is to confirm the analytical findings of all previous interviews; therefore, the same topics are applied.

** Value of DT for company?*
- DT in general:
** Personal understanding of DT?*
** Perceived organizational requirements for DT application?*
** Perceived applicability for DT?*
** Critique of DT method?*
- Future of DT within company?
- Role of designers within company?
- Interviewee's role within company? Personal role within DT project(s)?

Table 2: Types and Topics of Category A/Category B Interviews

As in Field Research I, the interviews were followed by the fragmentation of data and open coding as well as by analysis through memos and diagrams, resulting in a simultaneous data collection and analysis (see *Figure 11*).

Also, the steps of 'Constant Comparison and Conceptual Development' were executed as in Field Research I – always taking the outcomes from the previous research circle into account.

Axial Coding and Category Development

As proposed by Corbin and Strauss (2008), axial coding was conducted to depict the links and relationships between two or more concepts. The main result was category development, raising lower-level explanatory concepts to higher-level concepts (categories) based on their theoretical importance (Corbin and Strauss, 2008). This step was "(1) to show how the theory fits together, (2) to make relationships explicit between theoretical categories or between the properties of one theoretical category, (3) to specify the conditions under which these categories or this category arises and (4) to state the consequences of the theorized relationships" (Charmaz and Henwood, 2008, p.242)**.** One example of axial coding and the resulting category development from this thesis' research can be found in *Appendix 2*.

Field Research III

Field Research III contained Interview 7 with a company of Category B. This interview served to confirm the categories developed up to this point, as they had been constructed through the examinations of extremes and then needed to be validated with a mid-range outcome. *Table 2* shows that the topics discussed during the interview matched those already applied in Field Research II.

The concepts and categories were checked against the results of Interview 7 in a process of reflection, refinement, and prioritization (Goulding, 2002).

Abstract Categories

In this summarizing step, the categories based on the analysis of all seven interviews were abstracted once more, using data collected in codes and concepts to refine them.

Present Core Category and Theory/Model

The last phase consisted of the final integration and was conducted as suggested by Corbin and Strauss (2008): The procedure started with deciding upon one core category which portrayed the main issue of the research and which all other concepts could be related to. Then, the major categories were linked to the core category through explanatory statements, retelling the story about what was going on by using minor categories and concepts. This process was simplified by the consolidation of memos and diagrams which had been created during the research. After that, the theory/model was refined by checking the scheme for internal consistency and gaps in logic (Corbin and Strauss, 2008). The resulting model with its core categories and underlying concepts is depicted in *Chapter 4*.

3.4 Sample

As already addressed in *3.3*, one core method of GTM is the so-called Theoretical Sampling, meaning to let research guide the source for data collection (Corbin and Strauss, 2008). This type of sampling requires a researcher's flexibility in terms of location and time to follow the path established by previous data collection and analysis. Due to reasons mentioned above, this kind of flexibility was not given. Therefore, Extreme Case Sampling (Patton, 2002) was applied. In doing so, I could select information-rich cases strategically and purposefully and, further, focus on relatively small samples as suggested by Patton (2002). According to him, extreme cases can be considered 'information-rich' as they are extraordinary in some way. He explains the logic behind this type of sampling as follows: due to their specialness, extreme cases are precisely capable of elucidating the unusual as well as the typical.

In this thesis, the extremes of companies that have experience with DT are represented by two categories:

Category A: 'We are constantly pursuing DT as an innovation method and will do so in the future.'

Category C: 'We have tried DT as an innovation method; however, we are not pursuing any new DT projects anytime soon.'

Based on this categorization, I hoped to identify factors that influence the current and future adoption of DT within companies by examining companies with DT experience that are located at both ends of the continuum. To also incorporate Corbin's and Strauss' (2008) idea of verification (see *3.2*) and to stabilize the findings from Category A and C, Category B represents the mid-range experience:

Category B: 'We have tried DT as an innovation method, and are considering new DT projects in the near future.'

The above mentioned categories were constructed based on the definition of DT for this thesis (see *2.3.1*) and in order to help answering the research question:

What factors are affecting the current and future adoption of Design Thinking within Design-Thinking-experienced companies?

Internet research and contacts received from design centers and universities resulted in a list of 30 companies from a wide range of industries in Germany and Austria, having used DT in one way or the other. All of them were contacted and seven of these companies permitted an interview. The requirement for potential interviewees was that they had to have been or currently are affiliated with DT projects in some way – be it in terms of management supervision, project leadership, or a technical or methodical consulting function. This openness to different companies in various industries, to the diverse levels of experience, and different roles of the interviewees in regards to DT was accepted due to the research objective of gaining information-rich insights and in-depth understanding of why DT's current and future adoption within a company differs from company to company. Moreover, as Corbin and Strauss (2008, p.237) confirm, "Multiple perspectives add insight, richness, depth, and variation."

As supported by the same authors (Corbin and Strauss, 2008), unlike typical proceedings of other qualitative inquiries, this thesis does not put emphasis on how representative its interviewees are to a larger population. This is not only due to the limited availability of respondents but more importantly due to the ambition that something can be learned from the insights gained from the particular cases, rather than trying to gain general and representative information about DT. The

final model ought to be applicable to a range of organizations, allowing the specifics to differ (Corbin and Strauss, 2008).

Although Extreme Case Sampling does neither have the grounded-in-data character of Theoretical Sampling, nor is it able to achieve theoretical saturation[23] in the strict sense of GTM, it still has some parallels with the initial method of GTM sampling aside from the one already addressed above. Similar to Theoretical Sampling, the goal of Extreme Case Sampling in this thesis is not to achieve generalizability but to gain information-rich insights and in-depth understanding of the topic under study. Corbin and Strauss (2008) also encourage the researcher to look for the negative case which does not fit the pattern as it may offer an alternative explanation and adds richness to the dimensions of concepts. "And in regard to concepts, researchers are looking for variation, not sameness. Variation is especially important in theory building because it increases the broadness of concepts and scope of the theory." (Corbin and Strauss, 2008, p.156)

In the following, the details of the sample acquired in this thesis are listed. The setup of the description is determined by the chronological order in which the interviews were conducted which again was influenced by the research design and availability of the respondents. Especially with presenting the 'Company's Known DT Experience', the 'Interviewee's Connection to DT', as well as 'Impressions about Interviewee's DT Experience', I intend to provide the reader of this thesis with information about the data which enabled the generation of the final model presented in *Chapter 4*. When describing the model, I also emphasize the respective data in which the categories and factors are 'grounded' in.

[23] *Definition*/ *Comment*: "The ultimate criterion for determining whether or not to end the data gathering processes remains 'theoretical saturation.' […] It means taking each category and spelling out in considerable detail its properties and dimensions, including variation." (Corbin and Strauss, 2008, p.113)/ Strict theoretical saturation only is possible if the researcher is able to conduct research until all categories are fully elaborated. In this case, however, the limited availability of respondents and a restricted time frame decided the end of research.

Interview 1 Category C – 24.05.2012	
Company/ Industry	Ball Packaging Europe/ Beverage Can Manufacturing
Number of Employees/ Annual Revenue of Company	2,800 employees (2011)/ € 1.6 bn. revenue (2011)
Company's Known DT experience[24]	One DT project which was conducted by students of the University of St. Gallen[25]
Interviewee	Olaf Joeressen
Position of Interviewee	Front End Innovation Manager
Interviewee's Location	Bonn, Germany
Interviewee's Connection to DT	Joeressen was the project leader of one DT project that was run by Ball Packaging Europe. He describes himself as the "stimulus" for the students who worked on the project, supporting the students in their work when his support was demanded.

Impressions about Interviewee's DT Experience

Olaf Joeressen would generally recommend DT, as he believes that it is suitable to create radical product innovations. The DT project, he experienced, resulted in at least one "valuable prototype". However, he adds that his company does not require radical innovations as often due to the "mature industry" it is in and, therefore, he regards a strategic implementation of DT as improbable. He also sees this maturity as the reason why "it is difficult for externals to find new ideas which have not been considered and possibly overruled within the company before." That also leads him to claim that "the best team develops when people with methodical experience and others with contentual experience work together"; that has not been the case in Ball's existing DT experience. Although Joeressen acknowledges that one "valuable prototype" resulted from the project, it could not be realized due to "other reasons". Those reasons, however, did not include the way of working of the students or university, as he would consider engaging them for another potential project, if there was one. Joeressen criticizes DT for the lack of clear definition of the concept ("in different contexts everyone has his own dialect") and asks, "Where are its strengths? What can be understood by DT?" He would suggest a better standardization of the approach. In regards to the often promoted shopping cart designed by IDEO, he, further, makes the provocative assumption, "One can ask: Is it a poster child or does it really help?" Thereby he challenges the approach in terms of its promised benefits.

Table 3: Interview 1 – Olaf Joeressen, Ball Packaging Europe (Data from Ball Packaging Europe, 2012; Joeressen 2012)

[24] *Comment*: The choice for the term 'known' was made as the information about the DT experience solely relies on the knowledge of the interviewee; hence, the occurrence of other DT projects within the company are not to be ruled out completely. The same applies to all seven interviews.

[25] *Comment*: The DT approach of the University of St. Gallen can be found in *2.1.4.*

Interview 2 Category C – 01.06.2012	
Company/ Industry	Cancom a+d IT-Solutions GmbH/ IT Solutions
Number of Employees/ Annual Revenue of Company	1,981 employees (2012)/ € 544.4 m. revenue (2011)[26]
Company's Known DT experience[27]	One DT project which was conducted by students of Vienna University of Economics and Business[28]
Interviewee	Richard Oesterreicher
Position of Interviewee	Senior Key Account Manager; Business Development Manager Enterprise
Interviewee's Location	Perchtoldsdorf, Austria
Interviewee's Connection to DT	Oesterreicher was in charge of answering technical questions during the one DT project at Cancom a+d IT-Solutions.

Impressions about Interviewee's DT Experience

Richard Oesterreicher was part of the DT project, however, less concerned with the approach itself. He did not feel comfortable naming a definition of DT when I asked him about it and also was reluctant to list single components. Nonetheless, he would agree the students' DT application resulted in more creative and innovative outcomes compared to what traditional approaches could have achieved. He describes one outcome as an "aha experience" and points out that another one led to a follow-up project, testing its realizability. Usually, innovations at Cancom are rather generated by employees suggesting new ideas which then are discussed and followed or discarded. Oesterreicher states that the company does not apply any innovation methods, nor does it have a research and development department. The DT project was initiated by one employee who additionally studies at the Vienna University of Economics and Business and who heard about the DT course there. Oesterreicher believes that DT could potentially have a future within the organization; however, needed resources such as time and manpower pose big obstacles.

Table 4: Interview 2 – Richard Oesterreicher, Cancom a+d Solutions GmbH (Data from Cancom AG, 2012b; a; Oesterreicher, 2012)

[26] *Comment*: Information about number of employees and revenue is related to the whole Cancom Group as no information was found only related to Cancom a+d Solutions which is closely linked to the mother company.
[27] *Comment*: The choice for the term 'known' was made as the information about the DT experience solely relies on the knowledge of the interviewee; hence, the occurrence of other DT projects within the company are not to be ruled out completely. The same applies to all seven interviews.
[28] *Comment*: The DT approach of the Vienna University of Economics and Business can be found in *2.1.4.*

Interview 3 Category C – 04.06.2012	
Company/ Industry	adp Gauselmann GmbH/ Game Slot-Machine Manufacturing
Number of Employees/ Annual Revenue of Company	6,306 employees (2011)/ € 1.077 bn. revenue (2011)[29]
Company's Known DT experience[30]	Two DT projects which were conducted by students of University of St. Gallen[31]
Interviewee	Frank Dobrileit
Position of Interviewee	Product Manager
Interviewee's Location	Luebbecke, Germany
Interviewee's Connection to DT	Dobrileit was the project leader of both DT projects which were conducted at adp Gauselmann, supporting the students in their work when there was demand.

Impressions about Interviewee's DT Experience

Frank Dobrileit finds DT "very interesting" and "incredibly diverse". He, further, evaluates its problem solving process within teams as "great". To me as the researcher, the company's commitment to the DT test project was remarkable. In the end phase of the first project, 10-12 research and development employees were available to the students as contact persons, and the company even built up a prototype in the factory to support the teams. Dobrileit also proves involvement with the approach when he immediately finds a definition for DT as a "method to create innovations, working widespread and resulting in solutions which are thought outside the box". Apart from the DT trials, no particular innovation methods are applied at Gauselmann; innovations within the company are generated by technology-push projects and ideas developed by single employees. Although Dobrileit would not eliminate the possibility of a new DT project being run in the company someday, he believes that the chances of working on another DT project are rather slim. As he asks himself "whether it makes sense to use a broad, creative method in combination with a highly regulated industry." The industry regulations were also the reason why the outcomes of the first projects were not realizable in the end. Gauselmann's management initiated a second project to be able to learn from the first one and make respective changes. Although the second project is not finished at the time of the interview, Dobrileit doubts that there is going to be a further project, as the mentioned problem remains.

Table 5: Interview 3 – Frank Dobrileit, adp Gauselmann GmbH (Data from Dobrileit, 2012; Gauselmann AG, 2012)

[29] *Comment*: Information about number of employees and revenue is related to the whole Gauselmann Group, as no information was found only related to adp Gauselmann which is closely linked to the mother company.
[30] *Comment*: The choice for the term 'known' was made as the information about the DT experience solely relies on the knowledge of the interviewee; hence, the occurrence of other DT projects within the company are not to be ruled out completely. The same applies to all seven interviews.
[31] *Comment*: The DT approach of the University of St. Gallen can be found in *2.1.4.*

Interview 4 Category C – 12.06.2012	
Company/ Industry	MAGNA Powertrain AG & Co KG/ Automotive
Number of Employees/ Annual Revenue of Company	11,000 employees (2011)/ € 4.5 bn. revenue (2011)
Company's Known DT experience[32]	Two DT projects which were conducted by students Vienna University of Economics and Business[33]
Interviewee	Markus Bichler
Position of Interviewee	Project Leader Alternative Powertrain Projects
Interviewee's Location	Lannach, Austria
Interviewee's Connection to DT	Bichler was the project leader in the second DT project that was run by MAGNA Powertrain, supporting the students in their work when there was demand.

Impressions about Interviewee's DT Experience

Markus Bichler points out that DT as a method was rather held in the background while running the project, and he elsewhere adds that DT was used as "a means to an end". He says, "I have to admit, I do not completely understand what Design Thinking means and what its benefits are." Nevertheless, he acknowledges that a lot of knowledge was generated and "good results" were achieved when DT was applied. He also highlights the "very good" support by the university. The cooperation was evaluated internally and they came to the conclusion that the students did a "very good" job, even though it had been difficult for the company to formulate a precise statement of task due to the restricted business area of their department. Further, they had to recognize that a three-month-project has limited potential, and they realized that more manpower and guidance are needed during the project and afterwards to process the acquired knowledge. First and foremost, Magna engaged in a second DT project to deepen the company-university relationship and thereby also make use of "getting good results for good money". In comparison to other innovation methods which Magna applies, Bichler regards DT as one with a more strategic focus, located at a higher hierarchical level, rather than suitable for concrete product development. He explains this by stating that DT requires a certain amount of resources such as time and money. Moreover, Bichler assesses DT critically by suggesting that the approach derived its current status mostly by offering "a scientific method with international reputation" and assuming that all "target-aimed innovation methods appear to have the same basics but use other terms". He is skeptical about DT's future at Magna, as he regards it as "difficult" to find someone who continuously encourages its application.

Table 6: Interview 4 – Markus Bichler, MAGNA Powertrain AG & Co KG (Data from Bichler, 2012; Wirtschaftspressedienst Niederösterreich, 2012)

[32] *Comment*: The choice for the term 'known' was made as the information about the DT experience solely relies on the knowledge of the interviewee; hence, the occurrence of other DT projects within the company are not to be ruled out completely. The same applies to all seven interviews.

[33] *Comment*: The DT approach of the Vienna University of Economics and Business can be found in *2.1.4.*

Interview 5 Category A – 19.07.2012	
Company/ Industry	Bayer MaterialScience AG/ Materials
Number of Employees/ **Annual Revenue of Company**	14,800 employees (2011)/ € 10.8 bn. revenue (2011)
Company's Known DT experience[34]	Bayer MaterialScience has been applying DT since 2003. In combination with scenario-building, networks with other companies and design agencies and universities as well as design competitions, DT has been implemented in the workflows of the Creative Center, a department in charge looking for new opportunities in the next 10 to 15 years. Further, DT is embedded in the overarching Industrial Marketing and Innovation organization and the so-called Marketing Academy, thereby spreading also in the business units.
Interviewee	Eckard Foltin
Position of Interviewee	Head of Creative Center
Interviewee's Location	Leverkusen, Germany
Interviewee's Connection to DT	Foltin as the head of the Creative Center since its foundation has been responsible for the establishment of DT within the Center. He sees his role regarding DT in the area of "coaching", supervising the main issues of the diverse projects.

Impressions about Interviewee's DT Experience

Eckard Foltin understands DT as "a process which takes the customer as a starting point and understands him or her as a holistic interplay of issues." He stresses that experience with DT projects shows that this approach is more valuable compared to other tools which also aim at understanding a market, a value chain, and its single players. Although Foltin acknowledges DT as a valuable methodical approach, he would not say that "it is a wholly essential process" which beats every other approach. He comments, "Some call it DT, others call it foresight methods –whatever. I think it is about the package." In his opinion, one should not only rely on a single method, such as DT, but rather on a toolbox of different options. Nonetheless, he regards DT as "an essential element within the toolbox of opportunities". The Creative Center focuses particularly on looking into the future up until 15 years from now. DT helps to identify future scenarios and the paths "to exploit new fields of application and to conquer new markets"; either the know how to run these new paths then is developed internally, or external contacts are approached. When talking about DT, Foltin repeatedly highlights the importance of networks as they enable the company to think future oriented also outside the organization's boundaries and capabilities. Also internal networks of people who support progressive ideas are necessary, he claims. In order to get different stakeholders on board and establish DT within the company, he says, community thinking and openness are organizational requirements. Further, he emphasizes that interdisciplinary teams should be structured in a way that at least one person should have DT in her or his mind as an option for the project. Foltin calls Bayer MaterialScience a "learning organization" and thereby implies a general willingness to embrace new ways of thinking and working.

Table 7: Interview 5 – Eckard Foltin, Bayer MaterialScience AG (Data from Bayer AG, 2012; Foltin, 2012)

[34] *Comment*: The choice for the term 'known' was made as the information about the DT experience solely relies on the knowledge of the interviewee; hence, the occurrence of other DT projects within the company are not to be ruled out completely. The same applies to all seven interviews.

Interview 6 Category A[35] – 23.07.2012	
Company/ Industry	SAP AG/ Software
Number of Employees/ Annual Revenue of Company	55,765 employees (2012)/ € 14.233 bn. revenue (2011)
Company's Known DT experience[36]	DT at SAP started to grow in 2005 when the Design Services Team was established to utilize DT in strategically relevant projects. 1,5 years ago the company's CEO started a global initiative to roll out DT specifically in different project teams around the world, reaching more and more people in each phase. The application is regularly supported by the d.school in Potsdam[37].
Interviewee	Anja Fehlau
Position of Interviewee	Strategic Design Consultant
Interviewee's Location	St. Leon-Rot, Germany
Interviewee's Connection to DT	Fehlau joined SAP as a member of the above mentioned Design Services Team. Now being a member of an innovation team in the On-Demand division, she is working through many steps of the innovation process (research to concept to user interface design) – applying DT constantly. Additionally, she functions as an expert coach in SAP's global DT initiative.

Impressions about Interviewee's DT Experience

Anja Fehlau assigns great value to DT at SAP. The approach which she defines as an innovation process "does not only help to regard the usual, but also to identify competitors on other levels, such as social networks." In addition, she stresses DT's support in understanding economic viability, market potential, and desirability and claims that it fits for "everything which does not have a satisfying solution yet". Fehlau describes DT as "a not strictly defined process" because the "depth of its application is variable"; incremental projects, for example, would not require the same intensity as radical ones, she explains. Even though SAP is spreading DT in a global initiative, promotes it at internal events and conferences, as well as with posters on the company's premises and, it is not the only innovation process used in the company. When looking at DT, Fehlau sees the same problem as with other approaches, "How do I transform a good idea into reality?" She also remarks that the question of how to measure DT's success is often posed and difficult to answer as DT cannot be completely separated from other influencing factors. However, the fact that the DT approach has yielded entirely new perspectives compared to other approaches applied on the same project seems to compensate for missing measurement indicators.

Table 8: Interview 6 – Anja Fehlau, SAP AG (Data from Fehlau, 2012; SAP AG, 2012)

[35] *Comment*: Although Anja Fehlau categorized SAP as a 'Category B' company with 'Category A' teams, I decided to change SAP's status in this thesis to Category A, as their practices rather fit Category A than B: DT has been applied in quite a substantial manner for a longer period of time now.

[36] *Comment*: The choice for the term 'known' was made as the information about the DT experience solely relies on the knowledge of the interviewee; hence, the occurrence of other DT projects within the company are not to be ruled out completely. The same applies to all seven interviews.

[37] *Comment*: A similar DT approach to the one of the d.school in Potsdam by the Vienna University of Economics and Business iences can be found in *2.1.4.*

Interview 7 Category B – 15.08.2012	
Company/ Industry	Immobilien Scout GmbH/ Online Marketplace (Real Estate)
Number of Employees/ Annual Revenue of Company	>600 employees (2011)/ € 21 m. revenue (2007)
Company's Known DT experience[38]	The Scout Group organized two DT workshops for its Scout Verticals (one two years ago with the creative agency Tiefenschaerfe[39], the other one before – operator unknown). Since then DT has been applied a couple of times in product management and user experience teams within Immobilien Scout.
Interviewee	Jekaterina Cechini
Position of Interviewee	Team Leader User Insights
Interviewee's Location	Berlin, Germany
Interviewee's Connection to DT	Cechini participated in the second DT workshop and as team leader of user insights she shared the DT practices with the other members. As a consequence, DT has been used at least two times within the team; one project was realized by Cechini.
Impressions about Interviewee's DT Experience	
Jekaterina Cechini describes DT as "a defined sequence of tools and methodical approaches to generate plenty of ideas which are based on user needs and motives". Her team applies DT every now and then "because it simply is a valid method". By remarking that, she refers to the internet business which constantly requires new ideas due to its innovative environment. The high degree of novelty of ideas as well as their equally high quantity are the critical reasons why DT is still in use, she says. Further, she comments, "I think if it was not that time-consuming, we could absolutely apply it more often". DT within Immobilien Scout relies on the methodical knowledge that some employees obtained at two DT workshops or at internal sessions which were held by participants of the initial external workshops. Cechini explains that the company is not very much methods-driven. Therefore, she says, DT as a method is not set out in writing to be applied by others who did not attend one of the workshops. There are no concrete future DT plans at Immobilien Scout. However, Cechini could imagine spreading the method more intensively throughout the company as she "in principle considers DT as a very good method".	

Table 9: Interview 7 – Jekaterina Cechini, Immobilien Scout GmbH (Data from Cechini, 2012; Immobilien Scout GmbH, 2012)

[38] *Comment*: The choice for the term 'known' was made as the information about the DT experience solely relies on the knowledge of the interviewee; hence, the occurrence of other DT projects within the company are not to be ruled out completely. The same applies to all seven interviews.

[39] *Comment*: A similar DT approach to the one of Tiefenschärfe represented by Brown's (2008) 'Three Spaces of Innovation' can be found in *2.1.4.*

CHAPTER 4 – Research Results

As the analysis cannot be separated from data collection when applying GTM, the presentation of the analytical results in a thesis has to be structured accordingly. Whereas the process of generating and analyzing data is described in *Chapter 3*, in this chapter the main analytic message of the research in the form of the final model is depicted. The main analytic message was drawn from the most salient categories in the research which continuously appeared in all examined cases. Further, conceptual detail and descriptive quotations are used to convey that message and its components and to enable a comprehensive understanding of the matter. Everything aiming at answering the research question:

What factors are affecting the current and future adoption of Design Thinking within Design-Thinking-experienced companies?

It is to be remembered that detailed information about the interviewees, their companies, and DT experience can be found in *3.4*. Further, it is to be noted that all the DT-related information mentioned in this chapter solely relies on the findings from research and is in no case connected to the existing DT discussion, described in *Chapter 2*.

First, the overall model is illustrated. Then, its different components and underlying categories are presented in more detail. Finally, the analysis is concluded in a summarizing statement.

4.1 Analysis of Data: 'Uncertainty vs. Involvement Model'

The influence on the current and future adoption of DT within DT-experienced companies can be outlined as handling uncertainty with corresponding company involvement. *Figure 12* pictures the 'Uncertainty vs. Involvement Model' which I developed based on my research's findings. 'Uncertainty' is a factor which coexists with the concept of DT and either gains the upper hand or is managed to be reduced. It is determined by two main influencing sub-factors, '(Mis-)Conception of DT' and 'Unpredictability', which again consist of smaller, more specific categories. The vigorous effect of 'Uncertainty' depends on the degree of 'Company Involvement' which can prepare it to get on top of 'Uncertainty'; deciding upon whether DT application is continued or dismissed. 'Company Involvement' has different sub-factors, as well: 'Project Concept: Intensity of Actual Cooperation', 'Depth of DT Integration', and 'Organizational Structure and Culture'. The existence of either of them helps stabilizing against 'Uncertainty'. The higher the 'Company Involvement', the better the protection against 'Uncertainty'.

To emphasize what the model is dealing with, a more metaphorical explanation is added: 'Company Involvement' can be viewed as the shield which protects the organization from the negative effects of 'Uncertainty'. If that shield does not exist at all or only to a limited extent, the company is more likely to give in to these effects and tends to wipe out their cause, namely, DT.

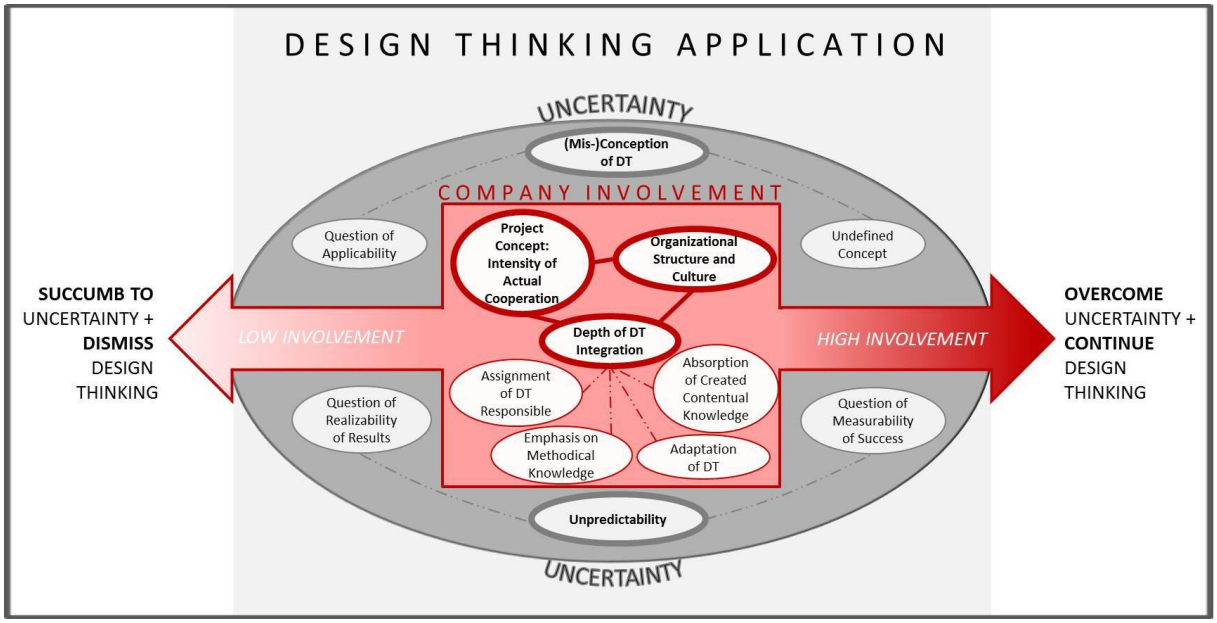

Figure 12: Uncertainty vs. Company Involvement Model

4.1.1 Uncertainty

The research of this thesis has shown that 'Uncertainty' is, next to 'Company Involvement', one of the two main factors influencing the current and future adoption of DT within experienced companies. In all cases, it goes hand in hand with DT application and is to be dealt with by DT users. However, before exploring ways of how to approach 'Uncertainty', its nature needs to be examined by taking a closer look at its single components.

(Mis-)Conception of DT

The sub-factor '(Mis-)Conception of DT' refers to the confusing conceptualization of DT which either was specifically pointed out by the interviewees or has become apparent through the disparity of described perceptions of the approach. I deliberately made no choice between either of the terms 'conception' or 'misconception' of DT as it ought to emphasize what can be found within DT (its conception) and, likewise, refer to what is wrong with it (the misconception of DT). This cannot only be assessed regarding the definition of DT, but also in terms of its applicability.

Undefined Concept

With regard to my research, I can state that a single answer to the question 'What is DT?' does not exist; neither in regards to its definition and conceptualization nor its demarcation. DT is not easy to grasp, and its core seems to be a matter of perspective. The definitions and with them the conceptualizations vary between a method, a process, and a tool and highlight either a customer or innovation focus. These differences are highlighted by the following two definitions. On the one hand, Frank Dobrileit (2012, n.p.) understands DT as a "method to create innovations, working widespread, and resulting in solutions that are thought outside the box"[40]. Jekaterina Cechini (2012, n.p.), on the other hand, depicts it as a "defined sequence of tools and methodical approaches to generate plenty of ideas which are based on user needs and motives". Sometimes no attempt is made to formulate what DT is due to its fuzziness (Joeressen, 2012; Oesterreicher, 2012; Bichler, 2012). The confusion about the term does not only manifest itself in exemplary cases and their observable differences, it is also particularly addressed by practitioners. Olaf Joeressen (2012, n.p.) openly criticizes DT for offering no clear definition – "in different contexts everyone has his own dialect". Additionally, Markus Bichler (2012, n.p.) suggests that it rather might be seen as a "scientific method with an international reputation" which he views as based on the same foundation as other innovation methods, simply using new terms. Criticism regarding the definition is not only expressed by companies which have no particular future plans with DT, but also by those which are continuously using it. Eckard Foltin (2012, n.p.) says that "some call it DT, others call it foresight methods – whatever". It, therefore, becomes clear that a concrete demarcation of the definition appears to be missing. The question of demarcation also arises when deciding upon how many components need to be used in order for it to be still recognized as DT (Fehlau, 2012; Cechini, 2012). Although the same DT components such as 'rapid prototyping' or 'customer-centricity' are mentioned frequently, it still seems to be questioned in how far all of them need to be applied to be recognized as DT.

Another issue adding complexity to the problem is DT's connection to the term 'design'. On the one hand, 'design' seems to be misleading as sometimes it is reduced to the look or layout of products (Oesterreicher, 2012; Bichler, 2012). On the other hand, it is not clear whether DT is understood as connected to the working mechanisms and presence of designers. Only one interviewee, Eckard Foltin (2012, n.p.), emphasizes that DT is applied "to look for customer needs like a designer".

[40] *Comment*: As explained in *3.3*, the interviews were conducted in German. All direct quotes of the interviewees are translated into English by me.

Further, it becomes obvious that in his company designers are deliberately included in the DT application (Foltin, 2012). All other interviewees, however, regardless of having designers in their DT teams or not, do not attach particular value to this profession when discussing DT (Joeressen, 2012; Oesterreicher, 2012; Dobrileit, 2012; Bichler, 2012; Fehlau, 2012; Cechini, 2012).

Conclusively, it can be claimed that the different perceptions and appraisals of the DT term, its definition, conception, and demarcation do not convey a coherent picture of the approach. The ambiguities add to the confusion of practitioners and in some cases reduce their willingness to apply DT. Accordingly, they are conducive to the '(Mis-)Conception of DT'.

Question of Applicability

Similar to the 'Undefined Concept', 'The Question of Applicability' fuels the debate about the '(Mis-) Conception of DT' as many different and also opposing answers can be found in this thesis' research.

One contrast I identified lies in the varying wideness of perspective. Some use DT as an approach to create products (Joeressen, 2012; Oesterreicher, 2012; Fehlau, 2012; Cechini, 2012) and processes (Fehlau, 2012) in the foreseeable future. Others view DT's applicability in a more strategic direction which implies looking further ahead and learning something about future societies, customer profiles and needs, as well as working and living modes (Bichler, 2012; Foltin, 2012). While Frank Dobrileit (2012) considers DT as applicable to both purposes (Dobrileit, 2012), Markus Bichler (2012) evaluates one of them as not suitable. In comparison with other innovation methods, Bichler sees DT as less suited for actual development of a product and more appropriate as a strategic instrument. He came to this conclusion due to the high resource investment which is attached to it and because of the fact that he does not regard every employee as capable of applying complex DT. Bichler is the only interviewee who compares DT with other innovation

The issue of services is only touched upon theoretically, and also in this area, proponents and objectors of this particular DT application can be found. On the one side, Richard Oesterreicher (2012) can vision DT as a possible approach for service creation, on the other side, Frank Dobrileit (2012) views DT especially in regards to technical services as incongruous (Dobrileit, 2012). The term 'technical' leads to another question of applicability. Solving technical problems with DT is questioned but by some not generally ruled out (Fehlau, 2012; Foltin, 2012). Eckard Foltin (2012, n.p.) understands DT at least as a complementary activity "to make the project transferable externally. […] Then comprehension of markets, of customers, and connections to externals are needed." Even though she does not consider DT as particularly suitable for solving technical

problems due to their knowledge-intensive character, Anja Fehlau (2012) still finds DT application in this case more beneficial than working in front of a computer by oneself.

Another conflict can be identified when it comes to the nature of DT results. While the application of DT for radical innovations is unquestioned, the applicability for continuous improvement of existing projects is doubted or neglected by some (Joeressen, 2012; Cechini, 2012) and advocated for by others (Fehlau, 2012). For example, Jekaterina Cechini (2012) states, "If one adapts existing things, I do not find [DT] suitable. If one conducts maintenance in the classical sense, it does not make sense. It only makes sense if one wants to serve new target groups or develop something new for an existing target group." Anja Fehlau (2012, n.p.), on the other hand, argues less strictly, "[…] there is a product which continuously is developed further and refined or improved and then maybe one does not necessarily have to conduct a full DT project; but it might be sufficient to look at a single aspect with new methods and then maybe derive a new idea from it."

Similarly, the applicability of DT within specific industries is contested for different reasons. One example is given by Olaf Joeressen (2012), who perceives the maturity of the industry his company is in as the reason for not requiring as much radical activities anymore (he connects it to the assumption that DT is only applicable for radical innovations). Another one is addressed by Frank Dobrileit (2012, n.p.), who considers the degree of "industry regulations[41] which obstruct creativity" as harmful to DT application. Opposing all limitations mentioned before, Anja Fehlau (2012, n.p.) asserts that DT "is applicable to everything which does not have a satisfying solution yet".

The analysis of DT in respect of its applicability prompts a lot of questions. Comparable to the examination of the DT concept, discordances have become apparent. There does not seem to be one particular domain for DT application, at least not one which is perceived as such by the interviewees. The insufficiently answered 'Question of Applicability' leads to the fact that DT application might have been ruled out before it was even tried in a different area; resulting in a limited frame of possible applications for most companies. Represented by its main components, the 'Undefined Concept' and the 'Question of Applicability', the '(Mis-)Conception of DT' becomes obvious. Within the conducted research, there only appears to be limited agreement among practitioners what DT is and what it is used for, thereby automatically limiting the effect that DT might have if its conceptualization and options were unveiled more clearly.

[41] *Comment*: By talking about "industry regulations", Frank Dobrileit (2012) means the legal regulations in Germany which determine specific characteristics of slot games, such as certain structural elements, technical components and safety functions like a minimum and maximum win or a defined break between games.

Unpredictability

Next to the '(Mis-)Conception of DT', another big influence on 'Uncertainty' surrounding the approach could be derived from the data. I am referring to the sub-factor 'Unpredictability' which has manifested itself in two particular forms in this thesis' research: 'Question of Measurability of Success' and 'Question of Realizability of Results'.

Question of Measurability of Success

How to measure the success of DT? Anja Fehlau's (2012, n.p.) answer to this question, "We have been asking ourselves this question repeatedly. There are no good options to compare it with." I have come to notice that the measurement of success of DT poses a big challenge, and there appears to be no easy answer. Some companies react by simply not measuring it at all. As noted by Olaf Joeressen (2012, n.p.), it seems to be "difficult for all creative methods". Further, success can be understood as the realizability of results. Richard Oesterreicher proves that by saying, "When I say that we practically have not realized any [of the DT results], [measurement of success] is difficult." Consequently, with an outcome which is not realizable, no measurement is possible (Oesterreicher, 2012; Dobrileit, 2012). In Markus Bichler's (2012) case, conclusions were drawn from the DT experience; however, no particular parameters for further measurement in terms of success of DT projects were established. Reliance on experience seems to be an alternative to measuring success. Also Anja Fehlau (2012) and Jekaterina Cechini (2012) report on the fact that only experience can prove whether DT can offer more valuable solutions than other approaches. Until one is able to draw conclusions from experience, risk-taking is required and the unpredictability of success has to be dealt with. Measurement of DT's success seems to be particularly difficult as many other variables such as the "actual realization, resources or marketing" (Cechini, 2012, n.p.) can inhibit a clear tracing of results to DT (Fehlau, 2012). Nevertheless, there are examples which have found a method of measuring it by adapting success monitoring from project to project; for example, Eckard Foltin (2012, n.p.) describes that before starting the DT project the initiator is asked, "[…] What is the project's success for you: When three project candidates are developed, when a business of a certain number is achieved, when we create visionary prototypes, when we develop a real business relationship?".

These observations show that measuring success of DT is not an easy task; some find altered solutions, others rely on trust in the approach based on experience, and a third group does not measure at all. There is neither a one-size-fits-all solution nor guidelines how to estimate the value of

DT projects. This non-existence increases unpredictability and automatically raises the barrier for further involvement.

Question of Realizability of Results

Not only does the 'Question of Measurability of Success' add unpredictability to DT but also the 'Question of Realizability of Results'. The research has shown that in many cases DT cannot yield realizable outcomes – realizable at least not in their full spectrum. That fact applies to companies without further DT intention as well as those which continue with the approach. Often only parts can be carried over, still requiring resources to find a good fit within a project. The deficiency of realizability of the final outcomes can be caused by "internal reasons" (Joeressen, 2012, n.p.), industry regulations (Dobrileit, 2012), restructuring followed by a shift of departmental focus (Bichler, 2012), technical and organizational reasons (Oesterreicher, 2012), or by yet absent readiness of the market (Fehlau, 2012). That the 'Question of Realizability of Results' is not fully to be solved is supported by Eckard Foltin (2012, n.p.) who perceives the achieved realizability rate of 35% of the projects as satisfying; he calls it "a high hit ratio". Even though not all companies which continue DT application measure realizability with numbers, Anja Fehlau (2012) also makes obvious that the probability of a DT project not leading to realizable outcomes needs to be accepted by saying, "[…]Sometimes it happens that only parts of a concept can be realized instead of the whole concept or vision. Sometimes it is also the case that projects are not developed further. That has different reasons. It also can be caused by organizational reasons, for example restructuring within the company. […] Sometimes it also happens that the time is not ripe yet, and the product is produced one year later."

Also adding ballast to the 'Question of Realizability of Results' is the difficulty of transferring ideas into the implementation phase. Anja Fehlau (2012, n.p.) criticizes, "The transfer into implementation is very difficult. The way HPI [d.school in Potsdam] and Stanford work, we noticed, is lacking the decisive step which actually implements the product. I believe that there definitely is potential for improvement."

The 'Question of Realizability of Results' is not to be mistaken with – to frame it accordingly – a 'Question of Value of Results'. The outcomes of the projects are consistently regarded as positive. They are denoted as "valuable" (Joeressen, 2012, n.p.), "good" (Bichler, 2012, n.p.), and "very interesting" (Dobrileit, 2012, n.p.); they are appreciated as innovative (Oesterreicher, 2012; Fehlau,

2012) and more valuable than the ones from competing methods (Foltin, 2012).[42] Thinking outside the box is actually said to be achieved (Fehlau, 2012) and different views are recognized as integrated (Cechini, 2012).

The low rate of realizability of results requires a lot of staying power and patience to profit from DT. This fact as well as the 'Question of Measurability of Success' notably constitute 'Unpredictability' concerning DT. Combined with the '(Mis-)Conception of DT', it results in a big bubble of 'Uncertainty' which DT users need to deal with. 'Uncertainty' can be detected in the environment of companies which are dismissing DT application just as well in that of companies which have been continuing the approach. It seems to be a question of handling that uncertainty. In the following, it is illustrated what I identified as actually making a difference: 'Company Involvement' (see *Figure 12*).

4.1.2 Company Involvement

As emphasized in the previously discussed chapter, DT application comes along with 'Uncertainty' in different facets. In order to be able to deal with this circumstance, a company needs to prepare itself accordingly. Arisen out of this thesis' research, it can be inferred that the degree of 'Company Involvement' in DT activities plays the critical role which decides whether a company manages to overcome uncertainty or succumbs to it. Three main sub-factors of 'Company Involvement' can be identified: 'Project Concept: Intensity of Actual Cooperation', 'Depth of DT Integration', and 'Organizational Structure and Culture'.

Project Concept: Intensity of Actual Cooperation

One attribute of the DT project concept has turned out to be particularly decisive when it comes to a long-term, widespread application: the intensity of actual cooperation between internals and externals. Internals are those who are employed by the company and mainly possess contentual knowledge. Externals are understood as those who rather have the methodical knowledge, such as consultancies or universities. This group, however, can also be represented by other companies or institutions which are pursuing the same goal as the company applying DT; they might function as a partner organization.

On the one hand, the importance of this factor can indirectly be retrieved from lessons learned of Category C companies (see *3.4*). On the other hand, it is also directly suggested by the following

[42] *Comment*: At this stage when talking about the value of DT's results, it is to be mentioned that none of the seven interviewees preferred another innovation method over DT, and also serious alternatives were not even mentioned.

assumption made by Olaf Joeressen (2012, n.p.): DT works best when "people with methodical experience and others with contentual experience" are put together. In Category C, externals more or less worked by themselves, leading to redundant outcomes which (a) already had come up in the company before (Joeressen, 2012), (b) were not realizable due to technical and corporate reasons (Oesterreicher, 2012), or (c) could not be realized because of industry regulations (Dobrileit, 2012). Producing knowledge exclusively internally or externally increases the barrier of applying DT again. It is to be assumed that a deeper cooperation between internals and externals, mixing contentual and methodical knowledge, could have yielded more realizable results. Category A companies' outcomes confirm that assumption. As Eckard Foltin (2012) points out, Bayer MaterialScience draws on internal networks of DT supporters and combines them with external design and partner networks. Anja Fehlau (2012) explains that SAP repeatedly gets externals on board who not only possess methodical knowledge but also train internal DT experts within exemplary projects. Those internals then unify knowledge about content and method in one person. Jekaterina Cechini (2012) depicts the adoption of yet another approach: Relying on the methodical knowledge that internals gained in two workshops, Immobilien Scout has been applying DT without external help since then. As Category B is still situated in the beginning of possible long-term DT application, it cannot be estimated if this model can be sustained. For instance, the question about what will happen when the workshop participants leave the company and take their knowledge with them needs to be considered.

It has become obvious that the cooperation between externals and internals is capable of enhancing the DT experience and reduce one crucial factor of 'Uncertainty' in particular: the 'Question of Realizability of Results'. It is required that internals and externals do not only work in parallel on the same topic, but that they actually cooperate. With this symbiosis, novel and realizable outcomes can be developed. Certainly, the inclusion of internals and externals within a project concept alone does not ward off 'Uncertainty'. That applies to all other 'Company Involvement' factors, as well. It is the combination of those which creates the shield to protect the organization from the negative effects of 'Uncertainty'.

Depth of DT Integration

Another striking sub-factor is the 'Depth of Integration' into the company. As *Figure 12* shows, the most decisive parts of integration can be found in different areas: 'Adaptation of DT', 'Emphasis on Methodical Knowledge', 'Absorption of Created Knowledge', and 'Assignment of DT Responsible'.

Adaptation of DT

Category C's DT experience is exclusively based on external providers, taking the approach as it is suggested without further alteration (Joeressen, 2012; Oesterreicher, 2012; Dobrileit, 2012; Bichler, 2012). Examples from Category A and B show that it can be beneficial to make some changes and adapt DT to the company's needs and conditions.

Eckard Foltin (2012) describes DT as integrated in the scenario building process; in the course of this, tools such as visualization, prototyping, and feedback within interdisciplinary teams are deployed. Aiming at an encompassing perspective of future markets and customer needs, Bayer MaterialScience collaborates with design as well as partner networks (Foltin, 2012). Alternatively, SAP has embedded DT in existing 'Lean'[43] and 'Agile'[44] methods (Anja Fehlau, 2012). Through a global initiative, DT is spread company-wide in different projects, thereby engaging more and more employees phase by phase; as Anja Fehlau (2012, n.p.) argues, "Selective activities such as single workshops are not sufficient." The DT purpose was specified by SAP: DT is addressing 'What is to be created?', while 'Lean' and 'Agile' are used to answer 'How is it created?' Both companies have developed their own frame for application and decided for a concrete purpose for it. Nonetheless, DT is not regarded as an exclusive process in both examples (Fehlau, 2012; Foltin, 2012). Similar developments can be recognized within Immobilien Scout. Jekaterina Cechini (2012) describes that after the external workshop small internal workshops were held in the team and adaptations to the concept of DT were made; it was searched for aspects to be added or left out, considering the company's conditions and needs.

Adapting DT allows exploiting the potential of the approach. As Eckard Foltin (2012, n.p.) expresses it, "It is very important to not only have embedded DT as a process but also to understand the diverse steps to say: we are the decision makers." In parallel, DT itself can be refined and consolidated. These actions help stemming the negative influence of the 'Undefined Concept' and the 'Question of Applicability'.

[43] *Definition*: "Lean strategy provides a strong infrastructure to support many innovative manufacturing methods, reduces the lead time of any process, and minimizes cost from activities that do not add value." (Sabri & Shaikh, 2010, p.7)

[44] *Definition*: "The ability to be agile depends on a close relationship with partners (suppliers, customers, carriers, logistics providers, etc.); integrated processes and access to real-time information on the value chain." (Sabri & Shaikh, 2010, p.7)

Emphasis on Methodical Knowledge

In order to spread the word about DT internally and widen its scope of application, this thesis' research shows that it has proven to be beneficial to pay attention to accessibility and documentation of the approach. The same applies to focusing on targeted communication about it.

Aside from a workshop or presentation of the DT project, the Category B and C companies (Joeressen, 2012; Oesterreicher, 2012; Dobrileit, 2012; Bichler, 2012; Cechini, 2012) have not processed the methodical knowledge in so far that others could profit from it. Knowledge of DT results and experiences is limited to those people who participated in the projects; therefore, the degree of DT awareness within the company is highly dependent on a limited circle of employees. If those people leave the company, knowledge about the experience gets lost. No concept is established to track the procedures and outcomes of the projects. This low 'Emphasis on Methodical Knowledge' in terms of DT complicates smooth transition into a next DT project. Additionally, it results in a learning factor which is fairly limited. Moreover, it leads to the fact that reapplication of DT is rather left to chance than planned deliberately.

Category A companies established DT hubs within the organization. Eckard Foltin (2012) mentions that DT is not only used in the Creative Center of Bayer MaterialScience, which is in charge of looking for new opportunities in the future, but also is embedded in the overarching Industrial Marketing and Innovation Organization as well as in the Marketing Academy where the approach is taught. At SAP, Anja Fehlau (2012, n.p.) explains, "there is a network of people who are familiar with [DT]. These people know each other. Then there are various virtual learning pages. […] There is a tool collection and community on the Intranet." Further, both companies communicate the existence of DT and ensure that DT knowledge can be accessed, applied, and trained (Foltin, 2012; Fehlau, 2012). By actively managing DT knowledge, built up on existing and assessed experience, new projects can be initiated more easily and run faster as well as more purposefully.

Absorption of Created Contentual Knowledge

Similar to the different levels of 'Emphasis on Methodical Knowledge', the 'Absorption of Created Contentual Knowledge' differs among companies**.**

In Category B and C companies, the created contentual knowledge stays within the project. Its results are either instantly utilized or discarded (Joeressen, 2012; Oesterreicher, 2012; Dobrileit, 2012; Bichler, 2012; Cechini, 2012). Again, the transfer of knowledge is dependent on participants of the

project, who later can include it in other ventures. However, it is not processed in such a form which enables non-participants to review unused knowledge and possibly extract parts from it to incorporate into their own projects. The absence of knowledge processing can either be caused by the unawareness of necessity or, as Markus Bichler (2012, n.p.) explains, by a deficiency of needed resources (time, manpower, budget).

Category A companies, however, seem to be aware that they need to be able to react flexibly to market changes and opportunities. Therefore, it is advisable to retain the acquired knowledge as utilization might not be obvious at this stage but could become relevant at a later point in time. In this context, Eckard Foltin (2012, n.p.), for example, argues, “When we illustrate and record these things, we will have a chance to reassess in two years: What were the constraints? Why did we put it aside? What has changed?“

Another possibility is a more active exchange about projects via different platforms, as touched upon by Anja Fehlau (2012): These could be presentations in front of project sponsors from diverse departments, or at internal networking events and conferences which allow broad, internal knowledge transfer. “At those meetings”, she states, “one talks about the completion of a project, about what went well, and what is in need of improvement.” (Anja Fehlau, 2012, n.p.)

When companies are not able to embed information and knowledge in a manner which makes it available and usable for others, knowledge gets lost, resources are wasted, and possible competitive advantages are given away. That way, the initial effort does not pay off as much as it could; especially considering that the realizability of results does not seem to be the norm.

Assignment of DT Responsible

“Design Thinking application should be decided by the board and a representative should be appointed”, argues Frank Dobrileit (2012, n.p.). Also Markus Bichler (2012, n.p.) indicates the necessity of the appointment of a “person who impels the Design Thinking project”. Currently, in Category B and C companies the promotion of DT is mainly left to committed employees (Joeressen, 2012; Oesterreicher, 2012; Dobrileit, 2012; Bichler, 2012; Cechini, 2012). On the one hand, that is important. Anja Fehlau (2012, n.p.) says that DT application needs “many advocates who enable [DT to flourish] on a lower level, as they are those who transfer knowledge and who can convey enthusiasm about it". On the other hand, however, to be able to plant factors such as the ‘Absorption of Created Contentual Knowledge’,’ Adaptation of DT’, or ‘The Project Concept: Intensity of Actual Cooperation’ deeply into the organization, the ‘Assignment of a DT Responsible’ becomes

relevant. As can be seen in Category A companies, this position is capable of promoting DT also at the board level, raise required resources, and can guide wide promotion of the approach (Foltin, 2012; Fehlau, 2012). Naturally, the higher the DT responsible is within a company's hierarchy, the more influence in terms of DT can be achieved.

The depth of DT integration in the company determines to what extent the approach is incorporated into the organization. That does not mean that DT demands an exclusive position. I believe, it is rather to be established as a throughout present opportunity to derive new insights and possibly generate innovations with it. By achieving a high level of integration, the main factors of 'Uncertainty', '(Mis-) Conception of DT' and 'Unpredictability', can be kept in check and even turned to something positive. For example, the 'Question of Applicability' can be used to create one's own path to DT through 'Adaptation of DT' instead of getting lost within the fuzziness of the approach. Instead of dismissing DT due to the 'Question of Realizability' and by rather focusing on the 'Absorption of Created Contentual Knowledge', the generated knowledge can be stored and used in another project.

Among the four components of 'Depth of DT Integration', there is none which appeared superior to the others. They seem to equally constitute this sub-factor of 'Company Involvement'.

Organizational Structure and Culture

Not only the DT concept and its integration into the company decide upon the stability of DT, this thesis' research shows that it also needs to be embedded in a corporate environment which embraces such an approach. The company's structure and culture need to enable the integration of DT.

Obstructive, for example, can be that a company is less methods-driven – meaning that no methods to purposefully create innovations are applied, as mentioned by Jekaterina Cechini (2012), Frank Dobrileit (2012), and Richard Oesterreicher (2012). Thereby the barrier to get fully engaged with DT is increased. It becomes more difficult to allocate resources in favor of DT or incorporate newly acquired knowledge. Also, long decision-making processes, as described by Frank Dobrileit (2012), do not support the requirement of being able to flexibly react to new opportunities.

More beneficial to the application of DT appears to be a "learning organization", as Eckard Foltin (2012, n.p.) calls Bayer MaterialScience, which recognizes that it "needs to stay modifiable" (Foltin, 2012, n.p.); one that appreciates community thinking and networking and allows scope for

development (Foltin, 2012). Jekaterina Cechini (2012, n.p.) adds that DT application requires an open company culture “which actively blurs boundaries” and reduces “thinking in silos”. She claims that such an environment allows cross-functionality and the release of employees from daily business in favor of project work. It, further, enables the integration of customers and other external experts (Fehlau, 2012; Cechini, 2012). Additionally, a CEO publicly supporting and encouraging new approaches appears to be advantageous as shown at SAP, where the global DT initiative is driven by the CEO (Fehlau, 2012), and Bayer MaterialScience, where the CEO is “the patron” of single DT projects (Foltin, 2012, n.p.).

However, also a correspondent organizational structure is required to enforce that kind of culture. Namely, one that on the small scale provides physical spaces and materials to engage in active teamwork (Fehlau, 2012; Cechini, 2012); on the large scale, at best, one which creates institutional entrenchment (i.e., an internal academy teaching DT, an innovation department which transfers the approach to the business units, or a center for innovation which functions as an “internal consultant” [Foltin, 2012, n.p.]).

Although such an environment in many cases requires a change in mindset and resource investment, it seems to be necessary to create a breeding ground for DT.

‘Company Involvement’ appears to be crucial on an operational (‘Project Concept: Intensity of Actual Cooperation’) as well as on a more strategic level (‘Depth of DT Integration’, ‘Organizational Structure and Culture’). It comprises factors influencing the current and future adoption of DT within DT-experienced companies from within the organization and offers correcting variables with which the application of DT may be enhanced. All three sub-factors of the main factor ‘Company Involvement’ can be regarded as equally significant, as each of them characterizes one major pillar of DT stabilization within a company. Further, they are strongly interrelated and each of them depends on others’ existence in order to create a safety-net against uncertainty. A high intensity of cooperation between internals and externals only becomes relevant and beneficial when its outcomes meet a certain depth of DT integration in the company. Namely, one which embraces newly developed knowledge and enables its processing; one which is steered by a committed person with an overview of what is relevant; and one which allows purposeful operation through adaptation of the DT approach. The depth of DT integration itself relies on an organizational structure and culture which foster establishment, embedment, and maintenance of such an approach. Conversely, an organizational structure and culture need to be kept alive by a respective operational purpose

which is created through the integration of a working method that yields valuable results on the project level by emphasizing strong cooperation.

4.2 Interim Conclusion

When applying DT, the business organization has to face a wall of 'Uncertainty'. It can break down that wall little by little with an increasing level of 'Company Involvement'. The research question can be answered by stating that the factors influencing the current and future adoption of DT within (the examined) DT-experienced companies can be summarized as handling 'Uncertainty' with corresponding 'Company Involvement'. Additionally, this overarching theme can be divided in more precise factors:

Uncertainty:

- (Mis-)Conception of DT (Undefined Concept, Question of Applicability)
- Unpredictability (Question of Measurability of Success, Question of Realizability of Results)

Company Involvement:

- Project Concept: Intensity of Actual Cooperation
- Depth of DT Integration (Adaptation of DT, Emphasis on Methodical Knowledge, Absorption of Created Contentual Knowledge, Assignment of DT Responsible)
- Organizational Structure and Culture

Due to their rootedness in the nature of DT, 'Uncertainty' factors are rather fixed (from company perspective) and any kind of company which is applying this approach encounters it. 'Company Involvement' factors, however, are flexible and can be regulated by the respective company. Thereby the organization can influence the degree of 'Company Involvement' meeting 'Uncertainty'. The higher the degree, the higher is the chance that DT is continuously applied by the company. Companies dismissing DT have been recognized to have had a rather low level of 'Company Involvement' and, therefore, were not able to overcome 'Uncertainty'. The company being in between, having tried DT and is considering new projects, signalizes first steps of developing in the direction of continuously applying companies. It is on a good way, but, nevertheless, it needs to invest in additional factors to be able to apply DT in the long-term. No factor within the main themes seems superior to the other. It is rather the density and combination of different factors which

creates the power of the whole. Due to this, companies having only a few of 'Company Involvement' factors are less likely to stabilize against 'Uncertainty'.

CHAPTER 5 – Discussion and Implications

With the research presented in Chapter 4, factors influencing the future of DT within companies have been revealed in the form of the 'Uncertainty vs. Company Involvement Model'. I thereby suggest that DT comes along with 'Uncertainty' which is rather obstructive for DT application. By offering a certain degree of 'Company Involvement' in reply to it, a company can overcome 'Uncertainty' and would be free to continue with DT. The development of this model and its underlying research, on the one hand, bring implications for research and practice and can be connected to the existing discussion about DT; on the other hand, they are subject to particular limitations. All of these aspects are discussed in the course of this chapter.

5.1 Implications and Suggestions

The research of this thesis has yielded results which contain implications for DT research as well as DT and design practice. In the following the particular issues are discussed and suggestions for further actions are made.

5.1.1 Research

The 'Uncertainty vs. Company Involvement Model' represents factors which are influencing the current and future adoption of DT within DT-experienced companies; and it reveals many implications from which recommendations for further research can be inferred.

Whereas for companies 'Uncertainty' is rather fixed, research has the possibility to reduce it at least to some extent. Considering the confusion about the definition of DT, it seems appropriate to search for ways of clarification. It might be helpful to settle for one overall valid definition and thereby stabilize the foundation of the concept to refine ensuing aspects such its applicability. But what could that universally valid definition be? Similarly, it would be interesting to examine other critical questions: Is the term 'DT' sustainable? Or have years full of confusion and different views caused damage beyond repair? Should another term be used which is free from presupposition? What might get lost if that would happen? If there was a new term to be chosen, it should be revised once more in how far the connection to the term 'design' is advisable; as that connection has caused additional

confusion. On the one hand, the confusion results from the existing discordance about the term and meaning of design, and, on the other hand, it does not appear to be recognizable in how far design and DT are actually related.

Additionally, it does not seem to be clear where DT begins and where it ends. Its demarcation could be determined in some way which, at the same time, does not restrain DT's ability to create innovation. A unified core of DT seems to be missing which helps identifying DT clearly. Other characteristics or components might function as possible additions to that core. It can be asked: What would that core be? Does it include human-centricity, a holistic approach, iterative cycles, and interdisciplinary teams? Or is it limited to only one or a two of them?

Another field of research could approach DT's applicability and examine if DT indeed is applicable in many different areas. Can it be used for incremental and radical innovations equally? Is it really suitable for concrete projects and for a broader, more society-oriented future scenario? Is it, in fact, applicable for product, service, process, strategy, and business model innovations? Can it be used within every industry? When trying to find answers to these questions, one should pay attention to the practical implications to increase the tangibility of applicability.

Also, research is required in regards to measurability of DT success. Although it is acknowledged that the measurement of an innovation method is rather difficult (due to many other influences on the innovation outcome), likewise, it is assumed that some sort of measurement might enhance the rate of DT application. Most businesses are still very much driven by numbers. In order to be able to convince more potential users, especially on the executive level, some effective way of evaluating DT and its outcomes should be invented; possibly one which can be flexibly adapted to the conditions and requirements of single projects. In addition, the alternative of relying on subjective factors such as experience and trust should be examined more deeply. It would be interesting to determine which level of experience and trust is needed and how one is able to rise to that level in order for these factors to eliminate the need for hard facts to measure success.

As a result of approaching all those questions and achieve some clarity, the reception of DT in practice could be enhanced.

Apart from potential research fields derived from within the model, the model in its whole can be examined more deeply. Generally, further cases could be analyzed in the same manner as in this thesis to evaluate whether this research is still valid within a broader frame. Alternatively, a quantitative study could be conducted to verify or falsify the findings. Moreover, the scope of

research could be modified. As the 'Uncertainty vs. Company Involvement Model' is limited to companies, it could be interesting whether it holds true in connection with other types of organizations or institutions, for example, in non-profit organizations within the social sector or political institutions. Also, the scope could be widened in terms of location by including other countries to be examined. Another approach of using this thesis' research, which would be interesting, is to try answering the research question again without further consideration of the 'Uncertainty vs. Company Involvement Model'. As already mentioned in *Chapter 3*, theory derived from GTM application is built upon the researcher's interpretation of findings (Corbin and Strauss, 2008). It acknowledges that many other interpretations could be possible even when they are based on the exact same data. In line with this, the 'Uncertainty vs. Company Involvement Model' is not claimed to be the only solution to the research problem.

5.1.2 Practice

Following the implications for DT research, lessons can also be learned on the practical side. In particular, companies which are applying DT or planning to adopt it, DT providers, such as universities and consultancies, as well as the design profession might gain value from it.

Companies

Practitioners from companies can learn from this research that DT application is accompanied by a certain amount of uncertainty. As extracted from this thesis' research, there are ways to meet that uncertainty. It might be useful to make oneself aware of both sides and try to examine whether the observations also hold true for one's own organization. If that is the case, this thesis can give insights about where one can get started to protect against uncertainty.

The research has revealed that DT has to be adapted to the conditions and requirements of a company in order to be perceived as a method worth continuing. Further, DT generates valuable and, equally, realizable outcomes with long-term dedication. Just using it for one project might have a deterrent effect as it might not bring the fast results one has hoped for. Engaging in intense cooperation of methodical and contentual expertise and being able to absorb both kinds of knowledge brings additional value; so does finding a good 'fit' and purpose for it within the company. By establishing it in the form of someone responsible for DT and combining it with a corresponding structure and culture, DT can be stabilized once more. Further, these adjustments help gaining more value in terms of realizable results and enhanced contentual knowledge.

Certainly, these efforts imply a lot of commitment and, therefore, might arouse repulsion; a certain amount of resources and 'belief' in the method need to be invested. Resources are to be understood in the form of time, money, space, and personnel. 'Belief' refers to the required endurance of bringing others on board and convincing them of the potential value – regardless if it is approached from bottom-up or top-down.

Despite the relatively high degree of needed investment, it can pay off in several aspects. On the one hand, DT is invariably said to bring valuable, innovative results. Therefore, the approach appears to be beneficial. On the other hand, most of the actions for 'Company Involvement' can be considered as generally valuable and not only useful for DT application. They also can support any kind of approach to innovation as they enable the company to react more quickly and flexibly to new challenges. As could be seen in the research, DT lives well along other approaches and does not require exclusivity.

DT Providers (Consultancies/ Universities)

The research of this thesis also includes implications for consultancies and universities who work together with companies on DT projects.

It also might be beneficial to them to realize that companies are facing certain kinds of uncertainty when applying DT. Those who bring DT into the companies, teach it, and apply it with or for them, need to start from where the customers are; meaning that it is necessary to understand the clients' perspective. As the research examples show, many DT users seem partly lost in regards to the term, the underlying concept and its implications. More explicitly, they seem to be confused about it even after having applied DT. Not only would it be in the interest of clients and the DT method itself, but also in the interest of DT providers to reduce this uncertainty by means of clarification. Thereby DT providers might achieve higher rates of follow-up projects and could leave an even more satisfied customer.

Further, by taking a look at the aspects of 'Company Involvement', DT providers can broaden their repertoire of support services. They can engage their clients in close cooperation, facilitate integration within the company, and assist in shaping organizational and cultural conditions. From these services, long-term engagements can emerge which again are beneficial for the client, the DT approach, and also the DT provider.

Designers and Design Consultancies

As already addressed, there seems to be confusion about DT's relation to design, the meaning of DT, and the meaning of design as well as both of their applicability. Designers and Design Consultancies could use this state as an opportunity to bring the value of their profession for companies up for discussion – in combination with or independent from the DT approach.

5.2. Relation to Existing Design Thinking Discussion

Although this thesis focuses on theory generation rather than testing, in this section the 'Uncertainty vs. Company Involvement Model' is examined in terms of its relation to the existing DT discussion[45], presented in *Chapter 2*.

The issue of general uncertainty is vaguely addressed within the context of DT challenges. The company's longing for security is emphasized in the literature by pointing out its penchant for valuing reliability and the tendency to avoid daring something new. However, factors within 'Uncertainty', such as the 'Undefined Concept' and the 'Question of Applicability', have aroused more attention within the existing DT discussion. Already when settling for a definition of DT as a basis for this thesis, the confusion about the concept became obvious (see *2.1.3*). That was intensified by the current critique of DT, especially regarding the disagreement about its definition (see *2.2*). Also the question of DT's applicability is raised in the course of DT critique. One other factor linked to 'Uncertainty', the 'Question of Measurability of Success', is mentioned once in the existing DT discussion in regards to the approach's challenges (see *2.1.8*). There, the business' need for numbers and its reluctance to work without them also occurs. The 'Question of Realizability of Results' has not been touched upon at all, neither in the literature nor in the blogosphere.

Although most of the 'Uncertainty' factors appear in the existing DT discussion, they are treated as some amongst many other challenges or aspects of critique and are not emphasized as particularly important. This thesis' research, however, gives weight particularly to these factors because they appeared to be dominant in the acquired data.

The term 'Company Involvement' is not used in the existing DT discussion; however, some of its factors can be found there, as well. The need for adoption of a particular 'Organizational Structure

[45] *Comment*: I deliberately chose to talk about 'the existing DT discussion' instead of 'DT theory' at this stage. DT does not qualify as a theory in the sense of the definition described in *1.2* and, for now, rather consists of various courses of action, loose components, and disorganized characteristics. In order to consider diverse stances on DT, it is referred to as 'the existing DT discussion'.

and Culture' is discussed at several stages (see *2.1.6* and *2.1.8*). One source also describes the cooperation between internals and externals as especially valuable in regards to the effectiveness of work (see *2.1.5*). Further, in a blog comment the question of 'Who is responsible?' is raised, fitting the factor 'Assignment of DT Responsible' (see *2.2*.). Aspects in the sense of 'Adaptation of DT', 'Emphasis on Methodical Knowledge', or 'Absorption of Created Contentual Knowledge' are not mentioned within the existing DT discussion.

The factors of 'Company Involvement', except from 'Organizational Structure and Culture', are discussed rather sparsely. Especially in contrast to the 'Uncertainty vs. Company Involvement Model', it becomes apparent that the existing DT discussion so far has put special emphasis on the definition and conception, courses of action and components; and thereby it neglected what happens when it is actually applied, what kind of real challenges occur and how they can be solved. I regard the latter facts as equally relevant to the discussion about an innovation method, since its practical relevance and applicability represent its right to exist.

The comparison of my findings with the existing DT discussion shows that there were still many aspects left untouched before my research and, certainly, still are as this thesis only deals with a specific research question and encompasses a small range of data. In my opinion, it is too early to claim that the factors elaborated in this thesis should be recognized as fixed influencing variables on DT as they need to be validated through further research first; however, they provide an indication of the fact that DT as an approach is not complete yet, and there still seem to be many aspects that deserve further consideration.

5.3 Limitations of Research

As already mentioned throughout this thesis, some limitations of the research need to be accepted. With GTM as the underlying methodology of this research (even though only single elements were applied), one limitation which comes along with it has to be highlighted. The application of GTM in a qualitative manner results in interpretations of data, constructed by the researcher. I do not claim to have come to the one and only interpretation. There might be other interpretations completely different from this one; however, it has to be pointed out that the developed model fits the acquired data and should be considered as one possible interpretation. When stated that only single elements of GTM were applied, it was implied that some major modifications to the methodology had been made: exchange of Theoretical Sampling for Extreme Case Sampling; consulting theory and relevant literature before conducting research; no other source of data than semi-structured interviews;

negligence of theoretical saturation. All these limitations result, in turn, from a master's thesis' limitations in terms of time and/or financial resources as well as from my novice status as a researcher.

Additionally, limitations regarding the execution of research have to be admitted. Due to the limited availability of potential interviewees, the sample size was restricted to seven interviews. This goes hand in hand with the next limitation: research only was conducted in Germany and Austria. Although it had particular reasons (see *1.4*), the research's results may have been influenced by cultural aspects which were not considered in the final model. Also the fact that the only sources of data used were interviews brings in limitations. They are highly dependent on the responsiveness of the interviewees, requiring them to have reflected about the issue at hand somehow. Further, three of the seven interviews were conducted as telephone interviews. This fact is accounted for by the varying locations of the interview partners in combination with my limited resources. The resulting restrictions in terms of traceability and richness of information were taken into account.

The aspect of traceability leads to the next category of limitations: the elaboration of this thesis. Limited traceability exists in respect to the omission of transcriptions which could have enhanced the comprehensibility of argumentation. Neither the interviews' transcriptions nor the notes are attached to this thesis. This is mainly due to the time exposure which is linked to a proper, rule-oriented reprocessing and translation of interview transcriptions and notes. If one requires further information about transcriptions and notes, I am to be contacted.

All in all, I intended to minimize limitations as much as possible; however, some could not be avoided due to the above mentioned reasons.

5.4 Final Conclusion

DT is situated in a kind of abeyance. Its further development appears to be open in all directions. It is certain that a lot has to be done to keep the approach on a sustainable path. There are many fundamental obstacles which need to be worked on. A strong practical orientation is required to enhance a quick and comprehensive transfer into reality. It demands clarity about the definition, concept, and applicability just as well as about the challenges and requirements and how to deal with them. In this respect, this thesis' research and the existing DT discussion in the literature and blogosphere indicate the same necessity.

The ‘Uncertainty vs. Company Involvement Model’ highlights factors which are influencing the current and future adoption of DT within DT-experienced companies and implies a need for action from company side to be able to continue with DT. With some effort put in ‘Company Involvement’, companies can stabilize themselves against ‘Uncertainty’ which comes along with DT application. Although this model is based on a micro level, it has macro level implications as companies do not work in a hermetically sealed space. If too many companies succumb to uncertainty and dismiss DT, in the long run the approach could not be sustained. It needs application in order to survive. After having examined the current and future adoption of DT, and by what it is determined within companies, an interim conclusion about DT in general is attempted at this point. Depending on which steps are taken next, DT can develop in a positive as well as negative direction, meaning that it either prevails or disappears. The future of DT is not yet decided. Speaking about a general ‘failure’ or proclaiming the end of DT is too early – that is proven by the examples which have implemented DT in their companies and are using it on a regular basis. Regarding the immense critique of the approach and the obstacles which are implied by the ‘Uncertainty vs. Company Involvement Model’, some might ask: ‘Is it even worth saving DT by putting research efforts into it?’ Based on the research of this thesis, it can be claimed ‘yes, it is worth pursuing it’. It is remarkable that the value of outcomes of the approach has not been criticized at all by the people interviewed in this thesis – that fact contains potential. Also companies which do not follow any further DT plans so far regard DT’s outcomes alone as valuable; other reasons are held responsible for why the outcomes could not have been realized in most cases. Accordingly, even though there are many hazards to be removed, DT somehow seems to have a right to exist.

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Appendices

Appendix 1: Examples of Open Codes and Resulting Concepts[46] (Data from Bichler, 2012; Cechini, 2012; Dobrileit, 2012; Fehlau, 2012; Foltin, 2012; Joeressen, 2012; Oesterreicher, 2012)

Original Quote	Open Code	Concept
Question: What were the follow-up actions after first DT project? "There was one workshop for interested parties within the company (…)." (Joeressen, 2012, n.p.)	One workshop as post-processing of DT project	Actions after first DT Attempt
"At our company, someone has an idea and then we talk about it or talk to the general manager. Then we try to realize it or we do not. We do not have particular meetings or apply methods; at our company it is rather spontaneous and fast." (Oesterreicher, 2012, n.p.)	No application of innovation methods	Application of innovation methods
Question: What would you improve when applying DT? "More manpower would be better to get a grip on restrictions." (Dobrileit, 2012, n.p.)	More personnel to meet challenges	Requirement of high personnel support
"I have to admit, I do not completely understand what Design Thinking means and what it benefits are." (Bichler, 2012, n.p.)	Uncertain meaning and benefits of DT	No clear concept
Question: Are there projects in which DT is not beneficial? "Projects in which it is not suitable are, I think, those determining how an innovation works. When I am a technology driver, there are elements of which I believe that it does not work." (Foltin, 2012, n.p.)	DT not suitable for technology driven projects	Applicability of DT
"It is not the only innovation process which is used here. There is also idea management or things which come in from the clients and which have innovation potential and are further pursued." (Fehlau, 2012, n.p.)	Not an exclusive innovation process	Non-exclusivity of DT
Question: Is the method available to other teams? "They can come to us, but it is not available as a set of methods, like a recipe. It rather is knowledge which is positioned in the minds of people. (Cechini, 2012, n.p.)	DT knowledge solely lies in people's minds	Availability of DT knowledge

[46] Comment: Examples contain questions when the quote itself does not seem sufficiently expressive.

Appendix 2: Example of Category Development[47] (Data from Bichler, 2012; Cechini, 2012; Dobrileit, 2012; Fehlau, 2012; Foltin, 2012; Joeressen, 2012; Oesterreicher, 2012)

Original Quote	Open Code	Concept	Category
"In different contexts everyone has his own dialect." (Joeressen, 2012, n.p.)	DT's definition has many variations	No unified definition	Undefined Concept
"Some call it Design Thinking, others call it foresight methods – whatever." (Foltin, 2012, n.p.)	DT interchangeable with foresight methods	No distinct features	
"Design Thinking is method to create innovations, working widespread and resulting in solutions which are thought outside the box" (Dobrileit, 2012, n.p.)	DT is an innovation method with broad scope and solutions which are thought outside the box	DT as a method	
Question: What is Design Thinking? "That I cannot answer." (Oesterreicher, 2012, n.p.)	No DT definition possible	No easy definition	
"I don't know a real definition, but with Design Thinking I connect 'branch and bound', rapid prototyping, fast feedback from users and an interdisciplinary character which is more or less developed depending on the project." (Joeressen, 2012, n.p.)	No definition, but components including 'branch and bound', rapid prototyping, fast feedback from users and an interdisciplinary character		
"I have to admit, I do not completely understand what Design Thinking means and what it benefits are." (Bichler, 2012, n.p.)	Uncertain meaning and benefits of DT	No clear concept	
"I understand by Design Thinking a process which takes the customer as a starting point and understands him or her as a holistic interplay of issues." (Foltin, 2012, n.p.)	DT as customer-oriented process	DT as a process	
"It is a defined sequence of tools and methodical approaches to generate plenty of ideas which are based on user needs and motives." (Cechini, 2012, n.p.)	DT as process of tools and methods for idea generation, based on customer needs		
"To me, it is an innovation process or approach to innovations and problem solving." (Fehlau, 2012, n.p.)	DT as a process to innovation and problem solving		

[47] Comment: Examples contain questions when the quote itself does not seem sufficiently expressive.