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Understanding Management Ideas:
The Development of Interpretability

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Abstract

In the face of an ever-changing, complex environment, managers in organizations need constantly to develop ideas on how to maintain competitiveness. One way to address this challenge comes in the form of ideas about how to manage – or management ideas (MIs). These may be developed by managers or consultants, and often are publicized through the business and popular press. Some MIs have achieved widespread temporary popularity and adoption, spanning industries and continents. As a result, MIs have been compared to e.g. fashions or even viruses. However, unlike fashions, MIs' popularity is not due to their specific looks or colors but due to their interpretability, i.e., whether or not they allow managers from various backgrounds to interpret their goals and means as in line with those of the MI. While beneficial to inter and intra-organizational spread, interpretability presents managers in charge of widespread intra-organizational adoption with a paradox. On the one side, interpretability supports widespread adoption, on the other, it allows individual interpretation, and thus non-unified adaptation. This can be seen as challenging to the involved managers, and also the ratings agencies, and the official institutions that want to foster and assess the widespread adaptation of MIs. This thesis investigates the development of interpretability by focusing on a contemporary management idea - design thinking. Design thinking advocates an approach to user-centered innovation based on the ways designers work. Investigating the development of different textual elements that comprise design thinking, in the literature as well as in large organizations, this thesis contributes to our understanding of how interpretability develops, and theoretically resolves the paradox of interpretability.

Keywords: management ideas, interpretability, design thinking, diffusion, spread, management innovation, translation theory

Appended papers

This thesis builds on a selection of papers, included in the appendix to the thesis.

Paper I

Lindberg, T., Köppen, E., Rauth, I., and Meinel, C. (2012). On the perception, adoption and implementation of design thinking in the IT industry. In H. Plattner, C. Meinel, and L. Leifer (Eds.), Design Thinking Research, pp. 229–240. Springer Berlin Heidelberg.

The first three authors contributed equally in terms of conceptualization and draft writing. Lindberg edited the final version.

Paper II

Carlgren, L. , Elmquist, M., and Rauth, I. (2014) "Exploring the use of design thinking in large organizations: Towards a research agenda." Swedish Design Research Journal, 1.14, pp 47-56.

All authors contributed equally in the conceptualization and writing.

Paper III

Carlgren, L., Elmquist, M., and Rauth, I. (2014) "Design Thinking: Exploring Values and Effects from an Innovation Capability Perspective." The Design Journal 17.3, pp. 403–23.

All authors contributed to the conceptualization and writing. Carlgren and Elmquist took a more prominent role in theory development and writing the final version of the paper.

Paper IV

Carlgren, L., Rauth, I. and Elmquist, M. (2015, forthcoming) "Framing design thinking: The concept in idea and enactment." Journal of Creativity Management and Innovation (accepted for publication).

All authors contributed to conceptualization and writing. However,Carlgren and Rauth played a more prominent role in theory development and empirical analysis.

Paper V

Rauth, I., Carlgren, L., Elmquist M. (2015) "Making It Happen: Legitimizing Design Thinking in Large Organizations." Design Management Journal 9, pp. 47–60.

All authors contributed to conceptualization and writing. However, Rauth played a more prominent role in terms of theory and content development and writing.

Paper VI

Rauth, I. (2015) "Management Ideas: towards a conceptual framework." EURAM Thematic Conference: Management Innovation, July 2015, Montpellier , France.

Single authored peer reviewed paper, presented at the EURAM Thematic Conference: Management Innovation.

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Abbreviations

ACE	Achieving Competitive Excellence
b.school	Business school
BMR	Business Model Reengineering
BPR	Business Process Reengineering
CHFCS	Conference on Human Factors in Computing Systems
CEO	Chief Executive Officer
d.school	Hasso Plattner Institute of Design at Stanford University
DT	Design Thinking
ftf.	Face to face interviews
HPDTRP	Hasso Plattner Design Thinking Research Project
JPD	Joint Program in Design at Stanford University (C.A., U.S.A.)
MI	Management idea
MIT	Massachusetts Institute of Technology
P&G	Procter & Gamble
TQM	Total Quality Management

Table of Content

1 Introduction

1.1 Interpretability of management ideas

In the face of an ever-changing environment, managers in most organizations need continuously to develop their organizations in order to remain competitive. Addressing this need, managers as well as consultants develop ideas about how to manage organizations based on their previous experience. Some of these management ideas (MIs) are theorized and labeled (Birkinshaw, Hamel, and Mol, 2008) by their inventors, researchers or the business press, and proposed as solutions to general challenges in the form of books, business press articles, keynote speeches, etc. Theorized and labeled, some MIs have become very popular, resulting in their adoption across geographical, industrial and organizational boundaries. Because of this, scholars have compared them to trends in fashion (Abrahamson, 1996) or to contagious viruses (Røvik, 2011). Recently, scholars have discovered that this contagiousness is due to the interpretability of MIs (Ansari, Reinecke, and Spaan, 2014; Benders and van Veen, 2001; Giroux, 2006). Their interpretability stems from the generality, ambiguity and vagueness of MIs (Giroux, 2006), which allows individuals to interpret MIs as being aligned with their individual goals and the means of achieving them. Some researchers find that MIs are useful to motivate and direct organizational change since they allow for functional diverse individuals to match, redefine and restructure, and thus adapt MIs to local conditions (Birkinshaw et al., 2008). Thus interpretability allows also for a diverse number of adaptations to emerge, at times leading to ceremonial adoption with no affect on the organization (Meyer and Rowan, 1977). Thus, managers concerned with widespread adoption across an organization are confronted with a double-edged sword (Ansari et al., 2014). One the one hand, they need to allow for interpretability of an MI to achieve widespread adoption. On the other hand, they need to reduce interpretability to achieve similarity in adaptations. While some strategies to influence the outcome of adaptation have been identified (Ansari et al., 2014), it is less clear how interpretability develops in the first place and how it develops during adaptation. Thus, the purpose of this thesis is to investigate the development of interpretability to contribute to our understanding of it.

1.2 Spread, adaptation, and the paradox of interpretability

To investigate how the interpretability of MIs develops at an inter- and intra-organizational level; this chapter introduces theories explaining spread, adoption and adaptation of MIs as well as the role of interpretability.

Most research on spread of MIs conceptualizes spread as a diffusion process during which proponents 'sell' MIs to managers. This conceptualization is influenced by the idea that MIs are products that are sold on a market from one organization to another (inter-organizational diffusion) (Ansari, Fiss, and Zajac, 2010; Birkinshaw et al., 2008; Sturdy, 2004). Managers adopting an MI do so, influenced mainly by two types of external forces. Initially, technical, rational, and economic forces such as the identification of technically advanced MIs or government regulations are considered to influence adoption (Abrahamson, 1991). Early research on the 'diffusion of innovation' (Rogers, 2003) argues that diffusion is the result of convincing qualities such as observability, relative advantage and trialability (i.e. the ease with which an MI can be tried out). According to this line of research, an MI spreads because of these qualities, which can be rationally assessed and can convince a potential buyer to adopt the MI. Further, rating agencies have started to factor in adoption of MIs as a positive measure of firm performance, thus providing an additional rationale for their adoption (Nicolai, Schulz, and Thomas, 2010). As more organizations adopt the MI, sociopsychological forces come into play. Examples of these forces are mass conformity or the wish to be regarded as legitimate by applying the latest MI (Abrahamson, 1991). Since technological, economical and sociopsychological forces are external forces that come into play only when the MI begins to spread, the question that arises is what leads to the initial adoption of MIs?

Research on the translation of MIs (Czarniawska and Joerges, 1996; Latour, 1986), offers an alternative explanation regarding what leads to their widespread adoption. The authors argue that MIs do not spread only because of external forces or because of their qualities but because of the interpretations made by individual managers. In other words, adoption is the result of managers who interpret MIs as being in line with organizational or individual goals and means. Compared to diffusion theory, translation theory depicts MIs as discourses which are interpretable by individuals who adopt an MI by adapting the MI as well as the organization. Adaptation is considered a lengthy process, which occurs in four distinct stages. In the initial stage, the MI is discussed in relation to the organization, which leads to an initial *matching*. In the second stage,

the MI and the organization are *redefined and restructured*. Redefined and restructuring then may lead to the third stage of *routinization* of the MI in the firm, or renewed *theorization and labeling* of the MI to be spread inside and outside the organization.

As discourses, MIs are communicated by written (e.g. business books and articles) or spoken (e.g. keynote speeches and presentations) means consisting of various textual elements, such as labels, claims, definitions, success stories, practices, etc. (Ansari et al., 2014; Benders and van Veen, 2001; Giroux, 2006). As text, MIs can only partly account for the complexity of reality. This leads to MIs being ambiguous and at times vague (Giroux, 2006). Further, to address managers from a variety of backgrounds, MIs need to be become more general and supported by examples from various areas of application (Birkinshaw et al., 2008). This ambiguity, vagueness and generality (here referred to as interpretability) is reflected in the elements of text that comprise MIs (hereafter referred to as textual elements). Being interpretable, MIs require managers to adapt them, which requires managers to rely on their individual experience and knowledge when matching, redefining and restructuring the MI in relation to their organizations. Thus interpretability is essential, as it allows also for the adaptation of MIs to specific contexts. Further, the adaptation of an MI to a specific context might inspire other managers in similar contexts, with similar goals and means. Thus, an MI's interpretability rather than some specific initial quality or outside pressures can lead to popularity and possible adaptation of an MI (e.g. Benders and van Veen, 2001; Giroux, 2006).

While translation is well developed as a theory, research that focuses on the widespread adoption and adaptation amongst individuals in the same organization (intra-organizational level) is scarce (e.g. Ansari et al., 2014; Birkinshaw et al., 2008; Gondo and Amis, 2013; Sturdy, 2004). Recent research on adaptation builds on rational accounts (e.g. Rogers, 2003) that propose a process framework for how adaptation might be managed by individuals (Birkinshaw et al., 2008). Given the diversity of functions, departments, groups and nationalities inside large multinationals, it is less likely that such a rational approach would lead to adaptations that could popularize an MI across diverse organizational functions. Here, large organizations are more likely to behave like the diversity of actors at an inter-organizational level. Thus, for an MI to achieve widespread intra-organizational diffusion it needs to be open to interpretation (Ansari et al., 2014).

Ansari, Rienecke and Spaan (2014) suggest that the challenge is to find an optimal level of interpretability, one that allows for individual interpretation as well as unified action across the organization. This is a difficult task for two reasons. First, although interpretability allows for necessary local adaptation, too much adaptation might hamper unified action aimed at a desired

outcome across the organization. Second, if an MI is low on interpretability, and thus only allows for little adaptation it is likely that it will not spread within the organizations since managers may not consider it an adequate solution to the problems they experience, or not see it as achievable using the means at their disposal. Therefore, the interpretability of MIs presents managers with a paradox, since interpretability needs to be high to allow for widespread adoption but low to assure standardized adaptation. In order to manage interpretability, managers concerned with adaptation need to know how this paradox arises, and how it influences widespread adoption and adaptation. This thesis investigates the development of interpretability to contribute to our understanding of it as a phenomenon and of how it can be managed.

1.3 Research questions

The management of interpretability during adaptation is addressed only to an extent by the theory. Ansari, Rienecke and Spaan (2014) suggest that interpretability can be managed using the following strategies: incentivizing stepwise adaptation of an MI, deciding on mandatory and negotiable textual elements, and allowing for limited local adaptation. To implement these strategies, managers would first need to know what are an MI's textual elements and how they influence interpretability. This would allow the formulation of strategies related to which textual elements should be mandatory and should be emphasized, and which are negotiable and can be left to interpretation. So far, only a few studies investigate the varying set of textual elements and their influence on interpretability. Giroux (2006) for example, investigates the interpretability of the definitions in texts on Total Quality Management (TQM). Benders and van Veen (2001) investigate the interpretability of various other elements such as claims and threats related to Business Process Reengineering (BPR). Both publications focus on interpretability at the inter-organizational level. In contrast, Ansari, Reinecke and Spaan (2014) focus on strategies related to managing an MI labeled Achieving Competitive Excellence (ACE) at the intra-organizational level, without focusing on individual textual elements that might influence adaptation. Thus, little is known about the number of textual elements influencing interpretability and how these develop at the inter- and intra-organizational level.

Thus, in order to improve our understanding of how interpretability develops, it is essential to first investigate:

RQ1: What are the textual elements of a management idea?

Once these are identified, the next step is to investigate the role played by these textual elements in the interpretability of an MI. This will be accomplished by an investigation of *design thinking* (DT), a recent MI which has achieved widespread adaptation across organizational and institutional boundaries. DT is selected since its recent high popularity allows for a timely investigation of its development and adaptation. Thus, the second research question is:

RQ2: How does the interpretability of textual elements develop at an inter-organizational level?

Understanding the development of interpretability of the textual elements of an MI at an intra-organizational level allows for comparison with adaptations of DT at an inter-organizational level, and gives a clearer picture of how the interpretability of DT developed during adaptation. In order to allow for comparison, this thesis will explore:

RQ3: How does the interpretability of textual elements develop at an intra-organizational level?

Comparing the development of interpretability of MIs at the inter- and intra-organizational levels, enables a discussion of how interpretability develops.

To summarize, MIs are considered to be very effective for influencing managerial work across organizations, industries and national boundaries. They are thus considered a powerful lever for change. A significant part of this influence stems from the openness of MIs to interpretation which allows managers to set their own means and goals. However, this openness to interpretation also makes it challenging to manage the wide spread intra-organizational adoption so that it leads to similar adaptation across the organizations. To gain widespread adoption requires openness to interpretation; achieving unified adaptation requires interpretability to be limited. Thus, the purpose of this thesis is to contribute to our understanding of interpretability by investigating this paradoxical development.

This thesis is based on several studies on one recent MI: DT. DT has been acknowledged to be an MI similar to TQM (Carr, Halliday, King, Liedtka, and Lockwood, 2010) but it has yet to be researched from an MI perspective. DT is an ideal object of research due to its recent development which started in early 2000 (Johansson-Sköldberg, Woodilla, and Çetinkaya, 2013). Also, it has achieved significant popularity among large organizations (e.g. Brown, 2009; Martin, 2011; Wong, 2009), allowing for detailed investigation of how its interpretability has developed. Finally, due to its recent development, the number of proponents advocating the MI is limited.

Hence, it is likely that organizations that have successfully adapted DT were influenced by a similar source, allowing for some comparison among cases of DT adaptation.

1.4 A brief introduction to design thinking

Proponents such as Tim Brown (2008) suggest that DT is a user-centered approach to innovation based on the way designers work. While multiple conceptualizations exist (Liedtka 2014), some proponents and prominent education institutes such as the Stanford d.school (d.school, 2010), have conceptualized DT as an iterative, concept generation and development process, consisting of five steps:

- Users are interviewed and observed using ethnographic research (*empathize*).
- Research results are reviewed to identify unaddressed customer needs (*define*).
- Needs are then used as the basis for brainstorming solutions to these needs (*ideate*).
- Ideas are rapidly prototyped using cheep materials as well as role-play (*prototype*).
- Prototypes are tested with customers to develop them and understand further (*test*).

The process is performed by diverse functional teams of employees and can be executed as a two-hour or a two-day workshop (Rauth and Svetina Nabergoj, 2016) or as multi-month projects (Brown, 2009). DT has its origins in the work of IDEO, a global design and innovation consultancy with headquarters in Palo Alto (California, USA). Tim Brown (CEO), David Kelley (Chairman, Stanford University Prof.) and Roger Martin (former Dean, Rotman School of Management, Toronto, Canada) are considered the main proponents of the DT (Johansson-Sköldberg et al., 2013; Kimbell, 2011). Another institution connected to David Kelley and IDEO is the d.school at Stanford University. The d.school educates both students and executives in DT. Due to DT's roots in practice, it is different from older, scholarly discourses which use DT to refer to the way designers think (Johansson-Sköldberg et al., 2013). Thus, DT as an MI captures the way a particular consultancy (IDEO) works, heavily influenced by its ties to Stanford University.

1.5 A note on terminology

Management ideas (MIs) are defined as spoken or written discourses that propose and justify a technology to manage different parts of an organization. As discourses they consist of textual elements that can be grouped into two dimensions, rhetorical and technological. The rhetorical dimension consists of the label, a central claim, superiority claims, threats and warrants. The

technological dimension consists of principles, practices, techniques and implementation instructions and warnings.

A *textual element* is defined as a word, sentence, paragraph, chapter or story that is communicated in writing or speech.

The *generality* of a textual element is defined as allowing for multiple unspecific interpretations. For instance, the word vehicle has a high degree of generality since it can describe an automobile or a mountain bike.

The *ambiguity* of a textual element is defined as allowing for multiple, distinct interpretations. For example the word car can refer to the tender of a train or to an automobile.

The *vagueness* of a textual element is defined as allowing for a single interpretation with multiple unspecific meanings. An example is the word automobile which might refer to a FIAT 500 or to a Mercedes Benz A Class.

Interpretability is used to refer collectively to ambiguity, generality, and vagueness.

Popularity is defined as the widespread adoption of an MI across national as well as organizational boundaries.

Adaptation is defined as a process consisting of the matching, redefining and restructuring of an MI and the organization. This can lead to routinization, and the MI and the organization being indistinguishable or newly theorized and labeled MI.

An MI is considered as *adopted* when an actor starts redefining and restructuring the MI and the organization.

Warrants, a reason or a cause (e.g. success story, reputation of authors, historical narrative, scientific research) that justifies a management idea or a textual elements of it.

1.6 Structure of the thesis

Following this introduction, Chapter 2 introduces the history of DT, showing that it developed as a discourse shaped by many individuals from different organizations. Chapter 3 introduces the theoretical framework underlying this thesis. Focusing on translation theory, it also develops an analytical framework that will later be used to assess interpretability. Chapter 4 summarizes the underlying studies and explains the methodological approach taken in this thesis. Chapter 5 summarizes the six appended papers and their contribution to this thesis. Chapter 6 presents a structural framework which can be used to distinguish different textual elements of DT, to address RQ1. Chapter 7 analyzes the development of interpretability of DT at the inter- and intra-organizational levels. Interpretability of each textual element is assessed using the analytical framework developed in Chapter 3. Chapter 8 summarizes and discusses the development of interpretability in relation to the theoretical framework. The thesis concludes with a summary of the findings and implication for future research and managerial practice.

2 The story of design thinking

This chapter describes the development of design thinking (DT), as an MI. As such, it does not include early scholarly discourse on how designers think which has also been labeled DT (Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013). The scene is set by describing the early influences which contributed to the developments of DT, especially Stanford University and the d.school, and IDEO which is a design and innovation consultancy with headquarters in the San Francisco Bay area. The chapter continues by describing various conceptualizations of DT. This sets the scene for the fieldwork interviews which were conducted in 2011. Most of the organizations involved, adopted DT after an initial collaboration with IDEO, the d.school, or both.

2.1 The early days at Stanford University (1957-1974)

In the early 1950s, design education was a recognized part of the curriculum in many US schools but design to address people's needs was not part of Stanford University's activities (Mountford, 1990). After recognizing the need for design education, Stanford's then provost, Terman Frederick, in 1957 hired John Arnold from the Massachusetts Institute of Technology (MIT). Arnold had developed the "Creative Engineering Laboratory" which allowed students to exploit their creativity to develop products for a fictitious alien planet, Arcturus IV (Mountford, 1990). At Stanford, Arnold became founding director of the Design Division, part of the Mechanical Engineering department. Here, Arnold developed his vision of human centeredness and creative engineering (Katz, 2015). He soon hired two PhD students, Robert McKim and James Adams, and together the three developed what became the "Joint Program in Design" (JPD). In 1963, Arnold died and the leadership of the program passed to McKim, Adams, and Peter Bulkeley, who launched the JPD as an interdepartmental graduate program that same year. It was centered on core engineering courses and admitted students of humanities, social sciences, and studio art (Katz, 2015). The program was guided by some central ideas. Engineers should take account of human factors such as "ease of operation and maintenance" (Katz, 2015, p. 127). Also, students should engage in interdisciplinary work and apply their creativity to the built environment (Katz,

2015). According to some, McKim wanted to “create little Leonardo da Vincis, people who were skilled in many things and diverse enough to create a whole product” (Soojung-Kim Pang, 2015).

As part of the program, McKim (McKim, 1980) proposed an approach to visual problem solving which consisted of multiple stages, each with its own set of tools (Fig. 1). These stages were: *defining the problem*, *selecting a strategy* based on the sequencing of stages, *relaxing and clearing one’s mind*, and working iteratively through an *express test cycle* (McKim, 1980, p. 124). The multiple iterations of the cycle allowed individuals to make deliberate choices regarding the use of creative or logical strategies in order to solve the problem being worked on. Drawing on the book “Human Problem Solving” (Newell and Simon, 1972), McKim saw research on artificial intelligence as “instructive to students of visual thinking” (McKim, 1980, p. 112).

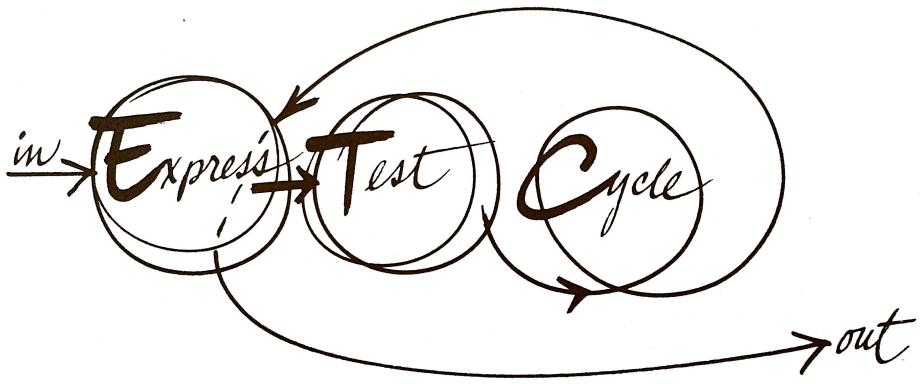

Fig. 1: McKim's (1980, p. 124) Express Test Cycle

2.2 Early days at Hovey-Kelley Design (1975-1974)

In 1975, David Kelley joined Stanford's two-year JPD (Whiting, 2007). He was intrigued by the program’s radicalness and heavily influenced by McKim (Soojung-Kim Pang, 2015) who became his mentor soon after he joined the program (Pang, 2000). The course and McKim’s influence inspired Kelley to become a teaching assistant. Turning his ambition into reality, Kelley became involved with Professor Larry Leifer, teaching microprocessor related knowledge to mechanical engineering students (Pang, 2000).

Kelley graduated from the program 1978 and Leifer proposed that Kelley should enroll in the Design Department’s PhD program, which Kelley did against McKim’s advice. On starting his PhD studies, Kelley discovered two things: first, that he did not like reading and writing, and

second, that his knowledge of microprocessors and mechanical engineering was in high demand in the booming personal computer industry in Silicon Valley (Pang, 2000). Kelley was intrigued by the possibility of working with his hands and using his knowledge, and he quit his PhD studies and founded a small design consultancy with Dean Hovey, a fellow Stanford student, called "Hovey-Kelley Design".

In 1978, Hovey-Kelley Design, was run out of an improvised office space in Palo Alto, and had neither a business plan nor much expertise (Kelley and Littman, 2001). What Kelley wanted was to "form a company where all the employees are best friends" (Benette, 2014). Hovey Kelley Design's way of working, which was rather lacking in expertise, has been described as fun, unstructured, experimental, and improvised (Kelley and Littman, 2001). While this might sound counter to conventional advice on how a company should be managed, it was in tune with the entrepreneurial, experimental computer technology at the time in Silicon Valley (Kelley and Littman, 2001).

Kelley was looking for work for the young consultancy, and McKim introduced him to Jerry Manock[1], a Stanford graduate, working for Apple Computer. Their initial work meeting led to a commission to design a computer mouse for Apple's Lisa computer (Cook, 2011; IDEO, 2015). This became the first commercially available computer mouse in 1983, and still features in IDEO's portfolio as one of its iconic achievements (IDEO, 2015). In an interview in 2007, Kelley stated that they "invented the technology in Apple's mouse … That's our most famous thing" (Whiting, 2007). Yurchenco, a former Stanford student and the first employee of Hovey-Kelley Design, recalled that the mouse's development process shaped IDEO's prototyping process because they "were always making stuff ", "prototyping as fast, as dirty, as rapidly as possible" (Vanhemert, 2014). Kelley later stated that this process and the focus on human values were the central things that IDEO adapted from the design program at Stanford University (Pang, 2000). He stated also that, "All the methodology that was used in the early days was from Stanford" (Katz and Spicer, 2011), and most of the early employees came from the Engineering program at Stanford.

Tom Kelley, David Kelley's brother who joined the company in 1987, reported that David "loved Apple's hipness" and that meetings at Apple resulted in David feeling "jazzed by its culture of innovation … [and] the way workers of all ages and experiences seem to effortlessly cross-pollinate" (Kelley and Littman, 2001, p. 20). The collaboration between IDEO and Apple led not

[1] Opinions differ about who approached Manock. The most detailed narrative came from Kelley (Katz and Spicer, 2011), but another story suggests it might have been Hovey (Cook, 2011).

only to a series of products but also to a friendship between Steve Jobs and David Kelley. Kelley later recalled the relation and influence of Jobs and Apple as having a major impact on IDEOs work and culture (Kelley and Littman, 2001; Rose, 2013). IDEO continued to work for Apple, designing computers such as the Apple II.

After some initial success, Hovey left the company in 1983 to start a new venture and the company was renamed David Kelley Design (Hovey, 2015).

In 1987, David Kelley Design took on the job of designing a computer mouse ("Dove Bar") for Microsoft. They collaborated with three other design consultancies in order to get the required engineering competences. Bill Moggridge design (London, England) and ID Two (San Francisco, U.S.A.) worked on human factors, bringing in ethnographic research experience from interaction design and Mike Nuttall's Matrix Product Design (Palo Alto, U.S.A) worked on the product design aspects. This and further collaborations marked the start of a partnership between the three firms which would lead to a new firm - IDEO.

2.3 Early developments at IDEO (1991-1999)

After collaborating on several projects, the three companies, David Kelley Design, Moggridge Associates, and its San Francisco office, ID Two and Matrix Product Design merged in 1991 and IDEO was born. According to Tom Kelley (2001) the name was picked by Bill Moggridge who came up with the term looking at a dictionary and being inspired by the terms "idea" and "ideology". Although David Kelley was named as president of the newly formed, interdisciplinary company, the rest of the organization was non-hierarchical. Project management duties were rotated and offices were kept to less than two dozen people with few administrative staff (Kelley and Littman, 2001).

The collaboration resulted not only in a larger size but also in a merger of competences, positioning the company to the fore in the rising demand for human computer interface design in Silicon Valley in the early 1990s. As methods and approaches to design interfaces were not yet fully developed (Katz, 2015), IDEO, and the employees of other firms, attended conference such as the Conference on Human Factors in Computing Systems (CHFCS) and exchanged best practice. For example, see the design process of Apple computer's interface design group described in Box 1.

The design process of Apple computer's interface design group

In 1990, the Apple interface design group presented its approach to user centered interface design at the CHFCS in the Silicon Valley (Mountford, 1990). The group, which was considered at the forefront of development at the time (Katz, 2015), presented an approach consisting of three iterative phases (Mountford, 1990). The first phase started with *brainstorming* ideas about how computers could be used. Ideas were then shared in brief descriptions or *scenarios* of how the technology could be used. These scenarios were shared and discussed within the design team. The chosen scenario was illustrated in more detail and discussed further. Once an idea in form of a *scenario was selected*, a *rough prototype* was developed in the build phase. This prototype was then *tested* (stage 3) with users. Further, it was mentioned that the approach *"*requires *attention to user needs* before and throughout the design and development process" (Mountford, 1990, p. 441).

Box 1: The design process of Apple computer's interface design group (Mountford, 1990).

At conferences, IDEO employees presented papers documenting their work and best practice. (Black, Bayley, Burns, Kuuluvainen, and Stoddard, 1994; Buchenau and Suri, 2000; Moll-Carrillo, Salomon, Marsh, Suri, and Spreenberg, 1995; Moll-Carrillo et al., 1995; Muñoz and Miller-Jacobs, 1992). Early contributions focused on describing how IDEO used product design prototyping techniques for interface design (Muñoz and Miller-Jacobs, 1992). A later contribution from Moggridge (Moggridge, 1993, pp. 15–16) presented a "*four- step process that IDEO uses to design for people*" consisting of: *understanding the problem* based on observation of potential users' experience, *visualizing scenarios* without initial constraints, and *evaluating* "*with a full range of the people* for whom the designed product or service is intended". In his paper Moggridge refers to Don Norman (1988), a fellow in Apple's User Experience Architecture Group. Norman, was a strong advocate of human-centered design who saw understanding users' needs as essential for good design (Norman, 1988). Thus, users should be included in the design process as sources of inspiration and to test prototypes and products. Based on these conference contributions and an expanding portfolio of work, IDEO began to attract the attention of academics, the business press, and investors.

In 1994, Robert Sutton and Andrew Hargadon (both now professors at Stanford University) conducted an 18-month ethnographic study at IDEO during which Sutton joint IDEO as a fellow.

In 1996, Steelcase – an IDEO client since 1987— made an equity investment in IDEO. The investment spurred the expansion of IDEO, which opened new offices in locations around the world (Kelley and Littman, 2001). Kelley was made Vice President of technical discovery and innovation at Steelcase in addition to his positions of CEO of IDEO and Professor at Stanford University (Weaver, 1996). Kelley was not the only IDEO employee to have multiple roles; Maik Nuttall also had a position at Stanford University and taught in the JPD.

In 1997, Dorothy Leonard and Jeffry Rayport published an article in the *Harvard Business Review* based on a study, which involved a number of firms including IDEO. Entitled "Sparking Innovation Through Empathic Design", the article featured a five step process consisting of (Leonard and Rayport, 1997): *observing the user*, *capturing data*, *reflecting and analyzing*, *brainstorming* for solutions and *developing prototypes* of possible solutions. Here, testing was mentioned only as a possibility during prototyping. The main advantage was seen as using ethnographic methods to better understand what users needed. In response to a personal request from the author of the present thesis regarding the influence of IDEO, Dorothy Leonard responded, that: "I believe I originated the term Empathic Design myself but the steps and process came from a number of sources, principally IDEO (Palo Alto). But some companies such as P&G have been conducting such anthropological explorations for years." (Author's correspondence with Leonard)

In 1999, IDEO featured in a 23 minute documentary on ABC's Nightline News, entitled "The Deep Dive. One company's secret weapon for innovation". The documentary showed how an interdisciplinary group of IDEO employees redesigned a shopping cart in five days. The documentary followed a five-day, five step (product) design process which Tom Kelley later described in his book *The Art of Innovation* (Kelley and Littman, 2001, pp. 6–7) as "The Method to our [IDEO's] madness":

1. "*Understand* the market, the client, the technology and the perceived constraints on the problem."
2. "*Observe* real people in real-life situations"
3. "*Visualize* new-to-the-world concepts and the customers who will use them."
4. "*Evaluate* and *refine the prototypes* in a series of quick iterations."
5. "*Implement* the new concept for commercialization. This phase is often the longest and most technically challenging in the development process…" (emphasis in original)

According to Tom Kelley (David Kelley's brother and IDEO employee):

> "the morning after the Nightline segment ran, our phones wouldn't stop ringing. I took dozens of calls from executives around the country who had seen the show. Most of them didn't give a damn about shopping carts. Instead, they wanted to know more about the process we used to bring the cart into being. One CEO told me that he understood, for the first time, what creativity really meant and how it could be managed in a business environment." (Kelley and Littman, 2001, p. 13)

Following the increased interest in IDEO's practices, David Kelley stepped down as CEO of IDEO and appointed Tim Brown – head of the London office – as his successor. Newly appointed as CEO, Brown quickly recognized the business opportunity behind the interest in IDEO's practices which would allow IDEO "to focus on their [customer's] broader needs and serve them more effectively" (Nussbaum, 2004).

2.4 The formation of design thinking (2000-2011)

The realization of the value of their approach lead to the formation of "IDEO U" in 2000 as a training center to teach IDEO's clients how to be more innovative. IDEO U caught the interest of various companies including software companies such as SAP (Holloway, 2009) and Intuit (Martin, 2011), health care providers such as Kaiser Permanente (McCreary, 2010), and the Mayo Clinic (Smith, Canales, and Elias, 2010), and manufacturers such as General Electric Healthcare and Philips Electronics (Wong, 2009). All collaborated with IDEO to train and establish an internal function working with IDEO's practices and supporting development teams in their innovation efforts.

Amongst these early adopters was one which came to play a central role: Procter & Gamble (P&G). Attracted by IDEO's offer, a delegation from P&G consisting of A.G. Lafley (CEO), Claudia Kotchka (Chief Design and Innovation Officer), and Roger Martin (Dean of the Rotman School of Management and Advisor at P&G), visited IDEOs Palo Alto office in October 2002 to meet with Tim Brown and David Kelley (Berger, 2014). The meeting led to an initial agreement to train P&G executives through multiple executive workshops, starting with a one day workshop for 40 of P&Gs top-executives in 2002 (Nussbaum, 2011). P&G also commissioned IDEO to develop an internal innovation function, called "The Gym" (later the "Clay Street project") and appointed Tim Brown, Roger Martin, and Patrick Whitney (Dean at Illinois Institute of Design) as

members of an internal design board, advising the company on building their design capabilities (Nussbaum, 2011).

In 2002, Martin talked to Brown about Brown's transformation of IDEO's business from technological products to use of IDEO's practices to "abstract [challenges] like designing customer experience or designing organizational structures" (Carroll, 2010). To reflect this transition, Martin suggested that "the firm [IDEO] needed to start to think more generally about design" (Carroll, 2010). To represent this shift, Martin suggested the label "design thinking", and the name stuck. Later David Kelley commented that "they would stop calling IDEO's approach 'design' and start calling it 'design thinking'" (Tischler, 2009). To Kelley, this was "the most powerful moment that words or labeling ever made. Because then it all made sense. Now I'm an expert at methodology rather than a guy who designs a new chair or car" (Tischler, 2009).

Working collaboratively for P&G, Martin stated that Brown, Kelley and himself "worked on integrating this new design initiative into general management techniques" (Martin, 2010b). In doing so, they discovered "that the design community is great at two things", "deep holistic, ethnographic user understanding and they're obviously very good at visualizing, imagining and prototyping" (Carroll, 2010).

The P&G team soon realized that its organization would be somewhat resistant to the new ideas and ways of working brought by employees who had gone to IDEO for training. Thus, in 2005, Brown, Martin, and Patrick Whitney (Illinois Institute of Technology) were contracted to develop an "integrated approach that took a product design team through the design process all the way through the impact on strategy" (Tripp, 2010). However, the approach, which was initially tested in London, led only partly to the desired result. The workshop engendered some excitement but was perceived as having too little business impact (Tripp, 2010). To overcome this, the work was redesigned with support of external consultants. When the new workshop design led to promising first results, P&G's Global Design Function adopted the term "design thinking" and a five-step process, conceptualized as: *Observe, Define, Ideate, Prototype, Test* (Tripp, 2011).

Based on this experience, Martin (David Dunne and Martin, 2006; Martin, 2009, 2010a, 2011) and Brown (e.g. Brown, 2008, 2009), published extensively on DT, frequently referring to each other and their experiences at P&G. Just prior to the first publications featuring DT, *Business Week* featured a cover story on IDEO, outlining a five-phase "*process for designing a better consumer experience*" (Nussbaum, 2004) as: *observation, brainstorming, rapid prototyping, refining* (the prototype with the client and top-level executives) and *implementing* (involving a

diverse group of IDEO employees). While the first four steps feature principles, practices, and detailed techniques, the last step, implementation, is only vaguely described. The article exemplified the IDEO process and executive education program based on various corporate client examples, featuring company names such as P&G, Intel, Nestle, Lufthansa, Samsung, AT&T, and others.

Martin, the first to use the label DT in print media , co-published an article in the journal of Academy of Management Learning &Education (David Dunne and Martin, 2006). His main argument was that managers should work, and more importantly think like designers, a practice that he described as *integrative thinking* (Martin, 2007). Martin defined integrative thinking as a way to think abductively, finding new, third solutions when faced with two alternatives. In October 2009 Martin published his book on the topic *The Design of Business: Why Design Thinking is the next competitive advantage* (Martin, 2009). Brown also published an article entitled "Design Thinking" in the *Harvard Business Review* in 2008 which addressed a business audience, and positioned DT as a general approach 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). Brown conceptualized DT as consisting of three activity spaces (Brown, 2008, p. 87): *inspiration, ideation, and implementation*. Using previous projects, Brown exemplified how IDEO had applied DT to a health care service related project for Kaiser Permanente, to a product design project for Shimano, and to a financial services project for the Bank of America. In relation to these projects, Brown (Brown, 2008, p. 92) highlighted the need for DT given the challenges of "unaffordable or unavailable health care, billions of people trying to live on just a few dollars a day, energy usage that outpaces the planet's ability to support it, education systems that fail many students, companies whose traditional markets are disrupted by new technologies or demographic shifts". To overcome these challenges, Brown called for new ways to transform ideas into reality, claiming that "design thinking is just such an approach to innovation" (2008, p. 86). Further, DT would allow advances such as those made by Thomas Edison which could lead to "a golden age of American innovation" (Brown, 2008, p. 89).

In 2009, Brown's book entitled *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation* was published. Building on his previous arguments, Brown further distanced himself from describing DT as a process. According to him this was due to "the nature of design thinking", which would make it impossible to provide a "simple, easy-to-follow recipe [or process] that would ensure that every project ends … successfully" (Brown, 2009, p. 15). In the second half of the book, Brown, based on IDEO projects, showed how DT

could be applied in the non- and for-profit sectors, explaining how products, services innovation portfolio and even the United Nations Millennium Development Goals could benefit from using design thinking as a approach to innovation (Brown, 2009).

Starting in 2008, IDEO published multiple guides in digital and printed document forms, explaining DT for non-commercial oriented audiences (Walker, 2009). The guidelines were tailored to different target groups such as NGO field workers (IDEO and Bill & Melinda Gates Foundation, 2008), educators (IDEO, 2011), and librarians (IDEO, 2014b). All the guides featured a series of common elements. Each publication discussed a multi-stage DT process consisting of between three (IDEO and Bill & Melinda Gates Foundation, 2008) and five stages (e.g. IDEO, 2011). Each stage was supplemented by a number of practices and techniques arranged in steps. For example, the hear phase (IDEO and Bill & Melinda Gates Foundation, 2008) was organized in six steps, each supplemented by detailed instructions and an estimated time for the exercise and a difficulty rating. Further, while the early publications discussed things "to have in mind" (IDEO, 2011; IDEO and Bill & Melinda Gates Foundation, 2008), the later ones explicitly referred to a number of central mindsets (IDEO, 2012; Ideo.org, 2015). All these publications were supported by a series of short case descriptions which showed the application of DT in relation to the publication's target groups (e.g. teachers, educators, etc.). Other later publications were published by IDEO.org, a non-profit arm of IDEO which targets non-governmental and non-profit organizations.

2.5 The parallel development of the d.school (2002-2014)

After resigning as CEO of IDEO in 2000, Kelley started to devote more time to his work at Stanford University. Starting in 2002, Kelley talked to the people around him about his idea to establish an interdisciplinary, general design program at Stanford University (Sutton and Rao, 2014, p. 207). This was challenging (Berger, 2014). There were a few initial supporters such as Bob Sutton (Prof. in Organizational Psychology), Huggy Rao (professor at Stanford University) and George Kembel, a former student (Sutton and Rao, 2014, p. 207). Kelley told Martin in a meeting at IDEO in 2002:

> "Listen, I've tried to do all this stuff [developing an integrated design program] at Stanford, but I've got to try and talk my chair into doing something other than what he's comfortable with, and then he's got to go and talk to the dean and try to get the dean to do something that he's really not comfortable with, and, Roger, it's just like pushing a rock up a hill." (Berger, 2014).

Scaling down his ambitions to an elective, non-degree program (Katz, 2015), in 2004 Kelley managed to pitch his idea successfully to Stanford's President John Hennessey (Roethel, 2010). On getting permission, Kelley joined forces with a former student and serial entrepreneur, George Kembel, who became executive director. The two started to recruit teaching staff and students from all over campus. The first four d.school classes took place in a double-width trailer in the 2004/05 academic year (Sutton and Rao, 2014, p. 305). The trailer had an improvised interior and was located on the perimeter of Stanford University's campus (Kelley and Kelley, 2013).

In October 2005, Kelley received funding from Hasso Plattner (CEO and founder of SAP, a global IT company). Plattner was interested in Kelley's idea for a general non-degree design program that potentially would improve information technology (IT) education, and donated $35 million to develop the "Hasso Plattner Institute of Design at Stanford University" (Whiting, 2007), informally known as "the d.school". Kelley later explained that the name d.school was originally intended "just to make fun of the b-School [Stanford's business school]" (Katz and Spicer, 2011, p. 24). The courses were open to students from all faculties. The first classes were taught by at least two professors from different faculties (including Kelley and Kembel) from various programs at Stanford (Castillo, 2006). The d.school's furniture was improvised, temporary, and mostly moveable to allow for repurposing of the space. While the school changed locations various times, the flexible furniture environment became part of the d.school's practices and its identity (Doorley, Witthoft, University, and Kelley, 2011; J. Feldman, 2007).

In 2006, Sutton and Rao taught the first d.school based executive program entitled "Customer-Focused Innovation". Developed in collaboration with Stanford's Graduate School of Business, the annual program started with a class of 27 executives (Sutton and Rao, 2014).

In the academic year 2007/08, the d.school moved into a slightly larger space on campus, increasing the number of classes to a mix of roughly a dozen courses (Sutton and Rao, 2014, p. 305). In that year, the school was visited by Ulrich Weinberg, newly appointed head of the School of Design Thinking at the Hasso Plattner Institute in Potsdam, Germany. Weinberg's mission was to establish a sister institution at his institute. Using insights from his Stanford visit, Weinberg returned to Germany, where he collaborated with IDEO in Munich (Plattner, Meinel, and Weinberg, 2009) to open the "German d.school" in the winter of 2008.

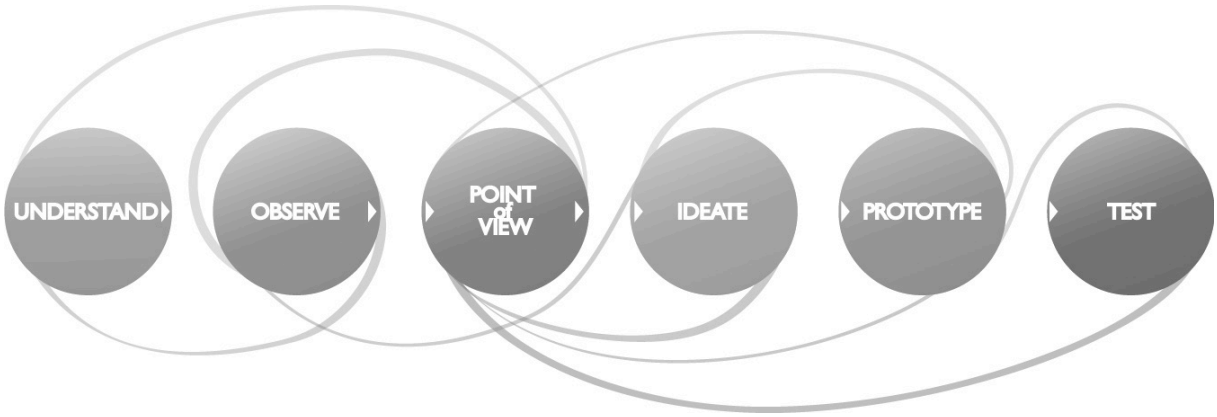

Fig. 2: Steps in the design thinking process, d.school's (d.school, 2009b)

Both schools initially followed a similar process, conceptualized as six iterative steps, consisting of: *understand, observe*, formulate a *point of view*, *ideate*, *prototype,* and *test* (Fig. 2). Each step, was supported by a series of techniques such as brainstorming for ideation or interviewing during empathizing (d.school, 2009a, 2010). DT was explained as following a series of principles or mindsets such as: "focus on human values", "embrace experimentation", "radical collaboration" (d.school, 2010). In recent years, the d.school at Stanford has changed its approach, leading to an alternative that combined the first two process steps under the name *empathize,* and "point of view" was renamed *define* (d.school, 2010). Also, Kelly introduced the term "creative confidence" (Kelley and Kelley, 2013) and included it as a DT mindset.

Attracting educators and students from different parts of the university, the d.school staff started experimenting by applying DT to their respective fields including entrepreneurship, public policy, developing country problems, and legal services (Castillo, 2006; d.school, 2015b). This led to a

diverse portfolio of 50 or more courses of various lengths and sizes which further increased the appeal of the d.school for students from all areas of Stanford University.

Opening up to interests outside of Stanford University, the d.school introduced executive education programs. It currently offers a three-day boot camp for US$11,000 (d.school, 2015a). Corporate clients include Jet Blue, Pepsi, Visa, and Target Cooperation (Stanford Executive Education, 2015b). Programs linked to the d.school feature almost identical modules and are taught by d.school staff (Stanford Executive Education, 2015a, 2015b).

Further, the school offers a free course for the general public, and specialized courses for teachers from kindergarten to 12th grade. About 1,000 individuals attend these classes each year (Sutton and Rao, 2014).

2.6 Reflections on the development design thinking

This chapter has described the multitude of influences that formed the discourse around the concept which make it clear that DT was not shaped single handedly by IDEO and the d.school. What became labeled DT developed based on multiple influences over a period of time, starting before IDEO and the d.schools emerged. For example, Stanford focused early on advocating human centeredness and rapid prototyping in its design and engineering program. Also, Silicon Valley can be characterized as the birthplace of a community that jointly explored approaches to addressing human computer interface design, as the early developments at Apple Computers show. Thus, early process descriptions such as those by Apple Computer or included in the article on Empathic Design, appear similar to what came to be known, some 10 years later, as DT.

Thus, it appears that multiple elements (practices, techniques, success stories, etc.) were influenced by a diverse set of actors. While these actors rarely referenced each other, the developments can be traced through the relationships of these actors and their descriptions of similar elements such as the conceptualization of similar process steps. Through this constant reformulation, elements were changed, were made more refined (e.g. from spaces to a step by step guide) or were lost (e.g. relaxing and clearing one's mind). This led to the emergence of a multitude of similar conceptualizations such as Empathic Design. Overall, the portrayed developments led to a broadening of the applicability of DT. This can be seen partly in the way IDEO's projects have been referenced. The scope changed from product to user interface to experience design, and from for-profit to non- profit. Further, the inclusion of a diverse body of educators and students at Stanford University led to the application of DT in a variety of areas.

Interestingly, it appears that the different understandings of DT developed even among its main proponents - IDEO and the d.school. For example, Brown emphasized that DT cannot be described as a process (Brown, 2009), while in the same year, the IDEO as well as the d.school published step-by-step instructions. However, recent publications of both organizations seem more consistent in their structure and wording. Thus, similar to the developments at the d.school, it seems that both a process and a number of mindsets have become the norm. The number of individuals active in both institutions might have influenced this development.

3 Theoretical framework

To understand the interpretability of MIs, it will be essential to first define what an MI is in relation to this thesis. After that, this chapter will focus on the role of interpretability and how it is addressed in theories concerned with how MIs spread[2] at an inter-organizational level, as well as theories on how MIs are adapted at an intra-organization level. These theories will be summarized, motivating the purpose of this thesis as well as the research questions. The chapter will conclude with a reflection on previous literature on interpretability and a depiction of how interpretability will be defined in relation to this study.

3.1 What is a management idea?

Defining what an MI is can be considered a challenging task given the variety of terms that have been used to refer to MIs (Birkinshaw et al., 2008). To define MIs in relation to this thesis, this section will review definitions stated in work central to this thesis (Table 1). The definition used in this thesis will be derived through a discussion of commonalties and differences.

Aiming at a definition of MI, a first distinction can be made between definitions focused on a specific type of MIs (e.g. fashion, innovation) and definitions that focus on the MI as such. Focusing on the second group, the definitions of management rhetoric, management ideas, and administrative technologies display a number of similarities that allow for a definition of MIs in relation to this thesis.

First, all definitions state that MIs propose techniques, practices, processes, rules of procedures, structures or principles to a managerial audience. Thus, MIs do refer to different aspects of organizations. A classic example would be TQM which primarily addresses principles, practices and techniques regarding how to improve the quality of products (Dean and Bowen, 1994a).

[2] This thesis will use the term spread to refer to the wide spread adoption of MIs as the terms diffusion (Rogers, 2003) and translation (Czarniawska and Joerges, 1996) refer to two distinct theories by which spread can be explained.

Another example would be the Matrix Design, which addresses the structure of an organization. Here specialists from different departments are organized in project teams as a means to solve problems that lie across functions (Huczynski, 2001). Huczynski (2001) suggested, based on a classification by Leavitt (1964), that MIs can be distinguishing based on these foci, dividing them into *task* (e.g. goal or mission of an organization), *technology* (e.g. skills, methods, procedures, routines), *structure* (e.g. authority, responsibilities and communication amongst employees) or *people* (behavior, inter-personal skills, values and motives) focused. Thus TQM has been defined as a technology focused MI (Huczynski, 2001), while Matrix Design would be defined as a structure focused MI. As DT has been found similar to TQM in its focus (Carr et al., 2010), this thesis will define DT as a technology focused MI.

Table 1: Key terms and definitions in extant literature.

Term	Definition	Focus
Management Rhetoric	"Spoken or written discourse that justifies the use of a set of [management] techniques for managing organizations or their employees" Abrahamson (1996, p. 259) based on Barley and Kunda (1992)	Management Idea
Administrative Technologies	"Prescriptions for designing organizational structures and cultures" (Abrahamson, 1991, p. 588), which establish a relation between inputs and outputs. Abrahamson based on Tushman & Anderson (1986).	
Management Ideas	"Fairly stable bodies of knowledge about what managers ought to do. . . a system of assumptions, accepted principles and rules of procedure" (Kramer and Kramer, 1975, p. 47)	
Management Innovation	"The invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organizational goals." (Birkinshaw and Mol, 2006, p. 825)	Fashion/Innovation
Management Fashion	"Transitory collective beliefs that certain management techniques are at the forefront of management progress" (Abrahamson, 1996, p. 254)	

Second, all definitions argued that MIs justify or legitimize (Birkinshaw et al., 2008) described technologies through a rhetoric that addresses the relation between input (e.g. certain practices) and output (e.g. increase in quality). Here, previous scholars have identified success stories that state convincing examples, general organizational threats (e.g. globalization) and a catchy label that addresses the spirit of the time as central textual elements (e.g. Kieser, 1997; Røvik, 2002). In

line with the previous points, scholars have found MIs to consist of a technological[3] ("what and how to do") and a rhetorical ("why and when") dimension (e.g. Birkinshaw et al., 2008; Zbaracki, 1998).

Third, these technological and rhetorical dimensions are seen as being expressed through a discourse consisting of spoken and/or written words. Conceptualized as discourse and in line with the first two commonalities, MIs have previously been identified as consisting of a variety of reoccurring, textual elements (Røvik, 1996) e.g. labels, success stories, technical descriptions. These elements have been addressed in various ways, as authors put focus on the technological (e.g. Dean and Bowen, 1994a), rhetorical (e.g. Kieser, 1997) or single elements (e.g. Giroux, 2006). As an example, Dean and Bowen suggested that TQM could be defined as principles, practices and techniques focusing on the technological dimension. In comparison Kieser (1997) described TQM and similar MIs analyzing the rhetorical dimension including a catchy title, central promise, threats, successful uses cases of the concept and claims of universality. Further, scientific publications which focused on textual elements from both dimensions did so by proposing a varying body of reoccurring textual elements (e.g. Furusten, 1999; Røvik, 2002).

This thesis defines MIs in relation to management rhetoric as *spoken or written discourses that propose and justify a technology on how to manage different parts of an organization*. As discourses, MIs consist of a number of textual elements that can be grouped into a rhetorical and a technological dimension.

Hence, in relation to MIs, management innovation is defined as the invention and adaptation of MIs in a way that it believed to be "new to the state of the art and is intended to further organizational goals" (Birkinshaw et al., 2008, p. 825). In case an MI leads to a wide spread, transitory belief that the MI is at the forefront of development, it is defined, in line with Abrahamson (1996), as a management fashion.

[3] Some authors use the term technical; however, this thesis will use the term technological since this dimension addresses the technological aspects of an organization (Leavitt, 1964). This also avoids potential confusion with techniques which is used to refer to individual textual elements.

3.2 Management ideas and interpretability

In the previous section, MIs were defined as discourses that consist of textual elements. These elements can be grouped into two: a rhetorical and a technological dimension. This section will introduce the notion of interpretability, where it comes from and why it is central to research in regards to MIs.

In order for an MI to spread at the inter-organizational level, it first has to be externalized. For this to happen the MI needs to be expressed in a way that others can understand it and perceive it as relevant beyond its original organizational context. Further, the MI must be theorized and labeled (Birkinshaw et al., 2008) in the form of words or pictures (e.g. presentations, business press articles etc.) as this allows the MI to travel freely between organizations (Erlingsdóttir and Lindberg, 2005). Due to this process of deinstitutionalization (Røvik, 1996), an MI changes from being context dependent and specific to being general, ambiguous and vague. This happens because of two reasons.

First of all, it would be impossible to describe a technique in full detail, thus requiring individuals concerned with externalization to simplify their descriptions. This process of simplification has been found to result in an interesting duality (Kieser, 1997). As individuals need to leave out details to achieve simplicity, they also make the MI more ambiguous, general and potentially vague. Further, the intended simplifications lead at times to formulations of too many principles, which are at times overlapping and or contradicting (Kieser, 1997) further increasing ambiguity.

Second, in order to make the MI relevant for others, it has to address a general audience. Thus, authors tend to incorporate examples from a variety of areas as well as historical references to convince a potential recipient of the applicability of the MI (Røvik, 1996). This further increases an MI's generality, ambiguity and vagueness.

As a result, textual elements of MIs have been found to be general, ambiguous and vague (Giroux, 2006). Due to these three characteristics, MIs require readers or listeners to make sense of them by interpreting them in relation to their individual organizational context. This thesis will use the label interpretability to refer to generality, ambiguity and vagueness taken together. As interpretability has been argued to be central to all MIs (Benders and van Veen, 2001; Giroux, 2006; Kieser, 1997) individuals necessarily have to interpret them. As interpretation depends on the individual, this will inevitably lead to a variety of views of the MI.

Interpretability has been found to have a variety of positive as well as negative effects at an inter- and intra-organizational level. Eisenberg (1984) is considered the first scholar to highlight the strategic role of interpretability (Giroux, 2006). Similar to most authors who explored this phenomenon, he mainly focused on ambiguity (Giroux, 2006). According to him, ambiguity of communication is not necessarily bad, and should therefore not be avoided but preserved. As multiple viewpoints exist in any organization, openness to ambiguity allows for co-existence of multiple viewpoints. This leads to a "unified diversity" amongst various individuals. Further, Chreim (2005) found that interpretability is beneficial to organizational change as it allows managers to transition from one view to another. However, managers are not the only ones who benefit from interpretability. Building on Star and Griesemer (1989) it can be argued that the interpretability of an MI allows any individual or group to interpret their work as a necessary part of the MI. This allows individuals to use the introduction of a new MI as a way to position themselves as central to its execution, possibly advancing their careers (Huczynski, 1993). As individuals and groups start to interpret themselves as vital to MI related activities, this process also starts to shape the MI itself (Star and Griesemer, 1989). The MI becomes a common reference point or what Star and Griesemer (1989) called, a boundary object. Similar to Eisenberg's explanation, a boundary object is described as facilitating the dialog between individuals while allowing for various interpretations. The MI becomes a "social lubricant" as it allows communication despite functional or other differences (Giroux, 2006, p. 1230).

Further, Kieser (1996) pointed out that MIs allow listeners or readers to interpret their "organizations into the concept and can thus interpret [the MI] as the solution to … pressing problems" (Kieser, 1997, p. 57). As all individuals will do this to some extent, it is argued that interpretability is what leads to a wide spread adoption, thus to the popularity of MIs (Benders and van Veen, 2001). Further, as more individuals interpret an MI, their views influence others with similar backgrounds (e.g. industry, organization, function etc.) to get interested in the MI, leading to further interpretations.

But interpretability does not only open up for engagement, collaboration and wide spread adaptation, it also allows for disengagement, and ceremonial adaptation or decoupling (Meyer and Rowan, 1977). In cases where an MI is uninteresting or does not prove beneficial, interpretability allows individuals to argue against it or to deny that they have been involved in it. Further, it allows for decoupling (Meyer and Rowan, 1977), in which cases the MI is only symbolically adapted (e.g. using the rhetorical dimension to describe existing practices) with little effect on organizational activities (Fiss and Zajac, 2006). This also makes it hard to assess the adaptation and use of MIs in large organizations.

Based on these benefits and drawbacks interpretability can be seen as a double-edged sword (Ansari et al., 2014). On the one side, it allows for interpretation and wide spread adoption and adaptation, serving as a social lubricant amongst functional diverse individuals. On the other side, interpretability can lead to decoupling and deniability. Thus, it is not only essential to understand interpretability from a theoretical point of view but also because paying attention to it is crucial when one seeks to manage wide spread inter- and intra-organizational adoption.

Having established and discussed the notion of interpretability as reference to ambiguity, generality and vagueness, the next sections will summarize previous research on interpretability during spread, adoption and adaptation.

3.3 Spread, adoption, adaptation and interpretability

As outlined in the previous sections, researchers have identified interpretability as central to MIs' spread adoption and adaptation. Thus, it is important to understand how the interpretability of MIs develops during spread, adoption, and adaptation.

The spread and adoption of management ideas

When it comes to spread and adoption of MIs, one can distinguish between diffusion (e.g. Rogers, 2003) and a translation model (Latour, 1986).

Diffusion theory

The diffusion theory seeks to explain inter-organizational spread of MIs by comparing it to a market (Abrahamson and Fairchild, 1999). In this market, proponents such as 'management gurus', academics and others tailor MIs to the demand of managers who actively search for solutions for the multitude of challenges they face (Abrahamson, 1991). Given the steady supply of new MIs, and the resulting variety of choices, managers have to choose which one to adopt. Within the diffusion literature, there are two dominant perspectives that seek to explain this adoption: the *rational* and the *social perspective* (Ansari et al., 2010).

The rational perspective assumes that MIs are widely adopted and thus spread, based on qualities that can be rationally assessed by managers (e.g. Birkinshaw et al., 2008; Rogers, 2003). Once an MI is identified it is evaluated based on experimentation and competitor analysis, focusing on criteria such as relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003). In case of a positive evaluation, an adoption decision is taken. If organizations purely rely on evaluation of other organizations, increased adoption can lead to what Rae, Greve

and Davis described as "imitation-driven choice" (2001, p. 503). Here, an organizations adapts an MI not because of an in depth evaluation but because of an assumption that the number of imitations proves the MI to be beneficial. Thus imitation-driven choice is considered to increase in speed in relation to the amount of adopting organizations as well as the reputation of early adopters (Ansari et al., 2010).

The social perspective, argues that MIs are not adopted because of an increased amount of information, but because of an increase in social pressure. This pressure is argued to stem from a desire to appear legitimate and to conform with norms (e.g. Ansari et al., 2010; DiMaggio and Powell, 1983; Sturdy, 2004). Hence the more organizations that adopt an MI, the higher the pressure on other managers to do the same (Abrahamson, 1991). The social perspective can be seen as a critique to the rational perspective (Abrahamson, 1991), pointing out that the adoption of MIs can at times be inefficient or potentially even damaging (Ansari et al., 2010).

In addition to the social pressure that stems from comparison with other organizations, managers have also been reported to face increasing pressure from rating agencies, "analysts and external executives [which] attribute a higher reputation to firms that adopt widely accepted [MIs], although adopting such techniques is not necessarily associated with higher firm performance" (Nicolai et al., 2010, p. 185). These pressures are argued to be exploited by proponents who develop MIs and interpreted them to address and inform manager's goals and beliefs (Abrahamson, 1991).

Despite their different focal points, the two perspectives are considered to have some overlap. On the one hand, the rational perspective acknowledges an increase in adoptions – which could be interpreted as social pressure – as influencing the adoption decision (Ansari et al., 2010). On the other hand, a weaker form of the social perspective acknowledges that adoption can be initially guided by rational evaluation as little or no social pressure is present (Tolbert and Zucker, 1983). Both views are considered "poles on a continuum, where both can explain diffusion under different conditions" (Ansari et al., 2010, p. 71). An MI that achieves wide spread adoption can thus be considered convincing in regards to rational as well as social grounds.

Further, both perspectives are considered powerful in their simplicity to explain spread at an inter-organizational level. MIs are portrayed as products with a central message that spreads amongst a population of managers that adopt them for similar, first rational, and then social reasons. However, these perspectives assume that MIs are stable, largely invariant constructs that possess an internal force (e.g. argument that addresses a need) that supports their wide spread diffusion

and adoption by managers (Latour, 1986). Given these assumptions, the diffusion model of spread can be considered limited in the following ways. First it does not account for a variation of MIs as a result of adaptation by managers (Ansari et al., 2010) which have been found to be the norm rather then the exception (Ansari et al., 2014). Second, it does not account for the diversity of managers as well as their individual ambitions as it assumes that all managers adopt an MI for similar rational or social reasons. Third, the diffusion model assumes a steady supply of MIs and thus does not account for how MIs come to be (Czarniawska and Joerges, 1996; Latour, 1986). Thus, the dominance of the diffusion model of spread and the social and rational perspective in MI research might have contributed to a the lack of research investigating the phenomenon of intra-organizational adaptation of MIs (e.g. Birkinshaw et al., 2008; Gondo and Amis, 2013).

Translation theory

Translation theory (Czarniawska and Joerges, 1996) goes beyond spread and adoption, and accounts also for adaptation and the varying nature of MIs. Here, authors do not distinguish between the roles of the proponents and the managers but see all individuals - as well as the ideas - as actors in a network where all influence each other (Latour, 1986). Thus translation theory does not focus on a market or organization, but on the individuals, ideas and objects that comprise them. In this network, MIs spread when one actor imitates another. Thus, adoption is defined as the imitation of an MI by an actor. To allow for imitation, practices need to be externalized which is done by describing them in simplified and abstract form mostly through written or spoken words and sometimes in pictures. The result of such an externalization is an MI which, objectified in a narrative covered in a book, article or movie can move through time and space (Czarniawska and Sevón, 2005). However, the MI does not move by itself. Rather it moves by the choices of actors who perceive the MI as relevant in addressing their need. In cases where an MI addresses a wide spread need or what Kieser (1997) named “spirit of the time” an MI can achieve wide spread popularity. Hence, if multiple managers interpret their needs into an MI, an MI achieves a greater rate of spread. In comparison to the diffusion model, proponents do not push MIs on managers, but managers adopt MIs that they see address a current, central organizational or individual need. As environments change, new organizational or individual needs might occur. If this is the case, a new collective need might form creating the need for a new MI. As MIs are simplified abstractions, actors such as managers who seek to adopt them will have to adapt the MI as well as their organization to make the MI work. In this process, MIs get renamed, re-interpreted, edited and thus adapted or dropped in parts or as a whole (Czarniawska and Sevón, 2005; Latour, 1986). As all actors imitate and adapt MIs to fit their diverse needs, the MIs get constantly modified. Thus adaptation becomes the norm rather then the exception and the idea of an invariant MI becomes obsolete.

As individuals imitate and adapt MIs, they get modified in a way that makes them attractive to other actors in similar circumstances. Thus, in translation theory, wide spread adoption is not the result of an energy that propels the MI, or mainly external factors but is also influenced by continuous imitation and adaptation by a multitude of actors. As a result, proponents are not powerful actors that influence managers, but actors who are perceived as influential due to the multitude of other actors (e.g. managers) imitating and adapting the MI they externalized. Thus a fashion is created by imitators and not by proponents (Czarniawska and Sevón, 2005).

In summary, diffusion theory describe rational as well as social accounts are seen as influencing the imitation and thus adoption decision of MIs. Here, MIs are mostly regarded as static objects. In translation theory, MIs are discourses that are characterized by their interpretability referring to MIs' generality, vagueness and ambiguity. Interpretability allows actors that seek to adopt MIs, to project their challenges and means reflected as part of the MI. Thus, the interpretability of MIs is seen as central to the spread of MIs, motivating the use of translation theory in this thesis.

Stages of management idea adaptation

In line with translation theory, authors focusing on adaptation have argued in line with translation theory that adaptation is the norm rather then the exception (e.g. Ansari et al., 2010; Benders & Van Veen, 2001; Birkinshaw et al., 2008; Feldman & March, 1981). Thus, given the diversity of organizations and individuals, an MI has to be flexible enough to lend itself to various views in order to appear rational as well as social. Further, given the diversity of functions and individuals on an intra-organizational level, it is also very likely that an MI has to be adapted to allow for interpretation if an organization seeks intra-organizational diffusion and adaptation across various functions and locations. Hence, this section will review theories concerned with adaptation to compliment translation theory. The review is undertaken as these adaptation theories allow for a depiction of stages in the adaptation of MIs. Thus, they are seen as helpful in analyzing and comparing the development of interpretability of an MI. To facilitate the use of these theories, this section will first summarize two prominent theories of adaptation before they will be re-conceptualized in relation to translation theory in the next chapter.

Recognizing the prominence of diffusion and adoption theories, Birkinshaw, Hamel and Mol (Birkinshaw et al., 2008) have recently drawn attention to the neglected phenomenon of adaptation and innovation of MIs. The authors conceptualized an iterative process consisting of four stages. In this process, MIs are considered influencers as well as the outcome of activities that the authors label management innovation. While their contribution is novel in terms of their focus of managers as innovators, the presented stages showed some similarities to Roger's " Five

Stages in the Innovation Process in Organizations" (Rogers, 2003, p. 421). Comparing both processes in Table 2 at the end of this section, they can be considered similar, although there are some important differences. Most importantly, Rogers (2003) describes activities without singling out specific organizational actors, while Birkinshaw and colleagues focus on managers and proponents as external and internal change agents. This implies a dialogic adaptation of MIs rather than one that is shaped by proponents.

Drawing on adaptation theories by Rogers (2003) as well as Birkinshaw and colleagues (2008), adaptation can be depicted as five stages:

Stage 1: Creation of a need through voicing of an organizational problem. Rogers as well as Birkinshaw and colleagues consider the realization of an internal problem to lead to the need for a new MI and thus initializing the adaptation process. However, Birkinshaw and colleagues (2008) see the agenda setting as a discursive process rather than a rational decision-making one. Here, proponents are considered to influence the "agenda setting process" (Birkinshaw et al., 2008, p. 834) by introducing new threats and opportunities. Thus they might influence the process being influenced by their knowledge of MIs. Birkinshaw and colleagues consider the development of a new solution as alternative ways to solve the identified problem. If done, the next stages would lead to the identification and subsequent development, theorizing and labeling of a new MI. The authors argue that an adaptation process could also lead to the invention and externalization of an MI.

Stage 2: Matching an organizational problem with an MI. During matching managers seek to identify an MI that possibly solves the identified problem. Rogers (2003) describes this stage as a first attempt to conceptually match the MI and assess potential benefits and problems that could result from its adaptation. Here, it is important to mention that more practical oriented MIs are considered to be less interpretable than more abstract ones (Birkinshaw et al., 2008). In comparison, Birkinshaw and colleagues do not separate a conceptual from a practical matching and seem to integrate stage two and three.

Stage 3: The organization tries the MI through experimentation. This stage is taking an MI from initial conceptual and organizational level experimentation to being operational (Birkinshaw et al., 2008), mainly focusing on the technological textual elements. Here, managers undertake two primary adaptation activities at times facilitated by proponents. The first is to engage in small random and planned experiments in adapting the MI, altering organizational activities. The second is being reflective about working with the new MI and alter it accordingly. Given the

mutual adaptation of the organization and the MI, this stage can be considered dialectic (Van de Ven and Poole, 1995), leading to a higher degree of compatibility (Rogers, 2003) . It can also lead to partial rejection of the MI as some of these experiments are then "selected and retained" (Birkinshaw et al., 2008, p. 835). This stage can lead to the formation of internal resistance, which can result in the rejection of the MI.

Stage 4: Clarification and theorization of the MI in relation to the organizational context. In this stage, an adapted MI is put into more wide spread use. During this step the MI is simultaneously further developed and spread. As individuals from multiple functional backgrounds start to act upon the MI they adapt it not only in relation to the firm but also to their specific work environments. This is argued to lead to theorization regarding how the MI supports individuals in achieving organizational goals (Birkinshaw et al., 2008, p. 835). Due to this development, Rogers argues, the MI becomes gradually clearer and embedded into the organization. Further, as more and more individuals engage in theorization, the practices and rhetoric of individuals become more similar to each other and to the MI. These similarities can lead to collaboration besides functional differences, they thus further rationales (legitimizations) supporting the wide spread adoption of the MI. This process of theorizing a logical rational can go hand in hand with a re-labeling of the MI to reflect the development (Birkinshaw et al., 2008, p. 837). Re-labeling is considered to significantly affect an MI's legitimacy (Kieser, 1997; Morris and Lancaster, 2005) as it signals the adaptation to the organization. Spreading an MI before it is labeled and theorized in regards to the organization is considered to "lead to disastrous results" (Rogers, 2003, p. 427). Beyond the development of an internal rational, Birkinshaw and colleagues argue that this step can also lead to the externalization of an MI beyond organizational boundaries. As a result, other firms might adopt modified, or newly created, MIs.

Stage 5: An MI becomes an integral part of the organization. Routinizing is considered the stage where an MI is embedded and sustained as part of the regular activities of the organization. Through this, an MI looses its separate identity and can also be referred to as institutionalized (Goodman and Steckler, 1989). Routinization thus takes place when organization's members have adapted an MI and integrated it as part of their routines (Rogers, 2003, p. 427). Further, routinizing an MI and sustaining it has been found positively related to the fit between an MI and an organization (O'Loughlin, Renaud, Richard, Gomez, and Paradis, 1998). Birkinshaw and colleagues have mentioned routinizing only as a consequence of Stage 4, but not focused on it in detail.

Table 2: Summary of rational perspectives on adaptation (Birkinshaw et al., 2008; Rogers, 2003).

Stages	Rogers (2003)	Birkinshaw et al. (2008)
1.) Creation of a need through voicing of an organizational problem.	Agenda Setting	Motivation
2.) Matching an organizational problem with an MI	Matching	Invention
3.) The organization tries the MI through experimentation.	Redefining and Restructuring	
4.) Clarification and theorization of the MI in relation to the organizational context.	Clarifying	Implementation
		Theorization and Labeling
5.) An MI becomes an integral part of the organization.	Routinizing	

Reflections on adaptation

Reflecting on the works by Rogers and Birkinshaw and colleagues, some similarities can be identified. Both theories conceptualize adaptation as a series of activities that over time lead to a change of the organization and the MI. Further; both theories propose that these activities are carried out continuously, focusing on the individuals involved in the process. Both consider an MI not as a fixed object but as something that is interpretable and hence can be adapted, thus they show similarities to translation theory, although they do not draw on it.

However, there are also some differences that would need further clarification in order to utilize adaptation theories to investigate the interpretability of MIs. First, focus has to be changed from the actors to the MI and its interpretability. As various combinations of proponents and managers might be involved in the described stages, this section will generally refer to them as individuals. Second, as this thesis will use translation theory, the five stages have to be re-conceptualized. The remainder of this section will do so by reframing the five stages into a four-stage model of adaptation.

Stage 1: During agenda setting and *matching stage*, the technological and rhetorical elements of the MI are discussed in relation to the perceived demands and possibilities. Here, MIs consisting of mainly rhetorical elements are argued to allow for greater interpretability (flexibility) (Birkinshaw et al., 2008). In comparison, MIs focused on the technological elements are regarded as less interpretable (adaptable), potentially hindering adaptation. However, textual elements from both dimensions seem to be essential, as an MI needs to address a current challenge as well as it

needs to appear actionable. In line with translation theory, the agenda setting is thus regarded as a discursive activity during which an MI and intra-organizational challenges and means are compared and possibly influence each other. Hence, in comparison to Rogers and Birkinshaw and colleagues, the agenda setting would not only influence the selection of an MI, but it will also influence the agenda itself. From this follows that an MI can lead to the discovery of a challenge that was not noticed or articulated before. Thus, separating the agenda setting from the matching stage makes little sense from a translation theory point of view, as a matching already happens through the initial conversations in relation to the MI. Hence, agenda setting and matching stage are interpreted as one stage, which is characterized by a decision to imitate after some initial, discursive *matching* of goals and means of the MI and the organization. This can lead to a formal or informal *decision to imitate* the MI; thus adoption.

Stage 2: After the initial matching and *imitation decision*, the MI is adapted through a series of intentional and unintentional experiments (Birkinshaw et al., 2008). These experiments will not only influence the rhetorical and technological dimensions of the MI but might also affect the organization to various extents (Rogers, 2003). Thus, the MI and the organization are *redefined and restructured*. The main difference to the previously described stages is that *redefining and restructuring* is seen as leading sustained change in the rhetorical and or technological dimensions of the MI. Thus changes during the *matching* stage are seen as having little sustained effects on the MI, while the *redefining and restructuring* stage leads to a substantial adaptation of the MI in relation to the organization.

Stage 3: As *redefining and restructuring* affects the MI as well as the organization, it can lead to two distinct results. One result is what Birkinshaw and colleagues (Birkinshaw et al., 2008) described as *theorization and labeling* of the MI. Here, the MI is clarified (Rogers, 2003) in relation to the organization, but still clearly distinguishable and thus not institutionalized. The MI remains interpretable and can further travel not only on an intra-organizational level but also at an inter-organizational level.

Stage 4: A second possible result of redefining and restructuring is *routinization*. Routinization happens when the MI loses its separate identity and becomes part of the organizational routine. This fourth stage can occur in unison with stage 3 in cases where multiple individuals or groups adapt an MI within the same organization.

Focusing on the development of the MI, four developmental stages of an MI can be outlined: matching, redefining and restructuring, theorization & labeling, routinization. This thesis will use

these four stages of MI adaptation as an analytical framework to discuss the development of interpretability during the adaptation of DT.

3.4 Revisiting the research questions

This chapter had defined MIs as discourses consisting of textual elements that can be distinguished into two dimensions. The rhetorical dimension consists of textual elements that justify the MI to lead to rational organizational progress. The second dimension depends on which part of the organization the MI addresses. It can focus on tasks, technologies, structure or people. As DT is a technology focused MI, the second dimension will be the technological dimension. In relation to technology focused MIs, scholars have proposed a variety of rhetorical elements (e.g. Dean and Bowen, 1994a; Kieser, 1997). Thus, previous studies investigating MIs' interpretability are limited as they only focused on a selection of these textual elements. This resulted in a fragmented understanding in regards to how specific textual elements influence the interpretability of MIs. To investigate the role of these elements in relation to technology focused MIs, this thesis first reviews and indexes previously conceptualized elements to address:

RQ1: What are the textual elements of a technology focused management idea?

Answering this research question will allow for a deeper exploration of how these elements contribute to an MI's interpretability.

As a next step, this thesis will investigate the role of these elements in regards to interpretability at an inter-organizational level (between individuals in different organizations). This is done because of three reasons. First, a popular MI should display a high level of interpretability, as it has been identified influencing its wide spread adoption (Benders and van Veen, 2001; Giroux, 2006). Second, given an MI is popular it should also appear rational, thus striking a balance between openness and closeness for interpretation. Thus, it should be possible to characterize this balanced level of interpretability at the inter-organizational level. Third, an intra-organizational exploration of interpretability amongst multiple organizations requires a common point of reference, to compare adapted MIs. Thus, the next step is to investigate:

RQ2: How does the interpretability of textual elements develop at an inter-organizational level?

Answering this question, will allow for a first assessment of what makes a popular MI interpretable, while still appearing rational. Further, it allows the exploration of how an MI's

interpretability changes through adaptation in regards to an MI's *matching*, *redefining and restructuring, theorizing & labeling and or routinization* on an intra-organizational level (between individuals in the same organization), thus motivating an exploration of:

RQ3: How does the interpretability of textual elements develop at an intra-organizational level?

Answering these research questions, the purpose of this thesis is to investigate the development of the interpretability of MIs at an inter- and intra- organizational level in order to contribute to our understanding of how interpretability can be understood.

3.5 Introducing an operationalization of interpretability

In order to assess the interpretability of textual elements, this thesis will follow the example of Giroux (2006) in developing an operational definition of the three characteristics that comprise interpretability: ambiguity, generality and vagueness. As Giroux largely builds her definition on the Webster's dictionary, additional theory was also used to clarify her definitions and develop a decision tree model that will be used for assessment (Fig. 3).

Ambiguity

Something is ambiguous if it allows for at least two, semantically unrelated interpretations (Zhang, 1998). One can distinguish between two types of ambiguity, semantic and syntactic ambiguity (Zhang, 1998).

Semantic ambiguity is present when one word allows for multiple, unrelated interpretations e.g. "Watch repairs!". The word watch can be a verb or a noun, depending at the interpretation the sentence can have two entirely different meanings: watching repairs or the repair of watches. Syntactic ambiguity means that the structure of a sentence can have more then one plausible meaning. An example would be "I talked to my mother in my car". This is ambiguous but neither vague nor general since we know that it is about the author's car, his mother, and the activity of talking. The sentence is ambiguous because it has two distinct interpretations since one does not know if the author or the mother, or both were in the car.

A rhetorical element is considered ambiguous if it allows for more then one distinct but specific interpretation.

Vagueness

Drawing on Geeraerts (2006), vagueness refers to a term with a single but unspecific meaning. An example would be the word "bank" which has multiple distinct meanings (e.g. financial institutions, edge of the river, piece of furniture) and thus is ambiguous. In comparison the word "aunt" is vague as it can refer to one's aunt on the mothers or on the father's side. Thus a pun for example, could never be made using a vaguely defined term, as the term does not differ in meaning.

A rhetorical element is considered vague if it allows for a single but unspecific interpretation.

Generality

A rhetorical element can be regarded as general if it does not specify certain details and thus leaves them open for interpretation. Hence the element has no multiple distinct interpretations (ambiguity) nor has it a single but unspecific interpretation (vagueness), thus in comparison generality points at a greater lack of specific.

As an example, the word vehicle is general, as it allows for multiple unspecific interpretations. The word car however is ambiguous even in reference to vehicle as it allows for multiple, specific interpretation i.e. an automotive as well as the tender of a train. Further the word automotive can be regarded as vague as it has a single but unspecific interpretation i.e. Fiat 500 as well as Mercedes Benz A Class 2012. Thus being not specific i.e. VW Beatle 1952.

A rhetorical element is considered general if it does allow for more than one unspecific interpretation.

Given this definition of vagueness, certain words (e.g. aunt, child etc.) and expressions (warm temperature, twenty something) are easy to distinguish as vague. However, Giroux (2006) pointed out that the vagueness of words referring to abstract ideas or emotions are challenging to ascertain as such she suggested to concentrate on ambiguity and generality "and [to] simply allude to the possibility of vagueness in certain instances" (Giroux, 2006, p. 1233). These uncertainties do not only concern words, they also allude to the challenge of evaluating vagueness in regards to the context. As an example: If a sentence states, that "the task needed to be executed by the R&D department", the sentence could be interpreted as ambiguous or vague. It would be vague if a firm consists of multiple, similar operating R&D departments around the globe. As these can be considered indistinguishable, it is unclear which of these departments is meant. If, however the firm would have multiple specialized R&D departments the information can be interpreted as

ambiguous, as multiple, distinct alternatives exist. Thus, this thesis will follow Giroux (2006) in focusing on the ambiguity and generality of rhetorical elements alluding to vagueness when suitable.

To allow for a simple assessment, the developed definitions for ambiguity, generality and vagueness are summarized in the following decision tree model (Fig. 3).

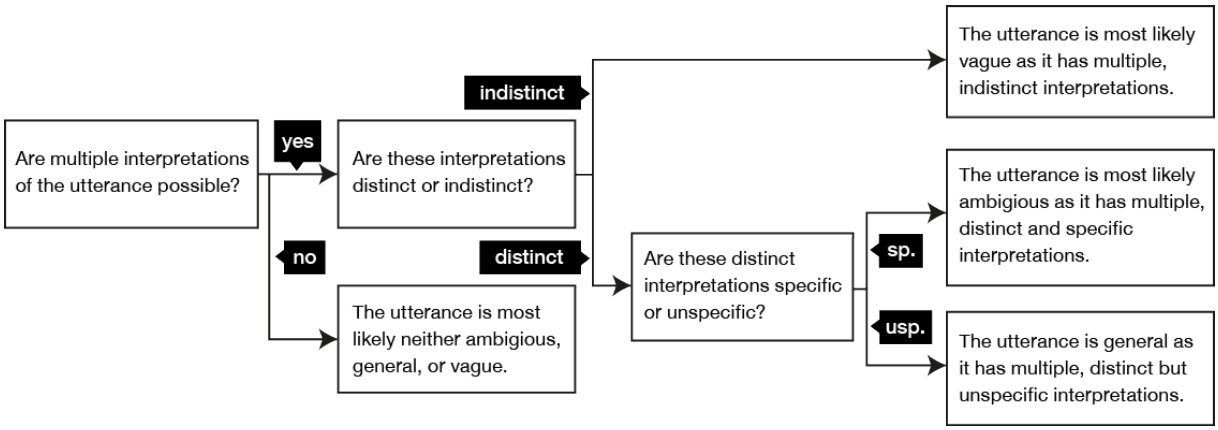

Fig. 3: Decision tree regarding ambiguity, generality and vagueness. Source: author, based on Giroux (2006).

4 Research setting and methodology

This thesis research seeks to contribute to a general understanding of the interpretability of MIs. This chapter presents the context and methodological choices required to produce this knowledge. First, the research process that led to this thesis is explained, ending with an overview of how the studies and appended papers are related (section 4.1). Second, the ontological and epistemological assumptions are highlighted in relation to the process (section 4.2). Third, the case studies are described in detail including motivation, sampling, and methodological choices related to the collection of data (section 4.3). Section 4.4 describes the methodological approach adopted, and the development of the analytical tools required to conduct the research. Finally, section 4.5 discusses some of the limitations of this research.

4.1 Research process

This section provides a chronological description of my research process which is briefly summarized in Table 3 at the end of this section.

The first research study was conducted during my time at the Hasso Plattner Institute at the University of Potsdam (Germany) during 2010/2011 where I participated in the Hasso Plattner Design Thinking Research Program (HPDTRP) which is connected to Potsdam University's School of Design Thinking. On joining the program I became part of an ongoing research project led by Tilman Lindberg. The project had been investigating the use of DT in one large IT firm for four months. Since most of the interviews had been conducted, I arranged some follow-up interviews together with Tilman Lindberg and Eva Köppen. In discussing and analyzing the data, we soon realized that there was a huge diversity in how DT was described by the interviewees, although they were all working for the same company. This was the inspiration for Paper I which proposes a typology for how DT is interpreted by individuals. Unfortunately, this project was discontinued and I was offered participation in another project concerned with the performance of teams and IT software to support creative processes. However, the first project had kindled my

interest in the adaptation and use of DT in large organizations, and I approached several scholars to discuss opportunities to pursue this interest. One of them, Maria Elmquist, invited me to join her and Lisa Carlgren at the Department of Technology Management and Economics at Chalmers University of Technology, an invitation I happily accepted.

In an early meeting we discussed how we should approach researching DT in industry. Since there was – and still is – little empirical work on the topic, we decided in 2011 to start with a broad exploratory study (study II). This study investigated the use and the implementation of DT in large organizations. My previous colleagues at the HPDTRP and the School of Design Thinking in Potsdam provided an initial list of German companies that met our criteria of large organizations using DT for more than one year. We then decided to extend the study to the U.S. focusing on the San Francisco Bay area where DT originally emerged. On a visit to the U.S. with Lisa Carlgren we managed to access a significant number of early adopters of DT, identified mainly from the business press and snowball sampling. The analysis of the data collected resulted in a first paper, reporting our early findings (Paper II). This first study provided some interesting insights, and led to more questions regarding the implementation and use of DT. A follow up study was designed and carried out focusing on companies with more than five years' experience of DT. Four of the six companies in Study III were part of the original sample set. However, we were missing two companies, one in the consumer goods industry in the service industry. Identifying these companies and persuading them to participate in the study led to the addition of two of the earliest adopters of DT in banking and consumer products. During and after the interviews, Maria, Lisa and I discussed our first impressions. During these conversations two questions emerged. The first was related to the diverse responses, and difficulty participants experienced when asked to describe: "What is design thinking?". The second question was somewhat related and was articulated first by an interviewee: "How can we measure the value of design thinking?"

The first question led to Paper V, which analyzes the transcripts of interviews in a way inspired by the framework proposed by Dean and Bowen (1994) to analyze TQM. This analyses was undertaken because both interviewees and the research team found it difficult to describe what DT 'is'. We were also repeatedly asked by the research community to define DT when we presented early, explorative results at conferences. The framework was selected as a starting point for several reasons. First, multiple authors compare DT to TQM (e.g. Carr et al., 2010; Liedtka and Ogilvie, 2011; Martin, 2009). Second, TQM is also difficult to conceptualize (Steiber and Alänge, 2013) because of the multiple, ambiguous definitions which have emerged since the

1950s. Third, in a review of the TQM literature, Sousa and Voss (2002) suggest future studies should build on established foundations and distinguish between principles, practices, and tools.

The second question led to Paper III as well as a curiosity to explore in depth the perceived value of DT. This interest led to Study IV, which explored ten DT projects in two companies sampled from Study III. When I embarked on this study, I realized that the issue puzzling these companies was not really proving the value of DT but knowing how to legitimize DT inside the organization. This differentiation guided the analysis that led to Paper IV which focuses on the approaches to legitimization that individuals used.

Since my first participation in research on DT in Potsdam, exploring DT has always been problematic, less so because of company access or supporting theories, and more because of the difficulty involved in explaining what DT was. In talking to colleagues, I realized that many scholars struggled with the same challenge in relation to MIs such as business model generation or lean start-up. This kindled my interest and led me to explore theories related to MIs and fashions, based on the initial hint given in the paper by Dean and Bowen (1994). All of this influenced my contribution to Paper V, and led also to the next study (Study V), which was a literature study. In searching for a way to frame DT, I started to review previous research on MIs (Study V) since I realized that various authors suggested a variety of textual elements, although nobody had attempted to combine them. This new investigation led to Paper VI, which propose a first structure to frame MI as discourses. During this study I discovered theories that both identified textual elements and explained that MIs' openness to interpretation – the issue I and many others were struggling with – is actually one of MIs' main characteristics.

Inspired by the phenomenon of interpretability, I began to reinvestigate my earlier exploratory case-based studies, to discover that in fact they reported on most of the textual elements I had identified in relation to MI. This new awareness was encouraging. The inspiration provided by these findings, and the phenomenon of interpretability, led to my developing a framework to investigate the interpretability of DT at an inter- and intra-organizational level, which became the basis for my thesis. I used the textual elements identified in the last Paper (Paper VI) to re-investigate the textual elements described in Papers I-V. Thus, the thesis as a whole discusses the relation between my previous findings and also uses them as empirical accounts to investigate the interpretability of MIs.

Table 3: Overview of studies, research approaches and publication by year.

Year	Study & research design	Resulting papers
2010	S. 1: Design thinking in the IT Industry. Single case study.	Paper I: On the Perception, Adoption and Implementation of Design thinking in the IT Industry
2011-2012	S. 2: Exploring the use and adoption of DT. Multiple case study, 15 organizations	Paper II: Exploring the Use of Design Thinking in Large Organizations: Towards a research agenda
2013	S 3: Deep exploration of more experienced companies. Multiple case study, 6 organizations	Paper III: Design thinking: Exploring values and effects from an innovation capability perspective Paper IV: Making it happen – Legitimizing Design Thinking in Large Organizations Paper V: Framing design thinking: The concept in idea and enactment.
2013-2014	S 4: Exploring the Value of Design Thinking. Multiple case study, 2 organizations, 10 project	The study was included as it informed the thesis, however publications based on this study are not included.
2014-2015	S 5: The structure of management ideas. Literature study	Paper VI: Management Ideas: towards a conceptual framework.

4.2 Ontological and epistemological considerations

Given the previous narrative, the ontological and epistemological assumptions underlying this thesis need some clarification. While they might seem clear in terms of acknowledgement of the multiple truths at various points in my research journey, this was not always the case. Starting off as a scholar and being engaged in the d.school and the connected research project, exposed me to 'one truth' or 'one version' of DT which might be viewed as a realist view (Easterby-Smith, Thorpe, and Jackson, 2012) of the world. In the first research project, we were fascinated by the number of different views on the same thing - DT – pointing to an internal realist view. In continuing this research, I came to realize that there are many DTs or many truths. I am now convinced that the facts depend on the viewpoint, and that there is not just one DT, although one interviewee told me that his company was "not doing the real DT".

However, I still believe that there is some common truth. This truth is reflected more in the way DT is described using natural language. While I believe that language is changing and interpretations evolve – as the thesis subject proves – I believe also that language consists of some universal elements. Hence, a verb is a verb, although its meaning might differ. This leaves me with an ambiguity. On the one hand, one could see this claim that a framework can be used to describe MIs in terms of its textual elements as a realist view. On the other hand, one could argue

that the phenomenon is acknowledged as dependent on the viewpoint of the observer, which is a social constructivist view (Easterby-Smith et al., 2012).

In order to face this duality, I position myself in relation to Easterby-Smith, Thorpe and Jackson (2012), as a normal constructivist. Thus, I acknowledge the existence of multiple truths but acknowledge also that independent objective knowledge does exist, thereby subscribing to relativism. This view is reflected in the research design of Studies I-IV which rely on multiple cases and consultation with a diverse group of individuals and data sources to investigate the phenomena under question. Study V might be seen as a divergence from this since the ambition with the literature study was to produce a framework to describe MIs. This implies that one description of an MI exists. However, I expect this description of textual elements to hold true for the group of researchers who share a similar viewpoint in conceptualizing MIs as discourses.

4.3 Studies underlying this thesis (2010-2014)

In this section I outline the studies underlying the papers that form part of this thesis, in chronological order. Since the data analysis is paper specific, it is presented in chapter 2 in relation to the paper summaries.

Study I: Design thinking in the IT Industry (2010)

The purpose of this case study was to explore how DT is adapted by multiple actors within one large organization. Software Co. had launched a series of workshops to educate their employees in DT. As the interest of the study was to investigate how DT was understood and implemented, the focus was on three groups of interviewees: DT experts who led the workshops, IT engineers who participated in the workshops, and traditionally trained design experts (e.g. user experience designers). In total, 30 semi-structured interviews lasting approximately 1h each, were conducted and transcribed. The questions focused at the interviewees' role in the company, their view of DT and the adaptation and use of DT in an IT context. The questions were adapted to the role of the experts (e.g. manager, engineer etc.) in order to gain additional information on the workshop design.

Study II: Exploring the use and adoption of DT (2011/2012)

Given the lack of empirical research on DT, and the overview of firms using DT, Study II aimed at identifying and exploring companies claiming to work with DT. Thus, the focus was primarily on the use of the label DT.

DT originated in the Bay Area, C.A., U.S. and was packaged and spread by the innovation consultancy IDEO (headquartered in San Francisco, C.A.) and by the d.schools in Stanford (C.A., U.S.) and in Potsdam (Germany). The first exploration focused on those two locations.

First, German companies were identified through a collaboration with the executive education program at the School of Design Thinking at the Hasso Plattner Institute, (University of Potsdam, Germany). Since collaboration with the d.school in the U.S. was not feasible, we had to find a different sampling approach for the U.S. We started by identifying a first set of companies using business press publications (e.g. Wong, 2009). We asked interviewees in the U.S. companies to suggest other companies which they knew had similar experience (snowball sampling). This resulted in eight German and nine U.S. companies. One firm had branches in Germany and the U.S. and was counted as one company in each location. One U.S. company was excluded following an initial interview; it transpired that the mangers responsible for DT used the label primarily to gain organizational support. However, the fact that the firm just used the label is interesting in relation to the topic of interpretability, and for this reason it is considered in this thesis research, resulting in a total sample of 17 firms.

Within each company, individuals critical to the adoption and use of DT were identified through articles in the press (e.g. Holloway, 2009; McCreary, 2010) and snowball sampling. All semi-structured interviews focused on the following topics: interviewee's professional background, perception of DT and its value, adoption of DT, and use of DT. These exploratory interviews lasted between 45 and 120 minutes. Whenever possible, more than one interview was conducted (Table 4). Twenty out of 31 interviews were conducted face to face by at least two researchers including the author. All interviews were recorded and transcribed. In addition to the interviews, all three researchers involved in the study took field notes and gathered additional documentation such as internally developed education materials.

Table 4: Companies included in Study II.

Firm	Sector	Employees	Adoption of DT	No. of interviews
A	Software	<100.000	2004/2005	7
B	Healthcare Products	<100.000	2010	1
C	Automotive	>200.000	2010	1
D	Telecommunication	>200.000	2008	1
E	Logistics	>200.000	2009	2
F	Software	<100.000	2006	1
G	Software	<10.000	2006/2007	2
H	Healthcare	>100.000	2003	3
I	Pet Care	>50.000	2010	1
J	Retail	>300.000	2008	1
K	Healthcare	>50.000	2005	1
L (US)	Consumer Electronics	>300.000	2006	2
L (DE)	Consumer Electronics	>300.000	2010	2
M	Finance	<10.000	2007/2008	1
N	Consumer Products	>100.000	2004	3
O	Finance	<100.000	2008	2
P	IT Hardware Co.[4]	>300.000	?	1
Total number of interviews				**31**

Study III: Deep exploration of more experienced companies (2013)

The purpose of Study III was to get a deeper understanding of how some of the companies in Study III adapted and used DT. As such the study focused on the six most experienced companies within three industries: products, software, and services. Since we were missing one consumer goods company, and one service provider, two additional early adopters were identified through

[4] IT Hardware Co. was excluded since it was found that DT was not really adopted. The manager of the design department only adopted the label DT to render the existing design practices more valuable to management. However, the case was interesting in regards to MI adaptation, hence it is included in this thesis.

business press. Based on initial contacts, additional interviewees concerned with the adaptation and use of DT were identified. This snowball sampling led to the identification of between four and six interviewees in addition to the ones that took part in Study II, depending on the company. Since we had achieved seven interviews in Software Co, we conducted three more and then excluded some of the earlier ones where there was a lot of overlap in content.

Table 5: Six companies participating in Study III.

Firm	No. of employees	Adoption of DT	No. of interviews	Position of interviewees incl. interviews from study II
Corporate Software Co. (US)	>50000	2005	7 (6 ftf.)	Director DT initiative (VP), DT manager & facilitator, Product Design (VP) (previous DT facilitator), Design leader, Designer, Innovation manager, R&D manager
Software Co. (US)	>5000	2007	5 (2 ftf.)	DT manager, DT facilitator, R&D manager, Innovation manager, HR manager
Consumer Products Inc. (US)	>100000	2002	7 (3 ftf.)	Director DT initiative (VP) & facilitator, DT manager, DT facilitator, R&D manager, R&D engineer, Senior manager, Business development manager
Electronic Products Inc. (US)	>100000	2006	5 (4 ftf.)	DT leader & R&D corporate unit (VP), R&D manager, R&D manager, Strategy manager R&D, Concept developer
Healthcare Inc. (US)	>100000	2003	7 (6 ftf.)	Director DT initiative (VP), Senior manager, DT manager, DT specialist & nurse, DT specialist & designer, Performance improvement manager (VP), Nurse manager
Finance Co. (GE)	>100000	2008	5 (1 ftf.)	Director DT initiative (VP), Innovation manager, Innovation manager, HR manager, DT specialist & internal consultant
Total No. of interviewees			**36 (22 ftf.)**	

The aim of the additional interviews was to get multiple perspectives on adaptation and use of DT. We looked for individuals with experience in managing and practicing (e.g. facilitators) as well as employees with one-time experience in using DT or sponsoring DT as part of a lager project.

The semi-structured interviews lasted between 45 and 120 minutes. Out of 36 interviews, 21 were conducted face to face (Table 5). As in Study II, all interviews were recorded and transcribed. The researchers also took field notes and collected additional data (internal documents etc.) wherever

possible. As the investigated organizations are a sub-sample of Study 1, some of the interviews from that study were included.

Study IV: Exploring the Value of design thinking (2013/2014)

One of the main challenges for individuals seeking to bring DT to their organization seems to be proof of the value or claims made regarding DT. This study began as an exploratory case study of two of the six most experienced companies, Corporate Soft Co. and Consumer Products Inc.. The aim was to investigate the perceived value of DT among individuals working with it. We identified five recently concluded projects per company, with the help of the managers who were responsible for the DT initiatives. The projects included both successful and discontinued (failed) projects.

The primary data sources for this study include 26 semi-structured interviews engaging the sponsor, the project manager, one participant and one facilitator per project. In some cases, these roles overlapped and we did not get access to all individuals. These semi-structured interviews lasted between 38 and 99 minutes; a team of two individuals conducted most interviews. All interviews were transcribed and later coded by two researchers. Secondary data sources consisted of documents such as workshop planning materials (e.g. timetables and lists of participants) as well as publically available documents (e.g. business-press articles, online publications and annual reports) which provided general information on the companies, the use of DT in the companies, and the result of the projects. Field notes were taken to track themes and ideas and to improve the questionnaires; these notes were reviewed later for additional input.

As this study informed the understanding of the author in relation to Paper V, it is included in the thesis. However, the publications developed from this study are not included.

Study V: The structure of management ideas (2014/2015)

The purpose of Study V was to synthesize earlier research on the textual elements used in previous studies of MIs. This was done for two reasons. First, previous research has called for the development of taxonomies and classifications (e.g. Damanpour, 2014a) which is not possible without an understanding of what an MI is. Second, rating agencies as well as governments seek to evaluate the use of MIs (Nicolai et al., 2010). However, given their interpretability and lack of understanding about what they are, it is difficult to assess the usefulness of an MI to the organization. Third, researchers interested in studying MIs such as DT, are hobbled by the problem related to describing what an MI consists of and how these elements vary.

The objective was achieved by conducting a literature review consisting of a scoping study of past literature reviews and analysis of frequently cited, peer-reviewed papers derived from three databases, plus relevant other publications including books. The identified publications were analyzed and selected based on their use of textual elements. The search was extended by a review of the references cited in the reviewed publications.

The study resulted in a framework (depicted in Paper VI) which depicts the various elements and which is presented in chapter 2.

4.4 Methodological approach underlying this thesis

This section describes the methodological approach, the development of the analytical tools and the analysis underlying this thesis.

Methodological approach

To research the development of interpretability, this thesis investigated the development and the adaptation of an MI, in this case DT. DT was chosen since its recent appearance in the early 2000s (Johansson-Sköldberg et al., 2013) allows for a timely investigation. The thesis research started in 2010, requiring the use of two research strategies.

First, the development of DT is investigated retrospectively. Since the DT had already been labeled and discussed in the popular and business press, a literature study was conducted. The investigation focused first on what earlier studies (Johansson-Sköldberg et al., 2013; Kimbell, 2011) have identified as the 'main proponents'. In addition, since the development of DT is seen as closely related to IDEO, a design consultancy with its origins in Silicon Valley in the U.S.A., the literature review also investigated the history that led to the early development of IDEO to achieve a better understanding of the context in which DT emerged. Publications documenting developments at Stanford University were also reviewed such as the creation of d.school (Hasso Plattner Institute for Design at Stanford University) which was seen as closely related to the rise in the popularity of DT. The relevant documents were summarized in order to produce a narrative constituting the first version of the DT story. In addition to written documents, the materials drawn on included video interviews and conference presentations. References and links in documents were followed up, and gaps in the reporting were used to direct the search for specific resources related to a particular time frame or person, or both. Once the story was complete, the text was sent to two researchers who focus on DT in the University of St. Gallen and the Hasso Plattner Institute Potsdam, for a first review and comments on the narrative. This led to the

identification of some issues that required further clarification, and the identification of additional literature which then was incorporated in the narrative.

To enable exploration of the development of interpretability during the spread and adaptation of MI, the thesis draws on the underlying studies of DT. As a recent MI, there are few empirical investigations of DT which is why it was considered a nascent theoretical field suited to an explorative, qualitative study (Edmondson and Mcmanus, 2007). As documented in Studies I-V and Papers I-V, the investigation was based on an initial purposive sampling and later relied on snowball sampling (Flick, 2009) to identify early adopters of DT. Study II is an initial scoping study; the number of companies was narrowed down in Studies III and IV in order to achieve a deeper understanding of how DT is interpreted, adapted to, and used in the studied organizations. All the underlying studies use interviews as their main source of data, and are complemented by collection of firm documentation and field notes taken by the researchers. In line with Suddaby (2006) interviews are used since they are compatible with the aim of the studies to understand the intersubjective perspectives of different actors on DT.

To summarize, the methodological approach can be described as systematic combining (Dubois and Gadde, 2002). First, early explorations led to an understanding regarding the challenges of describing and justifying DT (Paper I, II). This led to an investigation on the rhetorical (Paper IV) and technological (Paper V) dimensions of DT. Analyzing and writing of these papers let to the development of the theoretical focus on management ideas (Paper VI) and interpretability (this thesis).

Development of analytical tools

To identify textual elements and answer RQ1, a literature study (Study V) was conducted. This study resulted in a framework of previously identified textual elements of MIs and a focus on technology based MIs. The study approach is described in Study V, and the results are summarized in the description of Paper VI and presented in detail in Chapter 6 which addresses RQ1.

The identification of textual elements involved detailed analysis of the development of their interpretability which required operationalization of interpretability. This builds on the work of Giroux who operationalized interpretability as ambiguity, generality and vagueness (Giroux, 2006). An analysis based on Giroux's definitions proved difficult, so a decision tree model was developed to extend Giroux's definitions based on the theory from the literature studies (e.g.

Zhang, 1998). The decision tree model allows a clear distinction and definition of ambiguity, generality and vagueness beyond the previously stated, dictionary-derived definitions.

In order to analyze and discuss the development of interpretability in relation to spread, the research draws on accounts that focus on interpretability as central to the popularity of management ideas (Benders and van Veen, 2001; Giroux, 2006), largely translation theory (Czarniawska and Sevón, 2005; Latour, 1986). This was preferred since diffusionist accounts were found largely to conceptualize an MI as a static object, and not account for its changing nature due to interpretability. In relation to intra-organizational adaptation, previous accounts (Birkinshaw et al., 2008; Rogers, 2003) that build partly on diffusion theory are more insightful and distinguish between different stages of adaptation. Thus, in order to distinguish different kinds of intra-organizational adaptation, I build on translation theory to develop previous adaptation theories. The resulting adaptation theory focuses on MIs to allow the research to distinguish different stages of MI adaptation.

Analysis of the literature and the underlying studies

Due to the development of the analytical tools, it was possible to utilize the framework of textual elements to study the interpretability of MIs during inter-organizational spread and intra-organizational adaptation.

First, the DT story (presented in Chapter 2) was analyzed using the MI framework (Paper VI). This was done using a data table that depicted the story, and underlying publications on the various textual elements. Seven of the most significant publications were analyzed by 34 students[5] in class (Paper VI). This was used as a comparison to validate my own analysis. In a next step, textual elements were analyzed regarding their interpretability, using the decision tree model. The results were then coded and written up in paragraphs which served as a basis for the analysis reported in Chapter 7, section 7.1. and the discussed in relation to RQ2 (Chapter 8, section 8.1).

Second, the appended papers (Paper I-V) were investigated similar to the literature study. The papers first were screened for their contribution to the different textual elements. Papers IV and V were straightforward to categorize, Papers I, II and III applied only to certain dimensions. Since all the studies draw on combinations of the same companies (the company reported in Paper I is part of the US sample), the data were compared and analyzed using the analytical framework of textual elements and the decision tree model. Compared to the DT story, which was analyzed as a

[5] The students were masters students in project management at the Department of Technology, Management and Economics at Chalmers University of Technology.

development over time, the collected material was interpreted as a single point in time. Thus, the data were interpreted as the state of development in different companies, rather than a development over time. The derived data were then compared to the development of DT at an inter-organizational level, focusing on the time when the organizations adopted DT. This was done using the decision tree model. As for the first analysis, the results were documented in paragraphs that served as a basis for the analysis reported in Chapter 7, section 7.2. and the discussion in relation to RQ3 (Chapter 8, section 8.2.).

In a final step, both developments were compared, and discussed in the final section of Chapter 8.

4.5 Reflections on research quality and limitations

This section discusses the quality of the research presented in this thesis, given its social constructivist nature, and the research process adopted. Based on Bryman and Bell (2007), I first outline and then address the different types of validity and reliability, and the resulting limitations.

Construct Validity

This refers to whether the measure represents the concept it sets out to measure (Bryman and Bell, 2007). In the context of this thesis, construct validity refers to whether the decision tree model allows assessment of generality, ambiguity, and vagueness. To ensure that it did, the following measures were taken. First, the definitions were discussed multiple times by the author and two senior researchers. Second, the definitions build on established knowledge from literature studies since it proved difficult to assess textual elements based on the definitions in Giroux (2006). Further, the author of this thesis contacted Giroux regarding the definitions, asking specifically for her view on the definition of validity, which she had written was difficult to assess. Her response was: “I like your definition of vagueness, it is quite clear and not vague at all!” (author’s conversation with the Giroux, Sept. 2015)

On a more general level, one needs to be clear about whether the studies investigated what they set out to investigate, i.e., DT. As the first part of the sample relied on the d.school in Germany, to learn about and work with DT, these organizations are regarded as doing DT. However, the second sample was identified using popular press and all companies reported working with DT and also initially to have worked with one of the d.schools or IDEO. Thus they are considered to have been influenced by similar sources. Further, given the purpose of this thesis it can be considered that there is some variance in the way DT is communicated, and in terms of what it

became. However, this is seen as less problematic as the resulting variance in terms of its interpretability is the focus of this thesis.

Internal Validity

Internal validity refers to whether the causal relationships between variables hold (Bryman and Bell, 2007). Given the purpose of the thesis to understand the development of interpretability at the inter- and intra-organizational levels, the focus is on exploring and stating possible interdependencies and relationships. Thus, the results of this thesis should be understood as hypotheses regarding the development of interpretability, not as causal relationships. This is in line with the ontological position, and the aim to develop theories as a basis for further testing and exploration (Easterby-Smith et al., 2012).

Another internal validity issue is whether participants really did what they said they did; ultimately a consequence of the choice of interviews rather than ethnographical observation. So in describing their use of DT, is that what they actually practiced. Given the interpretability of MIs, it is unlikely that this is always the case. That said, the focus of this thesis is on the textual elements of MIs and their interpretability. Thus, the use of interviews and secondary data sources such as internal training material, reports, video presentations and news articles was seen as appropriate to assess interpretability in the study of DT.

External Validity

External validity refers to the extent to which results can be generalized beyond the context of the underlying studies (Bryman and Bell, 2007). Since the underlying studies in this thesis drew on a limited sample of organizations and focused on DT it can be argued that external validity of the findings is limited. This is due in part to the sampling approach which relied on purposive and snowball sampling (Flick, 2009). It is possible that a different sample would have influenced the results. However, previous studies show that the study of interpretability, focused on one single MI (Benders and van Veen, 2001; Giroux, 2006) or one firm (Ansari et al., 2014) could contribute to our general understanding of interpretability. In addition, the purpose of this research is not prove or disprove a general causality but to generate hypotheses regarding the development of interpretability.

Ecological Validity

Ecological validity is concerned with whether or not the findings from this research can be considered applicable to the setting addressed (Bryman and Bell, 2007). This thesis research set out to explore the inter- and intra-organizational environments. Focusing on MIs, managers and

management consultants are seen as those who could benefit from the issues raised by this thesis. Thus, while the specific findings should be explored in more depth, individuals working with MIs should be aware of the interpretability of MIs, given their effects on spread (Benders and van Veen, 2001) and adaptation (Ansari et al., 2014). Thus, contributing to the general understanding of the interpretability of MIs is perceived as supporting individuals in their ability to understand and work with MIs. This research was addressed to and should benefit these individuals.

Reliability

Reliability refers to the consistency of measures, i.e. if they are stable and consistent over time (Bryman and Bell, 2007). In relation to the analysis of interpretability, the following steps were taken to increase the reliability and consistency of the measures. First, a decision tree was developed and applied. Second, the assessment is described in detail, discussing each textual element separately, before summarizing developments related to the normative and descriptive dimensions. This was done to increase transparency regarding the consistency of measures, thus increasing reliability.

In relation to the underlying studies, the researchers involved took steps to improve the reliability of the results of these studies. First, all research related activities such as planning, execution, and writing were done by at least two researchers. Interview guides were designed jointly according to a number of predefined themes. Analysis of interview data was done jointly by two of the researchers, through multiple coding and discussion of codes. Second, all the researchers made field notes and discussed data immediately after the interviews. Additional material such as internal reports and training material (e.g. PowerPoint presentations and timetables), as well as newspaper articles and video presentations were collected. Third, reports were written on all the cases and validated with at least one interviewee per company. Fourth, research results (draft papers) were shared with participating individuals to assure consistency regarding the collected data and its use in relation to Papers I-V. This was also done to seek permission to publish the results and to release the company names. Getting individual consent regarding the information proved problematic, and permission to publish company names involved a lengthy internal process. Although we received permission in most cases, we did not get positive replies from all companies and thus excluded their names in the publications.

5 Summary of appended papers

This chapter provides a summary of the six appended papers (Paper I-VI)[6]. The papers are presented in chronological order and in relation to Studies I-V. They are summarized focusing on their method of analysis, and their contributions to the overall purpose of this thesis.

5.1 Paper I: On the Perception, Adoption and Implementation of design thinking in the IT Industry

Based on the diversity of definitions and uses of DT amongst companies, this book chapter investigates how DT is understood, adopted, and used by the individuals in one large organization. Based on Study I, the book chapter reports the results of 30 interviews with employees who observed, led, or participated in a company wide DT workshop format, which initially was developed by IDEO.

The analysis adopts a grounded theory approach following Strauss et al. (1996). To analyze the data, axial coding was performed based on "perception of the integration" as the initial category. Coding schemes were developed through frequent iterations. These schemes were synthesized in three hypotheses that serve as a basic construct to summarize the findings.

The analysis identifies an initial incongruity which prevented direct and seamless adaptation. Due to the juxtaposition of DT and IT developments, individuals reported the need for major adaptation efforts which resulted in the emergence of a diversity of views on DT. Overall two interpretations are feasible. The first is characterized by integration of DT into an existing IT development process (one-world game). Here DT was implemented as a phase of a process, or as part of an adaptive toolbox which was used when it was perceived to be helpful. The second interpretation is characterized by the separation of DT as an initial project phase or as a service that could deliver a concept or an idea for further IT development (two-world game). Given the

[6] The appended papers consist of one book which is referred to as Paper I, and five papers (Paper II-VI).

diversity and need for interpretation by individuals, implementation of DT seemed strongly connected to a conceptualization process.

The book chapter shows that the adoption of DT first requires an adaptation process that resolves initial incongruences and connects it to the context in which it is applied. It contributes to this thesis in highlighting different ways in which DT has been adapted.

5.2 Paper II: Exploring the Use of Design Thinking in Large Organizations: Towards a Research Agenda

Earlier research (Johansson-Sköldberg et al., 2013) identifies a lack of empirical research on DT. More research seemed critical since most existing work is based on consultancy and promotion of DT (e.g. Brown, 2008; Martin, 2009). To address this gap, this paper presents the findings from Study I which explored the adaptation and use of DT in 16 large organizations. Paper II contributes to a general understanding of how DT is adapted. It also discusses areas for future research.

Transcripts from all 31 interviews in Study I were openly coded. Codes and excerpts were sorted, and the authors discussed emergent patterns. This involved multiple discussions; codes were compared and refined through systematic combination (Dubois and Gadde, 2002). This led to the identification of the following themes.

First, the analysis revealed that perceptions of DT varied significantly amongst interviewees. Interviewees, including those responsible for the implementation of DT within the organization, found it difficult to define DT. While drawing on similar descriptors (e.g. DT as an approach, method, mindset) the emphasis in terms of tools and techniques varied. This highlighted the need to find a definition that would allow further study. Further, the term design was mentioned frequently as being problematic since it challenged the existing design function and gave an impression of DT being about gestalt rather then innovation.

Second, three ways in which DT was adapted - sometimes simultaneously in one company - were identified. In some cases, DT was used in the early phase in product development (fuzzy front end) to generate concepts. In other cases, DT was a separate process managed by dedicated DT teams. A third use was reflected in attempts to infuse DT as a mindset or culture across the organization. Thus, DT was not considered neither as part of an existing product design function nor as a replacement for design.

Third, since DT was used outside a professional design functions, individuals engaged in DT had a variety of professional backgrounds. The individuals trained through in-house initiatives had diverse backgrounds - from secretarial training to CEOs with an economics background. This raised questions about the skills, backgrounds, and training of individuals performing DT.

Overall, the paper reveals the variety of definitions, and the uncertainty of respondents in defining what is DT.

5.3 Paper III: Design thinking: Exploring values and effects from an innovation capability perspective

The main advocates of DT such as Tim Brown and Roger Martin, make claims about its contribution to radically innovative solutions, a message which has been repeated enthusiastically by the business press (e.g. Nussbaum, 2004, 2009; Reingold, 2005; Wong, 2009). Research theorizes about the possible contribution of DT to firm innovation capabilities (e.g. Hobday, Boddington, and Grantham, 2011, 2012), but little is known about how individuals working with DT perceive "the value of design thinking". Paper II contributes to our understanding of DT and innovation, and explores the claims made by individuals in large organizations compared to the literature on innovation capabilities (Lawson and Samson, 2001; O'Connor, 2008).

The data are analyzed in four steps. The first step involves open coding of interviews. In the second step, codes were grouped into two broad categories: long-term (effects), and short-term (value) benefits. Then a selective coding was applied to identify further examples (Flick, 2009). Last, based on innovation capability theory (Lawson and Samson, 2001; O'Connor, 2008) codes were analyzed and sorted into three sub-groups based on how individuals perceived DT as affecting their organization in terms of resources, processes, company culture (mindsets of individuals), and challenges. Challenges were included to balance overly positive statements and provide a more realistic picture.

In relation to resources, the paper shows what individuals think about DT in terms of increasing their individual abilities to work in and lead innovation projects. It is argued that working with DT makes individuals more open to alternative views including those of users and co-workers. This results in a more holistic view, and provides a sense of meaningfulness regarding the individual's work.

In general, individuals repeated the claims about DT as a new way or process to pursue user-centered innovation, and as supporting the development of innovation capabilities. Emphasis was put on user-centeredness in terms of its leading to a better problem understanding and more attractive ideas and solutions. Interviewees emphasized that rapid iteration of prototypes involving customers led to: easier idea selection, joint problem solving, and thus, faster development processes and learning. Various techniques have been applied outside the project setting to facilitate strategy formulation using visualization techniques and involving employees in change projects.

Several interviewees said that working with DT had induced a cultural shift. Values and norms such as optimism, openness to opinions and ideas, and empathy for users and co-workers were reported. Interviewees also reported less risk aversion, and greater acceptance of failure as a form of learning.

However, individuals also referred to problems. Since DT was perceived as focusing on the user, it was seen as less appropriate for the development of incremental improvements to existing products. Further, DT was perceived as resource and time intensive due to the lengthy user research and testing phases. Interviewees also mentioned that some parts of DT (e.g. synthesizing interview data) were difficult to master.

Overall, this paper contributes an analysis of benefits and challenges resulting from an adaptation of DT.

5.4 Paper IV: Making it happen – Legitimizing Design Thinking in Large Organizations

Managers concerned with the adaptation of new MIs face a central challenge. The impact of an MI cannot be proven beforehand, therefore it is highly uncertain. This applies especially to MIs such as DT which focus on innovation, and whose impact might be more difficult to measure in terms of efficiency improvements. The aim of paper IV is to explore how managers legitimized adoption to DT.

Identification of individual legitimization related activities is based on an analytical framework derived from legitimization theory (Suchman, 1995). Using this framework, this study investigates DT legitimization activities in six companies (Study III), based on semi-structured interviews with 36 individuals.

The analysis revealed four strategies deployed by managers: demonstration of usefulness, meshing with the organizational culture, creation of artifacts and physical spaces, and establishment of ambassador networks. Most of these efforts seemed to be a reaction to implementation challenges. This suggests that managers tend to be reactive rather than proactive when seeking organizational support.

The paper contributes to research by exploring the application of legitimization theory (Suchman, 2008) as an analytical framework for management ideas such as DT. In addition, suggestions emerge from identification efforts about how to build organizational support.

In relation to this thesis, Paper IV provides a detailed account on adaptations made with regard to the rhetorical dimension.

5.5 Paper V: Framing design thinking: The concept in idea and enactment.

Given the varying descriptions of DT in public discourse, it is difficult to define what really is DT. The framing needs to be sufficiently broad to account for variety in application, but narrow enough to not appear too general, and hence meaningless. The purpose of Paper V is to develop a framing of DT that allows for further exploration of DT in practice.

The paper is based on Study III. The resulting 47 interviews were analyzed using the framework developed by Dean and Bowen (1994b) consisting of principles, practices, and techniques. Using this framework, five central DT themes are identified: User-focus, Diversity, Problem Framing, Experimentation, and Visualizing. These five themes are present in all the cases investigated. The paper proposes that principles should be "brought to life" (enacted) through practices, and embodied by shaping individual mindsets. Mindset is not part of Dean and Bowen's (1994b) original framework but was added to refer to embedded principles. Mindset is defined as an inclination or mental attitude that informs an individual's way of thinking, and has been found to be significant for the acceptance and use of DT. Practices and mindsets are supported by techniques. While there are some general techniques that all companies seem to exploit, some companies also used specific techniques and developed varieties of practices based on their unique context. The six case stories show that DT is framed in various ways, including (p. 13): "a fixed teaching process for human centered innovation", "an innovation process, a set of principles on a firm level", "a set of elements to be used as part of a new developed product innovation process" or "an innovation process".

Overall, Paper V introduces a management idea perspective on DT, focusing on its technological dimensions, using Dean and Bowen's (1994) framework consisting of principles, practices and techniques. Principles are complemented by the addition of mindset to reflect the finding that principles were often described as mindsets, embodied by individuals. While the five themes were identified in all the cases studied, the exact description of textual elements varied depending on the context. Therefore, it is argued that these themes define a central body of elements as well as the boundaries to the concept.

In relation to this thesis, Paper V includes a detailed exploration of the development of the technological dimension of DT in the studied firms.

5.6 Paper VI: The Structure of Management Ideas

Paper VI investigates the structure of management ideas, identifying textual elements of practice focused MIs. This is accomplished by means of a literature review of the previous research on MIs which identified nine textual elements which can be grouped under rhetorical or technical dimensions. Paper VI contributes an analytical framework that defines practice focused MIs as discourses, consisting of textual elements. It shows that practice focused MIs only superficially address the implementation of MI, leaving it open to interpretation. The details of the framework are elaborated by addressing RQ1 in Chapter 6.

The contributions of each paper to the three research questions in this thesis are summarized in Table 6.

Table 6: Contributions of individual papers to the research questions.

Research Questions	Paper I	Paper II	Paper III	Paper IV	Paper V	Paper VI
RQ 1: What are the textual elements of a management idea?						x
RQ 2: How does the interpretability of textual elements develop at an inter-organizational level?					x	x
RQ 3: How does the interpretability of textual elements develop at an intra-organizational level?	x	x	x	x	x	x

6 Defining technology focused management ideas

This chapter addresses research question 1 (RQ1) by reporting the findings in Paper VI which focuses on the textual elements of technology focused MIs.

6.1 The textual elements of technology focused management ideas

Investigating the textual elements shows that they can be classified in both a technological and a rhetorical dimension.

The *rhetorical dimension* consists of textual elements describing, "what the MI is" and "why it should be used". This dimension includes the following textual elements:

- *Label*: The label which can be a metaphor referring to the central claim. It can be in the form of an acronym (e.g. Total Quality Management, TQM).
- *Central Claim:* A central (causality) claim comprised of a central activity that is claimed to lead to a generally accepted goal (e.g. increased quality = increased customer satisfaction = profit).
- *Superiority claims:* A series of superiority claims which render MI superior to widely accepted practices or previous MIs.
- *Threats:* References to general threats such as global competition, race for innovation, etc. which affect the organization as well the individual manager (e.g. layoffs, uncertainty about the future, etc.).
- *Warrants:* Warrants can be references to general accepted truths, partial references to scientific research, and success cases (historical as well as existing organizational and individual cases), used to underpin claims.

The *technological dimension*, addresses the questions "what should be done" and "how should it be done", and consists of the following textual elements:

- *Principles:* A series of principles which are defined as the "philosophical position that specifies the core values to be sought" (Hackman and Wageman, 1995, p. 310).
- *Practices:* Practices are defined as "general activity statements" (Paper VI). These are presented as ways to act upon principles. Practices may be presented in a sequence or geometric order implying a process.
- *Techniques*: Techniques are presented in relation to practices and are described as detailed step-by-step instructions on what to do.
- *Implementation instructions and workings:* Implementation instructions and warnings, were rarely identified and mostly generally described.

6.2 Defining technology focused management ideas

Given this depiction of the elements in both dimensions, the previous stated definition of MIs as discourses can be further refined:

Technology focused Management Ideas (MIs) are defined as spoken or written discourses that propose and justify a technology to manage different parts of an organization. As discourses they consist of textual elements, which can be grouped into a rhetorical dimension and a technological dimension. The rhetorical dimension consists of the label, a central claim, superiority claims, threats, and warrants. The technological dimension consists of principles, practices, techniques, and implementation instructions and warnings.

This definition of the textual elements of technology focused MIs in relation to RQ1, allows for the analysis of interpretability of the textual elements that comprise DT.

7 Analyzing the interpretability of design thinking

In this chapter, the interpretability of DT is analyzed, focusing on the technological as well as the rhetorical dimensions. This is done first by analyzing developments at an inter-organizational level (RQ2) based on chapter 2, followed by intra-organizational level analysis (RQ3), based on Studies I-III (empirical research on the implementation and use of DT in organizations) and Papers I-V. The analysis is aimed at understanding how interpretability develops during the spread and adaptation of DT.

7.1 Interpretability of DT at an inter-organizational level

This section starts with a general finding regarding the development of DT, which is followed by detailed analysis of each textual element of the rhetorical and technical dimension.

Identification of two phases

When analyzing the textual elements separately, it was found that the principles, practices and techniques develop in similar ways, regarding their interpretability. Studying the development of the DT literature, this development can be divided into two distinguishable phases: one during which principles, practices and techniques were formulated and labeled DT, and one where specialization towards specific areas of application (e.g. libraries, education etc.) occurred.

During the first phase, the interpretability of all elements was found to develop from a comparatively higher to a lower level. The naming of practices varies and techniques are described as part of many different practices (e.g. scenarios for ideation, user testing, etc.). Towards the end of phase one, the naming of practices became similar across publications, techniques were described as being part of one practice, and the label DT was established. This appears to be influenced by the broadcasting of "IDEO's design approach" in 1999, which created public awareness of DT as a process for innovation and was followed by an increase in the

number of publications on IDEO. Overall, phase one is characterized by a decrease in the interpretability of the technological dimension which resulted in theorizing and labeling of DT as an MI. Since theorizing and labeling refers to the adaptation of MIs at an intra-organizational level, the term *packaging* is used to describe phase one. This term was earlier proposed by Czarniawska and Joerges (1996) to refer to activities similar to theorizing and labeling in relation to translation theory.

During the second phase there is a clear separation in how DT is interpreted within different areas of applications such as non-governmental organizations, public libraries and schools. Publications begin to focus on detailed, step-by-step description and instructions about what to do and how to do it in relation to specific areas. These publications vary mainly in the emphasis they put on specific practices (e.g. experimentation or prototype and testing), and provide more detail on the techniques portrayed in relation to each practice (e.g. DT for educators vs. the bootcamp bootleg from the d.school (2009, 2010). Further, IDEO's publication feature more specialized claims and warrants. The d.school publications do not include such claims and are focused solely on the technological dimension. Phase two is thus characterized by *specialization* leading to decreased interpretability of the technological, textual elements that comprise DT.

To sum up, there are thus two distinguishable phases in the development of DT. Phase one, *Packaging*, where interpretability decrease in relation to principles, practices and techniques and Phase two, *Specialization*, where interpretability decrease even more as publications begin to address specific areas of application. These phases are used to characterize the development of interpretability in relation to the textual elements at an inter-organizational level.

The rhetorical dimension

This section analyzes the development of interpretability of the rhetorical dimension of DT focusing on labels, central claims, claims of superiority, threats, and warrants identified in the development of DT. This detailed analysis is followed at the end of this section by a summary of the developments.

Label

The label varied throughout the phase of Packaging: “design by storytelling”, “empathic design”, “the deep dive”, “method to our madness”, “IDEO’s approach to innovation”, “human centered design process” and “Design Thinking”. However, once the label DT became established at IDEO and Stanford’s d.school, it stuck. Thus, during the first phases, the label increased in its generality and ambiguity as it broadened from product to human centered, and from process, to approach, to

thinking. Modifications during the phase of Specialization consisted only of appendices to the label DT: “Design Thinking for Social Innovation”, “Design Thinking for Educators Toolkit”, “Design Thinking for Libraries”. Keeping the label DT but extending it in relation to a specific area of application made the label less general while retaining some ambiguity. In addition, the most frequently used word, “design”, can be regarded as vague in itself (e.g. design referring to objects, to a discipline or used as a verb) and thus contributing to the interpretability of the label. However, this vagueness also contributed to the ambiguity of the labels, since DT could be thinking about designed objects or thinking in a designerly way.

Central Claim

Overall, the central claim followed a similar pattern of development to the label. For example, an early claim was that DT was “a four-step process [that] facilitate[s] design for a particular market, in this case old people” (Moggridge, 1993, p. 24). A later claim, often cited as a definition stated that 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), and that it was therefore an “approach to innovation” (Brown, 2008, p. 92). In case of the first example, the publication targeted other designers. In the second example, the target audience was general, since it tried to appeal to every individual concerned with innovation. These examples show how claims became more general (e.g. multiple markets, approach to innovation) and possibly more appealing to a wider audience. During specialization, claims about the DT approach to innovation were complemented by claims more specific to the area of application, as exemplified in “Design Thinking Toolkit for Educators”:

> [DT] equips you with the process and methods of design. Businesses, social entrepreneurs and other innovators have used them for decades to create solutions for many different types of challenges. In this toolkit, these methods are adapted specifically for educators, because as an educator, you design every day. You design your classroom, you design curriculum, you design learning environments for your students, and you design experiences and interactions for your colleagues. (IDEO, 2011, p. 2)

Similar, to design, the word “innovation” is regarded as challenging since it can be a noun or a verb. Also, various authors used innovation as synonymous with invention or creativity, giving the impression that DT is an approach for developing ideas all the way from concept to product.

Superiority Claims

Early superiority claims focused on the design discipline (Moggridge, 1993) while later claims argued for DT to be promoted as advanced to other disciplines such as marketing. Thus, claims became more general as they addressed multiple disciplines.

For example, Leonard and Rayport (1997) made comparisons with marketing, using ethnographic methods exploited by IDEO and others, to allow for identification of needs which customers themselves would not be aware of. Thus, traditional marketing techniques are rendered inferior and leading only to minor improvements, while the use of DT could lead to the discovery of unarticulated needs which in turn, would lead to innovation. Another example was provided by Brown (2008, p. 86) who compared DT to industrial design, rendering DT as superior since it can do more than "put a beautiful wrapper around the idea". He considered it an approach to develop ideas "that better meet consumers' needs and desires" which go beyond physical products, results in "new sorts of processes, services, IT-powered interactions, entertainments, and ways of communicating and collaborating" (Brown, 2008, p. 86). Further, in an interview Martin (D. Dunne and Martin, 2006) described DT as a cognitive ability that allowed managers to go beyond the limitations of deductive and inductive logic, teaching them abduction.

During specialization, several authors claimed that innovation and user centeredness is rarely addressed in relation to the respective area of application, and that DT would allow this. An example is that educators "require new perspectives, new tools, and new approaches" to deal with the challenges in their classrooms and schools (IDEO, 2012, p. 3). Further, DT was presented as superior to previous means of engagement with users and stakeholders (e.g. library patrons, school pupils, etc.) as it strengthens individuals' understanding of needs (IDEO, 2014a). Thus, superiority claims became related to a specific area of application, rendering them less general compared to claims made during the phase of Packaging.

All these claims targeted general accepted truths related to various disciplines (marketing surveys are based on quantitative research, designers make things beautiful, managers think deductively) and challenging them, at times pointing to a specific practice (e.g. ethnographic research) or technique. Thus superiority claims were at times specific in mentioning a part of the technological dimension of DT, but were general in relation to what they claimed the part to be superior to. Thus, superiority claims were mostly general in nature and also were applied more generally as they began to address areas other than design. During the phase of Specialization, superiority claims decreased in generality since they targeted specific areas of application (e.g. schools, libraries).

Threats

A few of the reviewed publications identified threats. Moggridge (1993) referred to the problems that accompany an aging population in developed countries, especially in America. He believed IDEO's design approach could help to solve these problems by contributing to the development of physical products for elderly people. Brown stated that humanity faces an enormous number of problems that have "people at their heart" (Brown, 2008, p. 92), and that these problems could be solved only through human centered innovation, or DT. In contrast, Martin (2004) was more explicit about threats and stated that: These are turbulent times for business, as companies struggle to adjust to the globalization of markets and competition, the expansion of the service-based economy, the impact of deregulation and privatization, and the explosion of the knowledge revolution. (Martin, 2004, p. 7).

In a later article, targeting business education, Dunne and Martin (2006) stated that business schools are under intense criticism and, in the view of some, have reached a point of crisis. Both academics and management practitioners criticize MBA programs for their lack of relevance to practitioners, the values they impart to students, and their teaching methods (D. Dunne and Martin, 2006, p. 522).

In comparison, publications during the phase of Specialization, such the "Human Centered Design Toolkit" (IDEO and Bill & Melinda Gates Foundation, 2008) or "Design Thinking for Educators" (IDEO, 2011, 2012) did not refer directly to threats, but mentioned specific problems faced by a certain profession (e.g. educators) or individuals in case studies and which might be interpreted as threats. An example would be questions that raised doubts such as "Enter a new region? Adapt a technology to your region?" (IDEO and Bill & Melinda Gates Foundation, 2008, p. 1), or "… there is an underlying expectation that educators must strive for perfection, … that they should always be flawless role models. This kind of expectation makes it hard to take risks. It limits the possibilities to create more radical change." (IDEO, 2012, p. 3). Overall however, IDEO authors seemed to be more engaged in pointing out the benefits rather than the threats (e.g. Brown, 2008).

In summary, threats seem to increase in generality (e.g. product needs of an aging population to management education and globalization) during the phase of Packaging. During the phase of Specialization, threats were found to be reduced in generality and ambiguity, and focused on specific problems.

Warrants

During the phase of Packaging warrants became more general, although their development differed among success stories, historical examples, and author affiliations.

Initial success stories draw attention to how IDEO's employees developed a specific product (e.g. products for elderly people, computer mouse, etc.). Later publications described single projects in terms of areas of contribution, suggesting that DT was used to innovate the product, the interaction, the overall user experience, etc. An example was the successful case of the Bank of America (Brown, 2008). Here, the focus was on the customer experience (an easy way to save money by rounding up bills paid) and on the product (a special bank card) and the changes and impact related to the bank's business (offer of a new savings account that led to increased saving). Overall, success cases portrayed a development from DT as a way to design products (Moggridge, 1993) to provide services (Kelley and Littman, 2001) to more general examples of innovating the "consumer experiences" (Nussbaum, 2004) and "business innovation" (Brown, 2008). It would seem that the accumulation of success cases in IDEO's work portfolio – which is seen as typical for a design consultancy – led to a database of warrants that allow for a variety of adaptations.

In addition to the success stories and historical references, an increasing number of magazine articles and conference papers act as a second source of warrants. For example, Sutton and Hargadon (1996) wrote a case study on brainstorming at IDEO, comparing their work to the famous Edison Labs. Brown (2008), also referred to Edison in his HBR article. Reliance on historical references continued in later publications, thus Brown (2009) referenced the accomplishments of Isambard Kingdom Brunel in relation to the Great Western Railway as an iconic example of how DT can be applied to systems.

A third source of warrants can be seen in the affiliations of authors and publications. Since multiple publications were published anonymously the ambiguity in authorship suggests that they were "official" documents published by the d.school at Stanford University. Since Stanford University is a widely recognized educational institution, and IDEO became even more famous due to frequent features in the business press, the impression gained was that the institutions rather than individual authors were behind DT. Further, the affiliations of authors of books and articles highlighted the institution, e.g.: Tim Brown (CEO IDEO), David Kelley (IDEO, Prof. at Stanford University), Sutton and Hargadon (Stanford University), and Roger Martin (former Dean of the Rotman School of Management, University of Toronto and P&G advisor).

To summarize, during the phase of Packaging, success cases stories and warrants became more general and ambiguous in their descriptions of the use of DT. Initial publications targeted specialized audiences, later publications featured more general examples sketching a variety of ways of applying DT, thus increasing ambiguity. Warrants changed from describing a way of working to illustrating the influence of DT. In addition, success cases, historical examples and authors became more diverse (e.g. service, product, business process, etc.). This increased ambiguity, since it suggested that DT could be applied generally. Further, anecdotal references (such as to Edison) were more frequently featured, increasing generality by giving the impression that DT had always been present and thus, was indeed a "timeless approach to innovation".

This process of generalization of warrants changed during the phase of Specialization. Warrants became less general and less ambiguous in regards to a specific area of application. IDEO collaborated with renowned institutions such as private (e.g. IDEO & Bill & Melinda Gates Foundation, 2008) and non-governmental organizations to develop specific success cases (e.g. Borwn and Wyatt, 2010). These success cases served as warrants that were used as general examples in relation to e.g. libraries, but also to exemplify and justify the use of specific practices and techniques.

Development of the interpretability of the rhetorical dimension at an inter-organizational level

In summary, all textual elements have been found to increase in generality and also to some extent in ambiguity during the phase of Packaging. After the label DT became established, and adaptations to specific fields were published, claims, threats and justifications were found to decrease in ambiguity and generality and publications became more tailored towards specific organizations (e.g. libraries, schools). Overall, and in line with the assessment of Giroux (2006), the level of vagueness could not be assessed since most elements were found to be ambiguous or general rather than vague.

Summarized as interpretability, the generality and ambiguity of rhetorical textual elements were found to increase during the phase of Packaging and to decrease during the phase of Specialization (Table 7).

Table 7: The development of generality and ambiguity of rhetorical textual elements at an inter-organizational level.

	Development during Packaging		Development during Specialization	
Textual element	Generality	Ambiguity	Generality	Ambiguity
Label	+	+	-	-
Central claim	+		-	
Superiority claims	+		-	
Threats	+		-	-
Warrants	+	+	-	-

+ increased, - decreased, = remained similar, no findings in case the field is left blank

The technological dimension

Similar to the rhetorical dimension, this section analyzes the development of interpretability of DT focusing on textual elements of the technological dimension: principles, practices, techniques, and implementation instructions and warnings. The detailed analysis is summarized at the end of this section.

Principles

In line with the definition of principles as general guidelines, they were found to be general (i.e. they apply to a multitude of unspecific situations) and ambiguous (e.g. "one conversation at a time" (d.school, 2009) could mean that one person is speaking or one topic is discussed). While the wording changed slightly during the development, principles such as diversity (d.school, 2010; Martin, 2011) were repeated continuously after their first introduction (Brown, 2008; Kelley and Littman, 2001). Further, the number of principles increased over time. In 2008 Brown proposed five principles, while later publications suggest seven (d.school, 2010), adding new ones such as "creative confidence" (Kelley and Kelley, 2013). Since these principles are sometime contradictory (e.g. "stay focused" and "encourage wild ideas"), ambiguity as well as generality increases with the number of explicitly stated principles. Comparing the phase of Packaging to the phase of Specialization, the most obvious change is the increase in explicitly stated principles.

Publications during the phase of Specialization group principles into a category labeled "mindsets" (d.school 2009,2010; IDEO 2014). Mindset is used to refer to the way people should think, and is mentioned first in a publication by the d.school (2009b) and then in later publications by IDEO (e.g. IDEO, 2011, 2014b; Ideo.org, 2015).

Overall, principles became less interpretable as they were singled out, defined, and labeled as mindsets. However, taking individual principles as general guidelines, renders them interpretable.

Practices

Overall, the interpretability of practices can be regarded as high since they are general practice descriptions. However, analyzing their development in detail reveals some interesting patterns.

First, the number of practices advocated varies between three and six. Early on, McKim's (1980) sequential depiction of practices seemed influential due to the similarities among later descriptions. However, one significant difference is present in the form of two practices, strategy selection, and clearing and relaxing the mind. These practices do not figure in later publications. In an early publication discussing IDEO's practices, Moggridge (1993) described four sequential practices used in the development of products for elderly people: *understanding* the problem, *observing* the users, *visualizing* ideas, and *testing* ideas with users. Later practice descriptions vary very little and describe a similar overall sequence of practices. The biggest difference seems to be the emphasis on specific practices, reflected in their grouping and nesting. For example, the d.school in Stanford changed its description from a separate 'understand' and 'observe' practice to one that integrates both and is labeled 'empathize'. Similar developments occurred in relation to ideation (or brainstorming) and prototyping or visualizing and testing. Here practices were grouped and referred to under one practice (e.g. ideation as a label for ideation and prototyping).

Second, the names of the practices have changed over time but became more stable in later phases of discourse development. For example, once brainstorming was replaced by ideation, the name was used continually. Further, while the emphasis on practices have varied, their naming have been fairly consistent, although the various groupings might tend to suggest otherwise at first sight.

Third, during the phase of Packaging and Specialization, most authors described practices in a temporal succession, indicating an iterative or linear sequence, referred to as a process. An exception was Brown (Brown, 2008, 2009), who opposed the idea of a process. However, his view seems to have had little influence since other authors, including later IDEO publications, all present and describe practices as a sequence. The description of these sequences of practices are less ambiguous (e.g. *understanding* the user, *defining* the problem based on user research) and they are similarly described with little variance between early descriptions from the Apple Human Computer Interface Design Group (Mountford, 1990) and later descriptions from IDEO and the

d.school (e.g. d.school, 2010; Moggridge, 1993; Nussbaum, 2004). This indicates that these practices were considered the "standard way to do things".

An irregularity in the development of practices is the description of an implementation phase in some publications by or about IDEO. The implementation phase attempted to describe how ideas and concepts should be developed further within the organization. These descriptions were general (e.g. Brown, 2008) during the phase of Packaging, and more specific during the phase of Specialization since they target a specific type of organization (e.g. school, development organization, library). The d.School publications generally left out this step (d.school, 2010).

To summarize, multiple developments in relation to the interpretability of practices can be identified. First, the number of practices advocated varied throughout since they were grouped and nested depending on the publication, increasing their interpretability slightly. Second, the naming of practices became more similar, thus decreasing interpretability. Third, the overall description of practices and their succession seems to have varied very little and were similar amongst publication. Given these developments, interpretability of practices seems to decrease slightly due to the increasing similarity amongst publications.

Techniques

Early publications argue in more general terms for specific techniques (e.g. storytelling, scenario building) to be used by portraying their use as part of different practices. An example is the use of scenario building which was described as used in exploration as well as prototyping (Fulton Suri and Marsh, 2000). Thus the technique itself was described in specific detail but in relation to multiple practices, which rendered the use of the technique general and ambiguous. This changed during specialization when each practice was described as entailing a number of specific techniques. Thus, each technique was attributed to one practice, and its use was less ambiguous. An exception is ideation; most publications mentioned only one technique – brainstorming – which was first introduced as a practice label. Later publications referred to multiple techniques in addition to brainstorming and the label was changed to ideation (e.g. d.school, 2009b, 2010). Further, publications during specialization described an increased number of specialized techniques in relation to each practice, further reducing ambiguity.

Overall, single techniques were step-by-step instructions and thus were low on interpretability. However, during the phase of Packaging their interpretability was comparatively high due to the multitude of practices for which they could be employed. This changed in later publications where

interpretability decreased as techniques were described in more detail and as being executed in relation to one practice.

Implementation guidelines regarding DT

No explicit or detailed guidelines have been identified on how DT could be implemented in relation to a pre-existing organizational structure or culture. However, multiple publications feature descriptions of the physical work environments of IDEO and the d.school. Also, Martin (D. Dunne and Martin, 2006) compared the organizational environment to the design studio environment, and various cases provided some information about how large organizations work with DT (e.g. Brown, 2008; Martin, 2009). An important development regarding implementation guidelines occurred in relation to who should engage in DT. During the early phase of Packaging, publications (e.g. Moggridge, 1993) focused on how designers, and more specifically, IDEO employees worked for organizations. Towards the end of Packaging, the focus shifted to how designers worked with organizations to implement DT (e.g. Brown, 2008; Kelley and Littman, 2001). Here, generality increases with general advice such as "involve design thinkers at the very start of the innovation process" and "find talent any way you can" (Brown, 2008, p. 90). During the phase of Specialization, publications started to described how employees in organizations could work with DT themselves (IDEO, 2012, 2014b). Non-IDEO authors even portrayed companies as working with DT without the involvement of IDEO. An example is Martin's (2009) book, which described how P&G adapted DT, and a case study on the software company Intuit (Martin, 2011).

Further, DT texts seem more specific about characterizing how teams and individuals should work. Brown (2008, p. 87) for example, provided a list of characteristics portraying the "design thinker", and publications such as Stanford d.school's bootcamp bootleg (d.school, 2010) provided techniques for how to share feedback in teams (e.g. "I like, I wish, What if"). Brown (2009) stated that it might be difficult to train people to get the necessary cross disciplinary as well as the specialized skill set required for DT. This was also the only implementation warning that could be identified.

Overall, some implementation guidelines can be identified. However, given the variety as well as the limited detail of the texts, this information is ambiguous and general in the first phase of Packaging, but less so during the phase of Specialization.

Development of the interpretability of the technological dimension at an inter-organizational level

To summarize, the development of interpretability of the technological dimensions generally is inversed to the development of the rhetorical dimensions, with the exception of the implementation guidelines. First, some textual elements decreased in terms of interpretability. Principles became more clearly stated and summarized. Practices became more similar in their naming and use, and overall were described in a similar succession. However, they slightly increased in ambiguity due to variance in grouping and nesting of practices as parts of each other. Further, techniques became clearly attributed to one practice and more detailed techniques were added during specialization. Thus, overall it is argued that the technological dimensions decreased in interpretability.

Summarized as interpretability, the generality and ambiguity of technological textual elements were found to decrease during the phase of Packaging and the phase of Specialization (Table 8).

Table 8: The development of generality and ambiguity of technological textual elements at an inter-organizational level.

	Development during Packaging		Development during Specialization	
Textual Element	Generality	Ambiguity	Generality	Ambiguity
Principles		-		-
Practices		+/-		=
Techniques	-	-	-	-
Implementation Guidelines	+	+	-	-

+ increased, - decreased, = remained similar, no findings in case the field is left blank

7.2 Interpretability of DT at an intra-organizational level

The studied companies adopted DT during the first phase of the development of the MI, previously referred to as the phase of Packaging. In this section adaptation of the MI in the studied organizations is described, and compared to the development in the phase of Packaging at the inter-organizational level. The analysis is based on the studies and findings presented in Papers I to V. Since all the papers are based on companies who have adapted DT, the dimension "implementation guidelines" is not analyzed. Further, threats and superiority claims were not explored specifically in the underlying studies and are thus not analyzed in detail. As in the

previous chapter, this chapter presents the findings first in relation to the rhetorical dimension and then in relation to the technological dimension.

The rhetorical dimension

The development of interpretability of rhetorical dimension at an intra-organizational level is analyzed focusing on the individual textual elements, and their development is summarized at the end of this section.

Label

Overall the label DT is perceived as sometimes problematic due to its ambiguity (Paper II). The vagueness of the term design in DT resulted in different interpretations. Thus, the label became associated with traditional design disciplines and as such the gestalt of objects (Paper II, IV). The term "thinking" contributed to the overall ambiguity since it was perceived as indicating that nothing (physically) was involved, although individuals working with DT perceived themselves as doing things with their hands (Paper IV). Further, the vagueness of the word design led to a conflict between DT adaptation initiatives and existing design functions in some firms (Paper II, IV). Given these difficulties, some firms relabeled DT more generally as "user centered innovation" or "innovation" (Paper IV). Others decreased ambiguity by developing their own label in combination with company specific terminology, such as "design for delight (D4D)" or "design for improvement". Interviewees perceived company specific labels as less misleading and easier to understand, hence less general and less ambiguous.

One exception was the case of a computer electronics company (Study II) . Here, the manager in charge of DT stated that he found his department's activities and rhetoric very similar to DT. As top management became increasingly interested in DT, he stated that he adopted the label to generate increased top management support.

Overall, two ways in which the label developed can be identified. In the first case, only the label was adopted unchanged, thus interpretability was sustained. In case two, interpretability decreased due to the adaptation of the label in relation to the organization.

Central Claim

With regard to the central claim, individuals stated multiple variations. Some interviewees saw DT as a systematic problem solving tool (Paper II) or a general innovation approach (Paper III). These interviewees gave various, company specific examples, to underline their claim, ranging from applications as diverse as human resources and finance (Paper II) to products and services

(Paper III). In some cases, where there were ambitions to foster DT across the organization, individuals claimed that DT was about changing the culture of the organization. Special emphasis was put on principles and making them part of every employees' mindset (Paper III). At the individual level, DT was claimed to increase empathy and thus also leadership skills and team performance (Paper III).

More often than the central claims, individuals were stating more specific, organization related claims. Examples included the statement that user centeredness leads to the development of offerings (e.g. products, services) which were claimed to be closer to what their customers wanted (Paper II, III). Some individuals claimed that their product development time decreased as technical challenges were discovered and addressed early on through rapid prototyping (Paper II, III). These claims were less ambiguous as they referred to specific principles or practices, however they were still general in terms of their impact.

With the exception of the central claim of DT leading to innovation, other claims made by individuals were less ambiguous but remained general.

Superiority claims

Since the studies did not aim to investigate superiority claims, only a few examples can be highlighted. One interviewee with previous experience in design described DT as a label for "really good" user-centered design, rendering it superior to user centered design (Paper II). Others were less enthusiastic and described DT as utilizing pre-existing design methodologies (Paper II). In two companies the founders related to DT as an entrepreneurial approach, similar to what they had used when they founded the firm (Paper IV). Further some individuals compared individual practices (e.g. rapid prototyping) to previous practices, rendering the new practices as improved versions (e.g. learning through prototyping vs. prototyping to present).

Similar to the central claims, comparisons seem to be more specific to organizations or individual experience, and thus less general and ambiguous. However, given that superiority claims were not specifically investigated, further investigation is required to draw any conclusions.

Threats

When asked about reasons for adoption, individuals mostly referred to potential gains such as an increased innovativeness (Paper III). However, some interviews mentioned that the company had lost its entrepreneurial roots, speculating that if they did not innovate it would lose its competitive edge (Paper II). However, the overall lack of threats might be due to the focus of the studies –

threats were not specifically investigated. Thus, the interpretability of threats cannot be assessed in this study.

Warrants

In general, DT warrants such as success stories and experts from other companies, lost their initial appeal during adaptation (Paper IV). Thus, managers concerned with adaptation, felt increasing pressure to present company specific warrants, proving the usefulness of the DT (Paper IV). This was achieved in various ways but in ways that are similar across organizations. First, more recent external warrants were presented, such as guest speakers, business press articles, and research publications (Paper IV). Second, intra-organizational projects using DT were documented and presented as company specific success cases. Third, in some cases, project based metrics were employed to get measures before and after a DT project. Fourth, collaborations were initiated with powerful groups and individuals inside and outside the organizations (e.g. CEO, top management, university professors). These were then used as references when presenting internal DT efforts to other individuals inside and outside the organization. Fifth, DT team spaces were created providing a concrete, physical location for DT. Sixth, DT workshops were hosted. These one- to two-day events were described as fun experiences where individuals worked based on DT to create innovative concepts (Paper II, IV).

Compared to the Packaging phase, warrants became less general as they became adapted to an organization, group and or individuals. A reduction in generality and ambiguity was also evident in the level of detail in which they were reported in the study.

The development of interpretability of the rhetorical dimension at an intra-organizational level

All textual elements were found to decrease in generality and ambiguity, thus decreasing interpretability during adaptation. This was due mainly to replacement of labels, general claims, and warrants with organization specific ones. However, the adapted elements were generally easily interpretable, e.g. labels and general claims were organization specific but were still ambiguous and general.

Summarized as interpretability, the generality and ambiguity of rhetorical textual elements was found to decrease during adaptation (Table 9). The development of superiority claims and threats cannot be assessed due to lack of empirical data. Table 9 also presents the developments during the phase of Packaging to allow for comparison.

Table 9: The development of generality and ambiguity of rhetorical textual elements, comparing Packaging at an inter-organizational level and the adaptation at an intra-organizational level.

	Development during Packaging at an inter-organizational level		Development during adaptation at an intra-organizational level	
Textual Element	Generality	Ambiguity	Generality	Ambiguity
Label	+	+	-	-
Central claim	+		-	
Superiority claims	+			
Threats	+			
Warrants	+	+	-	-

+ increased, - decreased, = remained similar, no findings in case the field is left blank

The technological dimension

The interpretability of textual elements in the technological dimension is analyzed in detail and their development summarized at the end of this section.

Principles

Compared to the late stages of the Packaging phase, almost all principles were mentioned by the interviewees. However, wording and emphasis varied (Paper V). The analysis of principles in Paper V resulted in a list of stated principles which featured all previously stated interviews summarized as "being empathic", "thinking through doing", "bias towards action", "learning-oriented", and "being comfortable with complexity and ambiguity" (Paper V). However, the distinction between principles was not always clearly expressed and was partly overlapping (Paper V). An example might be that "eagerness to share" indicates one should talk while being "empathic*"* could be interpreted as being attentive and listening. At times DT was described only as a set of general principles (Paper II) which ideally would become the mindset of the employees working with innovation (Paper V). In two cases being empathic with users was adapted in the central principles of a firm in an attempt to make it part of the company culture (Paper IV). In other companies, principles were used as general guidelines for training (workshops) and teamwork (Paper II)

Compared to the Packaging phase, all principles were stated and described in similar general and ambiguous terms. However, since they were stated in relation to a variety of circumstances, and phrased in a variety of ways, principles were more generally used.

Practices

Overall practices were often adopted as a sequence of practices similar to those described on the Packaging phase, as an iterative process preceding a pre-existing development process, or as a way of working in independent, specialized DT teams. These teams were described as utilizing the process to facilitate workshops and training, and to run special innovation projects (Paper I, II, V).

In rare cases, specific practices were adopted and introduced as new process steps in pre-existing R&D processes (Paper I). This was done if they were found to be similar or compatible with pre-existing practices. In these cases, rapid prototyping and ethnographic user studies were described as not present before adaptation of DT (Paper III, V). As the practice became routinized as part of the organization, its interpretability was reduced and the practice became associated to a specific function (e.g. R&D). In one case, DT practices were combined with practices for continuous improvement (Paper II). This led to the development of what could be described as a new internal MI, which was only based partly on DT.

Overall, DT practices developed in two distinct ways regarding their interpretability. In the most common cases, practices were described as similar to Packaging phase, thus interpretability did not change. In cases where practices were adapted as part of or in relation to pre-existing practices, interpretability decreased, and practices were seen not as general but as specifically applicable. Thus, the development of interpretability seems to depend on the adaptation.

Techniques

Many of the techniques stated during the Packaging phase (e.g. observation, brainstorming, interviewing) were adopted by almost all companies. However, the number of stated techniques exceeded the lists in popular discourse (Paper V). This seems to be the result of organizations developing and modifying techniques, and adopting additional ones to meet their specific requirements (Paper V). In addition, some interviewees mentioned using DT techniques to solve personal, every day challenges (Paper V). Thus, some techniques became more generally applied, and some more specific techniques were developed.

Compared to the Packaging phase, techniques increased in terms of their interpretability for two reasons. First, they were applied more generally. Second, they were modified and additional techniques added, thus the number of available choices for various circumstances increased.

Development of the interpretability of the technological dimension at an intra-organizational level

To summarize, the development of interpretability of the technological dimensions was diverse within the companies and was influenced by the form of adaptation. It is therefor difficult to identify general trends. Principles increased in interpretability, and were described by various terms, and in various circumstances. However, an exception was identified in one case, where one principle was stated as a general principle at the organizational level. The development of practices at this level depended on the use of DT but was found to be mostly similar to the Packaging phase. It was influenced mainly by the adoption of DT as a process for workshops, or as an early product development phase; however, the temporal succession of practices seems to depend on the circumstances. Techniques on the other hand, increased in interpretability and were described as being applied in a variety of circumstances; also the available choices, and thus interpretability increased with organization specific developments. These developments are summarized in Table 10 in comparison to the development during Packaging at an inter-organizational level.

Table 10: The development of generality and ambiguity of technological textual elements, comparing Packaging at an inter-organizational level and adaptation at an intra-organizational level.

	Development during Packaging at an inter-organizational level		**Development during adaptation at an intra-organizational level**	
Textual Element	Generality	Ambiguity	Generality	Ambiguity
Principles		-		+
Practices		+/-		=/-
Techniques	-	-	+	+
Implementation Guidelines	+	+		

+ increased, - decreased, = remained similar, no findings in case the field is left blank

8 The development of interpretability

This chapter summarizes and discusses the findings regarding the development of interpretability at the inter- and intra-organizational levels, in relation to theory, to address research questions two and three. Both developments are compared and discussed in the last section of this chapter. The investigation was aimed at what can be learned about development of interpretability of MIs based on the case of DT.

8.1 At an inter-organizational level

This section discusses the development of the rhetorical dimension followed by the technological dimension, and compares the developments in both dimensions to address RQ2.

The rhetorical dimension

The rhetorical dimension increased in interpretability as the discourse developed. This was reflected in the label as well as the central claims, threats and warrants. These findings confirm most previous research showing that interpretability increases with the popularity of an MI (Benders and van Veen, 2001; Giroux, 2006). A deviation occurs in the development during the phase of Specialization where publications address specific areas of application. This was clear from how they were labeled e.g. “Design Thinking for Librarians” (IDEO, 2014). In addition, warrants and claims became more detailed and specifically linked to the area of application of DT e.g. libraries. This was achieved partly through collaboration with organizations in the area of application. Thus, adaptations were developed, theorized and labeled leading to a particular version of DT, and thus a reduction in interpretability due to the relation to a specific field of application. Although it could be argued that these specialized versions might increase interpretability at the inter-organizational level, they reduced the interpretability of the rhetorical dimension in relation to the area of application. Thus, the interpretability of MIs might reduce as they gain popularity in relation to specific areas of application. Development of specialized versions (e.g. sector specific standards for TQM) seems to have been mostly overlooked in

previous research on interpretability (e.g. Benders and van Veen, 2001; Giroux, 2006; Kieser, 1997).

The technological dimension

In the technological dimension, interpretability was found to decrease in relation to principles, practices and techniques. This was due mainly to the following factors. First, principles became singled out and stated explicitly under the label of mindsets. Second, practices were similarly named with little variance related only to their grouping and nesting. Third, techniques were described in relation to each single practice, reducing their ambiguity and generality. In relation to this general trend, it should be pointed out that these three textual elements are characterized by different levels of interpretability. Here, principles are general guidelines, and thus are more general than practices which refer to certain activities, and techniques which are specific step-by-step instructions. Thus, while the interpretability of these elements decreased overall, the interpretability of principles was considered relatively higher compared to the interpretability of techniques. The analysis revealed also a decrease in interpretability during the phase of Specialization. Here, an additional practice concerning the implementation of ideas and concepts was added along with specific instructions and techniques with regard to the area of application. The reduction in interpretability during the phase of Packaging and the phase of Specialization has not been identified in earlier research, perhaps due to the focus of previous research on an overall increase in interpretability (Benders and van Veen, 2001; Giroux, 2006).

The development of interpretability at an inter-organizational level

Overall, interpretability of the rhetorical dimension of the MI was found to increase, confirming previous findings (Giroux, 2006). An exception to this general trend was found in the development of the technological dimension, where the interpretability decreased. Further, during the phase of Specialization, the rhetorical and technological dimensions were found to target specific areas of application, which led to a decrease in interpretability. These findings, contradict previous findings of an overall increase in interpretability in relation to the content of the MI (Benders & Van Veen, 2001). The findings in this thesis suggest that interpretability of an MI's technological and rhetorical dimensions show an opposite correlation during the phase of Packaging. That is, during this early phase, the interpretability of the rhetorical dimension increases, while the interpretability of the technological dimension decreases. Further, the overall interpretability of the MI seems to decrease during the phase of Specialization, which is marked by the adaptation of the MI to specific areas of application.

Birkinshaw and colleagues (2008) conceptualize management innovation as a process that takes place between individuals both internal and external to the organization. This thesis contributes by showing how the development of an MI can occur also at the inter-organizational level, thus between individuals working in multiple organizations. This development seems to be influenced largely by the interpretability of the MI and whether it allows for various actors from different organizations to participate in the development of the MI, despite the variety of ideas and conceptualizations.

8.2 At an intra-organizational level

This section discusses the separate development of the rhetorical and technological dimensions and then compares them in order to address RQ3.

The rhetorical dimension

The interpretability of the rhetorical dimension was found to decrease during adaptation. This development was characterized by the increased specificity of the labels, warrants and claims with regard to organizational and personal experience. Thus, the development might be seen as similar to the phase of Specialization at the inter-organizational level. However, there were some deviations in this general development. First, claims and warrants became more specific which led to decreased interpretability. However, the amount of them increased, suggesting an overall increase in interpretability, this is caused by the diversity of personal experience and non-standardized communication regarding the rhetorical elements. Second, the label was rarely adapted, thus its interpretability was stable. Maintaining the label increases the likelihood of individuals being influenced by developments at the inter-organizational level. Thus, maintaining the label opens the way to inter-organizational developments to influence intra-organizational developments, and vice versa.

The technological dimension

The interpretability of the technological dimension develops in two ways, both of which are characterized by the development of practices.

In the first case, interpretability of the technological dimension decreased as practices were adapted and routinized. This was exemplified by the experience of two organizations. In the first organization, DT practices, principles and techniques were adapted selectively as part of a pre-existing R&D process. Thus, the perceived similarity of the technological dimension to already routinized technologies benefited routinization. This finding supports Ansari and colleagues'

(2010) argument that the similarity (fit) between the technological dimension and the organization influences adaptation. In the second case, the technological dimension was further developed in relation to an established approach to evaluate the impact of improvement efforts. This case was an exception because it led to a redefining and restructuring as well as theorizing and labeling of a specialized version of DT since it added practices and techniques that allowed implementation as well as measurement of the impact of ideas and concepts. Hence, this case seems similar to the development during the phase of Specialization.

In the second, and more common case, the adaptation of DT led to little redefining and restructuring. This was characterized by the similarity of practices which were adopted largely unchanged. There were slight changes in relation to the techniques, all of which were adopted but were sometimes adapted or complemented by more organization specific practices. Also, principles were more widespread, similar to the overall discourse. Thus, the technological dimension was only slightly redefined and restructured, perhaps for several reasons.

First, it might be that managers wanted to maintain interpretability in order to foster widespread adoption or uphold the claim that DT was a general approach to innovation. If this was the case, there were little evidence that it was intentional since few measures were taken to align practices to the organization, leading to a scaling up of challenges which could have been resolved before scaling. Thus, if the aim was to spread DT, this was done without considering that DT needed to be adapted.

Second, it might simply have been that redefining and restructuring of DT takes time, which is in line with previous theoretical statements (Birkinshaw et al., 2008). However, there were little evidence of redefining and restructuring of practices which could have occurred given the development in the rare cases of routinization or theorization and labeling.

Third, it might have been that individuals were not able to articulate the adaptations they had made. However, since a significant number of individuals were involved in training others in DT this hypothesis is unlikely. These individuals should have been able to communicate practices including adaptations.

Finally, the experience of individuals might have influenced their ability to redefine and restructure the technological dimensions. Thus, individuals with no related experience might have been more likely to imitate the technological dimension than individuals with similar technologies in place. Thus a similarity of the technological dimension would allow for a comparison and thus

identification of differences, and thus the selection and adaptation of principles, practices or techniques, which appear superior.

Overall, it seems evident that individuals engaged in little redefining and restructuring prior to the intra-organizational spread. Possible reasons for this behavior are a lack of DT related and adaptation experience, and individuals not being aware of the consequences of maintaining interpretability.

Development of interpretability at an intra-organizational level

Adaptation of DT resulted in a decrease of interpretability in the rhetorical dimension, and with some exceptions, maintenance of interpretability in the technological dimension. However, in reference to Ansari and colleagues (2014), this development can be considered a double-edged sword - interpretability supports spread but also allows for a variety of adaptations and thus decoupling. Rogers (2003) warns that a lack of redefining and restructuring could have negative consequences as the MI might be perceived as foreign, thus increasing organizational resistance.

Birkinshaw and colleagues (2008) propose that MIs with high levels of interpretability are easier to adapt than MIs with low levels of interpretability. This thesis argues that an MI consists of two dimensions. A rhetorical dimension, which is easier to adapt when its interpretability is high, and a technological dimension which is harder to adapt when its level of interpretability is low. Hence, to assess the ease of adaptation, both dimensions have to be considered.

8.3 Discussing the development of interpretability

The analysis showed that the interpretability of the rhetorical dimension of interpretability increased during the phase of Packaging. However, when adapted on the intra-organizational level, or to specific fields of application during the phase of Specialization, interpretability decreased. Exceptions are threats and superiority claims; the available data do not allow for a detailed analysis of those elements.

When it comes to the technological dimension, the analysis shows that their interpretability decreased during the phase of Packaging. This development was largely maintained at the intra-organizational level, changing only in rare cases of routinization. Most organizations only redefined and restructured techniques and principles but maintained practices. In addition, the interpretability of the technological dimension decreased further during the phase of Specializations.

Combining the developments at the intra-organizational level during Packaging and at the inter-organizational level during adaptation, a trajectory model is visualized in figure 4, where the developments of interpretability of the rhetorical and the technological dimensions are inversed. This implies that the previously stated paradox could - at least theoretically - be resolved. Comparing the development of interpretability in relation to the rhetorical and technological dimension separately, it is evident that they are characterized by different levels of interpretability over time. The Packaging phase of DT at an inter-organizational level is characterized by an increase in interpretability in the rhetorical dimension and a decrease in interpretability in the technological dimension. Adaptation on an intra-organizational is characterized by decreased interpretability in the rhetorical dimension and increased interpretability in the technological dimension. In comparison, the phase of Specialization is characterized by a further decrease in interpretability of the rhetorical and technological dimensions. These developments, theoretically, resolve the paradox of interpretability since they prove that an MI can be low and high on interpretability at the same time, when the different dimensions are considered.

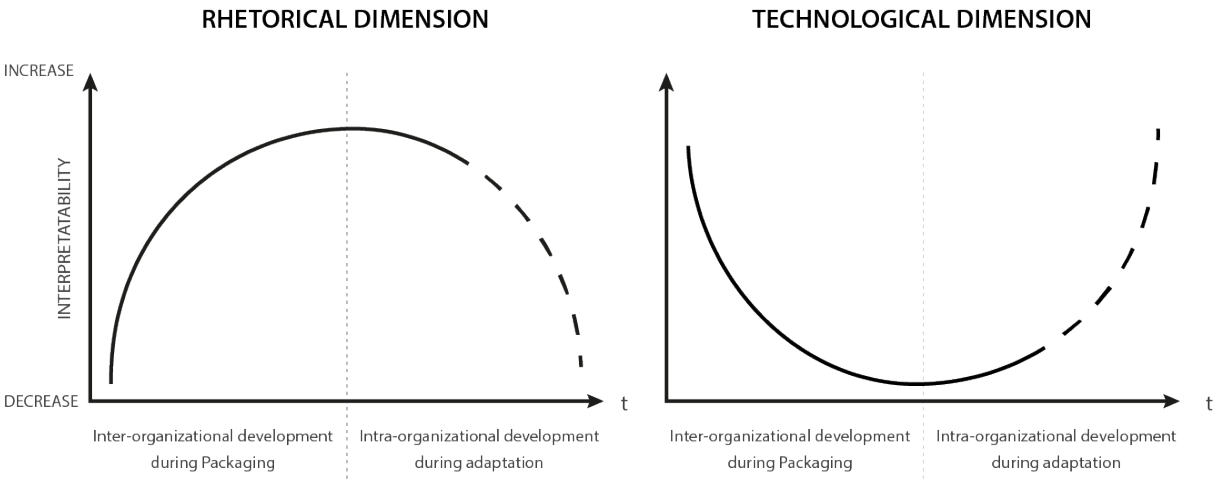

Fig. 4.: Trajectory model of interpretability development of rhetorical and technological dimension (developed by the author).

The inverse development of technological and rhetorical dimensions provide additional empirical evidence that the social and the rational perspectives on diffusion are complementary (Ansari et al., 2010), since it can be argued that both perspectives are true at all times. The reduction in interpretability of the technological dimension leads to reduced complexity, and thus an easy to access rationale. At the same time, an increase in interpretability of the rhetorical dimensions renders the MI universally applicable in a diversity of circumstances, hence supporting a rationale based on the social perspective. Viewing interpretability as a combination of a rhetorical and a technological dimension, allow for the co-existence of the rational and social perspectives that are

not polar opposites or on a continuum (see Ansari et al. 2010), but that can be separated in their focus on two different dimensions.

This finding in relation to the cases examined reveals an interesting development. Most individuals were concerned with adopting DT as an approach to user-centered innovation, and adapting it such that it would contribute to the organization's innovation efforts. However, some cases show a high level of interpretability regarding the rhetorical dimension, and a low level of interpretability regarding the technological dimension. This indicates that individuals' efforts were geared less towards routinization and more towards spread.

While this might have been intentional, the lack of redefining and restructuring produced several challenges. First, not redefining and restructuring the technological dimension to fit the organization could lead to more widespread requirement for intra-organizational adaptations. Thus, the challenges that could have been addressed centrally spread across the organization. Second, allowing for individual adaptation is likely to result in diversification of DT, as exemplified in Paper I, leading to an increase in interpretability and confusion over what DT is and how it should be done. If multiple adaptations of DT exist, DT risks losing its rationale and being perceived as an empty promise - of everything and nothing. The organizations then risk developing an intra-organizational fashion rather than a routinized approach to innovation.

9 Conclusions & implications

This thesis has investigated the development of interpretability of MIs at the inter- and intra-organizational levels, based on six appended papers which discuss the development of DT in large organizations. The purpose of this investigation was to contribute to our understanding of how interpretability develops, and how it can potentially be managed.

9.1 Conclusion

The thesis first proposed a definition of technology focused MIs to include two dimensions of textual elements: the rhetorical and the technological dimension. It also detailed the textual elements of these two dimensions. This was required since previous investigations of interpretability assess a diversity of textual elements, focusing mostly at the inter-organizational level, without including the technological dimension.

At the inter-organizational level, two phases of development, Packaging, and Specialization, have been identified. The phase of Packaging is characterized by reduced interpretability in the technological dimension, leading to simplified explanations regarding what should be done and how things should be done. At the same time, the interpretability of the rhetorical dimension increases, leading, e.g. to more general claims regarding when and why an MI should be applied. The second phase of Specialization is characterized by a reduction of interpretability in the rhetorical dimension since label, warrants and claims are directed towards a specific area of application (e.g. library, education). The technological dimension decreased further in interpretability, as more specific techniques were added. The identification of an overall reduction in interpretability of the technological dimension contributes to our understanding of the development of interpretability since previous work focuses mainly on the development of the rhetorical dimension (Benders and van Veen, 2001; Giroux, 2006). Further, the identification of specialized versions of the MI question previous research findings of generally increased interpretability.

At the intra-organizational level, the interpretability of the rhetorical and technological dimensions develops inversely: when the interpretability in the rhetorical dimension decreases, the technological dimension increases. Here, adaptation efforts led to a redefining and restructuring of the rhetorical dimension and little adaptation regarding the technological dimension. This indicates a low level of awareness of managers regarding interpretability of the technological dimension. Further, previous research implied that adaptations of MIs depend on their overall interpretability (e.g. Birkinshaw et al. 2008). However, this thesis found that adaptation is influenced differently depending on the two identified dimensions.

Also, when comparing inter- and intra-organizational development, it was found that the rhetorical and technological dimensions of MIs develop inversely regarding interpretability. Thus, the interpretability of the rhetorical dimension increases during Packaging and decreases during Specialization, redefining and restructuring, and routinization. In comparison, interpretability of the technological dimension decreases during the phase of Packaging of the MI but increases during its redefining, restructuring, and routinization. Given these developments, the paradox of interpretability is at least theoretically resolved since an MI can be high and low on interpretability simultaneously. This has additional implications in conciliating the rational and social perspectives in diffusion theory. Focusing on the rhetorical dimension, social accounts are considered relevant. Focusing on the technological dimension, rational accounts are considered relevant. Thus, these perspectives are complementary when interpreted in relation to a definition of MI that include two dimensions of textual elements.

9.2 Theoretical contributions & areas for future research

The main contribution to the understanding of the development of interpretability of MIs is the identified inverse development of interpretability in the rhetorical and technological dimensions, which partly resolves the paradox of interpretability.

Further, this thesis makes several other theoretical contributions. First, it proposes a structural framework to analyze technology focused MIs, distinguishing a rhetorical and a technological dimension consisting of a defined set of textual elements. The framework could be exploited in future research on the similarities and dissimilarities in technology focused MIs (e.g. TQM, BME, Lean Startup, Six Sigma etc.). It could also lead to the development of taxonomies whose absence is seen as one of the main barriers to research on MIs (Damanpour, 2014b). Future research could investigate the influence of these textual elements on the spread of MIs and examine whether the composition of the technological dimension has implications for MIs' interpretability and spread.

Second, this thesis also contributes by developing a decision tree model which enables an assessment of ambiguity, generality, and vagueness. Based on Giroux (2006) the model could increase the reliability of future analyses by allowing for a simple distinction between these three characteristics.

Third, this thesis extends previous research on intra-organizational adaptation (Birkinshaw et al., 2008; Rogers, 2003) in relation to translation theory. This allows four stages of adaptation to be distinguished: matching, redefining and restructuring, theorizing and labeling, and routinization. These stages could be used to distinguish companies based on the stages of adaptation and allow for more detailed comparison regarding their activities and progress.

Fourth, In the context of the development of interpretability of MIs, this research shows that the level of interpretability in the rhetorical and technological dimensions are inversely related, which contributes to previous research focused mainly on the development of the rhetorical dimension. Focusing on the discourse, future studies could investigate adaptation beyond the discourse, using observations.

Finally, the identification of two phases of development of an MI at the inter-organizational level (Packaging and Specialization) highlighted the existence of MIs specifically tailored towards an area of application. This phenomenon is worthy of further exploration. First, the effects of these adaptations on spread and future adaptations could be explored. Second, as these application specific versions of DT were developed by a design consultancy (IDEO), it would be interesting to investigate their development from a design theory or management innovation perspective.

9.3 Practical implications

The results presented here have many implications for practice. First, interpretability of MIs and the consequences of non-adaptation in their efforts is relevant to any individual concerned with the widespread adoption, and/or adaptation of MIs. While this may seem simple, describing the topic of this thesis to some practitioners showed that some were initially not aware of the challenges, and the need for adaptations, and how these challenges could be managed.

Before initiating the adoption of a new MI, managers concerned with adaptation could discuss what the adoption is aiming at (e.g. spread, routinization, etc.), the answer to which would provide a first hint about how the interpretability of the rhetorical and technical dimensions could be managed.

Previous studies suggest considering the technological, cultural and political fit between the MI and the organization (Ansari et al., 2010). An assessment of fit might be achieved by comparing the identified textual elements of both dimensions in relation to the organization. This might lead to a better matching of the MI with the organization. However, it would not guarantee unified adaptation across the organization.

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