

Design Thinking: Critical Analysis and Future Evolution

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Abstract

The importance of design as a source of value creation has been studied for decades. In the late 90's, however, a specific approach in the practice of design achieved a rapid diffusion across organizations: Design Thinking. This is a formal method for creative problem solving characterized by user-centeredness, ideation, and iterative prototyping. The rapid diffusion of Design Thinking in practice has not been coupled with a similarly rapid and robust development of its theoretical underpinnings. Most contributions have been inward-oriented towards a confined community of scholars; therefore, the scientific discourse on Design Thinking has unfolded in a vacuum - often independently from other innovation management theories. The consequence has been that Design Thinking is often confused (especially among those new to the field) with the entire practice of design. Subsequently, we still lack an understanding on whether, why, and when Design Thinking contributes to innovation.

In this editorial, we discuss the journey to the Special Issue "Design Thinking and Innovation Management: Matches, Mismatches and Future Avenues" that intends to critically reflect and enrich the scientific debate around Design Thinking. First, we aim at clarifying the distinction between "design" and "Design Thinking". The former is a practice, to be studied; the latter is a paradigm, i.e., a set of specific principles, methods and tools to practice design. Second, we offer a brief overview of the community that has been investigating Design Thinking, a synthesis of the ten papers included in the Special Issue (distributed across this and the next issue), and show how they contribute to close the theoretical and empirical gaps with innovation studies. Finally, we suggest that the paradigm of Design Thinking is significantly contingent: its diffusion and success have been favored by the emergence of specific contextual conditions (substantially by the ubiquitous diffusion of digital technologies in direct interaction with users).

As the context is dramatically shifting again, we wonder whether Design Thinking will keep its relevance and ability to support organizations in addressing the new challenges ahead? We address this question with the support of a contingent framework to position several design paradigms and suggest that the context ahead, where problems have multiple stakeholders and are undefined, will require the emergence of new paradigms characterized by a systemic (rather than user-centered) and reflective (rather than ideative) practice. We therefore propose a few research questions that will hopefully encourage and shape future scholarly efforts into the study of the design practice for innovation in organizations.

1. Introduction

In a 1999 broadcast of ABC's *Nightline*, anchor Ted Koppel announced a video that in the following two decades would have a remarkable impact on the practice of innovation: "The Deep Dive", a 20-minute clip illustrating how influential design firm IDEO realizes innovation through Design Thinking¹. Since then, "The Deep Dive" and other similar tutorials have been a centerpiece in MBA innovation classes and executive programs on strategic transformation. Books and articles on Design Thinking have proliferated in the business press (Brown, 2008; Martin, 2009). The major management consultancies have acquired design firms to expand their offerings into Design Thinking. Corporations have invested in design, hiring designers, and using Design Thinking as a backbone for cultural change, sometimes even driven by human resource departments.

If Design Thinking has risen high in the agenda of innovation, it is not only because of that 1999 broadcast, of course. The practice of design dates much further back in time. Even within Stanford, Design Thinking was discussed and practiced earlier (as the fascinating article by Jan Auernhammer and Bernard Roth, in this Special Issue, clearly identifies; Auernhammer and Roth, 2021). Its rise in the management agenda can be explained by a significant change in the business context. As technologies become more sophisticated and diffused into everyday things, the necessity of making this technological behemoth accessible and usable to people become essential. The most striking example comes from digitalization: as IT applications move from business services to direct consumer uses, design - especially in the form of user experience/user interface (UX/UI) design – comes into high demand.

Yet, that 1999 video and the promotional activity of IDEO have two important impacts: first, it succeeded in moving design from a practice leveraged in business only by a few executives, such as Alberto Alessi or Steve Jobs, who "understood the value of design", to a popular management practice. The word "management" here has an important meaning: it implies that Design Thinking in the last two decades has not only been "leveraged" (i.e., by hiring designers), but also directly "practiced" by people in business, whatever their educational background. Design Thinking has moved beyond the traditional circles of design. It has been packaged into handbooks, short courses, tutorials, and made accessible to everyone. Second, the IDEO video forged the narrative through which design entered our life in the last two decades - through the perspective of Design Thinking. As we will discuss later, this is only one of the many possible ways to practice design. That video created a movement and that movement brought about a path dependency in the way we discuss design in business: user-centered, brainstormed, and often unencumbered by expertise.

More than two decades have passed since 1999. Design Thinking as a phenomenon is mature enough to be discussed with sufficient empirical evidence and with sufficient distance from early enthusiasm, to command critical reflection. These twenty-two years have been marked by a successful diffusion of Design Thinking in

¹ IDEO: Shopping Cart Design Process <https://www.youtube.com/watch?v=izjhx17NuSE>

business practice, in education, and in research. This has been paired with strong critiques. First, there is a concern about its nature. Design Thinking has been introduced and often confused with design writ large (e.g., at the end of the Deep Dive video, David Kelley, the founder of IDEO, claims that “everything that is designed has to go through this kind of process”). Expert designers and design scholars have often suffered this monotheistic perspective lacking understanding of the multifaceted richness of design, characterized by approaches largely antithetical to Design Thinking, and yet extremely effective (Kimpbell, 2011a and 2011b). As we will discuss in this article, design, on one hand, and Design Thinking, on the other hand, have many distinct qualities.

The second critique concerns the theoretical and empirical depth of studies on Design Thinking (Liedtka, 2004; Capaldo, 2007; Dell’Era and Verganti, 2010; Borja de Mozota, 2010; Brown and Wyatt, 2010; Johansson-Sköldberg et al., 2013; Seidel and Fixson, 2013, Kolko, 2015). As often happens when new movements start, the earlier enthusiastic efforts to understand Design Thinking were punctuated by anecdotal evidence and rushed forward with minimal attention to the theoretical background that underpinned the concepts. This critique comes especially by innovation scholars, who judged studies on Design Thinking as empirically unconvincing and theoretically disconnected from the rich body of theories on user analysis, creativity, teamwork that had already developed in innovation management. For example, 90% of scholars participating in the DRUID 2019 conference voted, in an informal poll, against the motion, “Let it be resolved that this conference believes that recent developments in Design Thinking represent a major advance in our understanding of innovation, strategy, and entrepreneurship over traditional approaches.”²

The third critique, emerging more recently, concerns the capability of Design Thinking to address the great shifts occurring this moment in society (Verganti et al., 2020). With its extreme focus on users (or “userism”) and problem-solving (implying a strong incremental movement), Design Thinking can imply some limits in addressing big challenges today faced by businesses and society, which are more systemic in nature and require reimagining the future instead of solving problems from the past.

With a better understanding of what has happened around Design Thinking, we can reflect more critically on what could happen in the future. In curating the Special Issue covering “Design Thinking and Innovation Management: Matches, Mismatches and Future Avenues” for the *Journal of Product Innovation Management*, the most prominent journal on innovation management in the scientific community, we have a very privileged perspective. We called for contributions to the state of Design Thinking. We received 65 manuscripts from approximately 190 scholars residing in 40 countries which is a considerably large number given the size of the community. Further, we organized a digital workshop inviting the authors of 16 of the

² Debate on Design Thinking, DRUID 2019 Scientific Conference <https://vimeo.com/345411273>

papers that passed the first round of reviews to discuss their perspectives and collectively reflect on relevant questions about the scientific evolution of Design Thinking. Finally, 10 papers have been included in the Special Issue.

This article offers a summarization of the richness of the dialogue. Of course, being ourselves immersed in the Design Thinking scholarly discourse, we have complemented the views of these scholars with our own perspectives and research experiences. We hope to offer some additional insight and complement this important collection of articles in the Special Issue that contributes to research on design in business progress in a meaningful direction. We continue this essay by addressing a core question on the object of our reflection: *what is Design Thinking and how is it related to design writ large?* This is an inevitable question in a space that has been marked by significant theoretical ambiguity. Next, we address a second key question: *to what extent have studies on Design Thinking contributed to the development of theories on innovation and design?* This question is essential especially given the stage on which this reflection unfolds, the *Journal of Product Innovation Management*, which has been at the center of theoretical development on innovation management for decades. We then dive deeper into this question by focusing specifically on the articles curated in this Special Issue, highlighting their positioning and contributions within innovation management theories. Finally, we move from analysis to prescription offering insights from conversations with the scholars to trace a possible path forward for the design discourse in business and research.

2. Positioning Design Thinking

Both scholars and practitioners acknowledge the central role of design as a driver of innovation and change (Brown, 2008; Martin, 2009; Liedtka, 2015). The importance of design as a source of value creation has been studied for decades (Peterson et al., 1986; Hirschman, 1986). Most of these investigations, however, address design as the aesthetic and symbolic dimension of products, i.e., design as “form”, identity, and emotions, which gave design a marginal role in the realm of innovation studies (Capaldo, 2007; Dell’Era and Verganti, 2010). What has driven the steep growth in attention to design in the business community is the emergence of a particular approach to design: Design Thinking (Brown, 2008; Martin, 2009). Far from being connected with the “form” of products, Design Thinking is accepted as a formal method for creative problem solving with the intent to foster innovation (Brown, 2009; Martin, 2009; Liedtka et al., 2013 and 2020; Magistretti et al., 2021b).

The rapid diffusion of Design Thinking in practice has not, however, been coupled with a similarly rapid and robust development of its theoretical underpinnings. Early accounts were mainly anecdotal and often connected to promotional activities by design consultancies. Yet, Design Thinking has attracted attention

among innovation scholars. Initially, a number of articles in academic journals have focused on trying to bring more theoretical clarity to a concept that appears elusive and ill-defined (Liedtka, 2004; Borja de Mozota, 2010; Brown and Wyatt, 2010; Johansson-Sköldberg et al., 2013; Seidel and Fixson, 2013, Kolko, 2015). With only partial results, the speed and breadth of its evolution across applications escape scholars' effort to capture its ontology. Indeed, according to Carlgren et al. (2016), the literature on Design Thinking provides ambiguous or partial definitions. Some focus on its mindset, e.g., as an abductive way of thinking (Martin, 2009; Leavy, 2011); some focus on its creative dimension (Kelley and Littman, 2001; Brown, 2008); some focus on its attention on the user, or its abilities to frame problems, to visualize, and to build prototypes (Carlgren et al., 2016).

Most contributions have so far been oriented inwards towards a limited community of scholars. A consequence of this inner focus is that the scientific discourse on Design Thinking has unfolded in a vacuum - often independently from other theories, especially other innovation management theories (Verganti, 2008; 2009; and 2017; Norman and Verganti, 2013; Verganti and Dell'Era, 2014; Dell'Era et al., 2020). Without a deeper attempt to connect Design Thinking with the landscape of innovation management theories, the implication is that scientific discourse on innovation would fail to capture the why and how of its impact on practice. A thorough scholarly investigation of the matches and mismatches of Design Thinking with alternative innovation paradigms can significantly enrich the comprehension of its potentialities and future avenues. This is especially true and necessary as Design Thinking is spreading to other areas such organizational change and leadership. Once again, this is a sign of its versatility but also of its conceptual fuzziness.

Design as a practice, Design Thinking as a paradigm

One of the questions this gathering of well-informed researchers asked first was, "What is Design Thinking?" After 20 years, we are still asking ourselves this question. The answer coming from the discourse of the scholars engaged in this Special Issue arrives with a major clarification, marking a profound difference between design, on one hand, and Design Thinking, on the other: design is a practice, Design Thinking is a paradigm, i.e., a set of specific principles, methods and tools to practice design. By saying that "design is a practice" we underline that design is an activity conducted with the aim to address an area of problems. In the case of design, this area can be encircled by the definition of Herbert Simon (1969), "Design is about devising courses of action aimed at changing existing situations into preferred ones", or by the definition of Klaus Krippendorff (1989), "Design is making sense (of things)". Whichever the case, these definitions do not indicate a tool, or a method, or a process whose effectiveness needs to be demonstrated. Design simply "happens". Similar to medicine (the practice of caring for a patient) or to "management" (the practice of administering resources and organizations - for which no one would ever feel the need to demonstrate its

superiority because it would then require an answer to the question, “Compared to what?”). Thus, design needs to be studied in order to “devise *better* courses of actions” or to create “*more* meaningful things”.

Of course, any practice can be practiced in different ways. In medicine, we can treat backpain through drugs, manipulation, or surgery. In management, we can schedule production through Material Requirements Planning (MRP) or Just-In-Time (JIT). There are different methods that enable people to perform a practice. Sometimes these methods coalesce around a coherent set of tools, guidelines, processes, and norms that can be addressed as paradigms (Kuhn, 1962; Dosi, 1982). For example, JIT emerged as a new paradigm for production control (Bartezzaghi, 1999). Note that we refer here to the applicative side of paradigms (which, in the sociology of science are addressed in the broader sense of assumptions and concepts along with “the entire constellation of beliefs, values and techniques, and so on shared by the members of a community” (Kuhn, 1962; p175). Relatedly, “To be located in a particular paradigm is to view the world in a particular way” (Burrell and Morgan, 1979; p24). A paradigm induces one of possible ways to practice within a problem area, and it can demonstrate superiority in a given context (until other superior paradigms emerge or until the context changes).

Design Thinking is a paradigm or, as Jeanne Liedtka puts it, “a social technology” (Liedtka, 2020). It is one of the many possible ways to practice design. It implies assumptions (for example that innovation can be the result of one clearly identified process), and especially a constellation of beliefs, values and techniques that coalesce around three very specific principles (Seidel and Fixson, 2013; Liedtka, 2015; Micheli et al., 2019; Verganti et al. 2020):

- *User-centeredness*. This implies two things: a) design decisions are driven by *maximising meaningfulness for the user* (instead of business viability and technical feasibility are means to achieve that purpose); b) the design process *begins* by understanding the user, their problems, pain-points, and desires. In other words, the design problem is framed starting from user needs and Design Thinking is a paradigm that enables us to understand these unmet needs better;
- *Ideation*. This implies two things: a) quantity matters, i.e., good solutions to a problem are more likely to emerge if many ideas are identified and explored; b) subject-field expertise does not matter, i.e., good solutions are more likely to emerge if approaching a problem unencumbered by expertise and by taking unusual perspectives;
- *Iterative Prototyping*. This implies two things: a) design can be practiced as a learning process of trial-and-error, often engaging users. Early design mistakes are just ways to iterate towards better solutions; b) learning iterations are based on visual and material representations of the solutions rather than on abstract design models and representations.

Needless to say, there are many other paradigms that support the practice of design. Design Thinking may share some tools and principles with other paradigms (for example, the practice of iterations has become commonly used in contemporary design practice) but they also propose a contrasting way of practicing design on other dimensions. For example, the design practice in “system engineering” departs from a user-centered focus to embrace the requirement of complex systems of stakeholders and actants, including devices and natural elements (Latour, 1987). It also values field expertise and abstract modelling. The “reflective practice”, typical of architecture or policy design, departs from the creative and ideative view of design to embrace a process based on inquiry and critical reflection, where quality and depth of exploration matters more than quantity of ideas (Schön and Rein, 1994).

Note that the paradigm of Design Thinking is proposed not only as an approach to design but also (and probably even more so) as an alternative way to practice innovation in an organized context. In other words, it is also a paradigm for innovation management. Some also proposes Design Thinking as an alternative paradigm for organizational and cultural transformation. Here it shares some principles with novel innovation paradigms (e.g., the iterative view of agile development described by MacCormack et al., 2001), or the generative approach of dialogic organizational transformation (Bushe and Marshak, 2014), but also contrasting views. There is, for example, evidence that a user-centered approach prevents disruptive innovation (Christensen, 1997; Verganti, 2009), that problem solving and ideation have limited impact on organizational action (Bushe and Marshak, 2014), and that these alternative innovation approaches promote a “vision driven” or “speculative” practice where the will of the innovator matter as well as the unmet needs of users (Csikszentmihalyi, 1988).

When we state that Design Thinking is a paradigm, we hope to contribute by clarifying an important distinction. Design Thinking is not a practice, such as design, or innovation management, or organizational transformation. Nor even a theory. It is one of the possible ways to practice design, innovation, or transformation. We can study this paradigm (*through* theories of design, innovation, and organizational development) to understand whether it supports those practices in a better or worse way compared to other paradigms. Design Thinking is not “good” or “bad”, but “better” or “worse” *compared* to something else (and this alternative paradigm should be clearly identified by scholars who study Design Thinking). Specifically, Design Thinking is not to be confused with design. Design Thinking, as a paradigm driven by the above principles, may become “common practice” (as a whole or with some of its tools) and be regularly embedded in the way things are designed, or instead, as the context changes and as new contrasting design paradigms emerge. It can take a more marginal role or even disappear. Alternatively, design, as a practice, will never die.

3. Discussing the Journey to the Special Issue

In order to critically reflect and enrich the scientific debate around Design Thinking, a digital workshop was organized (11-12th of September, 2020). Out of 65 manuscripts initially submitted to the Special Issues, 16 papers passed the first round of reviews with 43 authors engaging in a two-day discussion. Figure 1 offers a view of the boards collaboratively conceived by three teams during the digital workshop. The co-authors of each paper were engaged three months in advance and asked to critically reflect on the theoretical contribution provided by their own manuscript with respect to specific innovation management theories. This pre-activity allowed the guest editors to arrange an embryonic map indicating preliminary connections between Design Thinking and innovation management theories. During the first phase of the digital workshop, participants presented ideas focused on theoretical contributions, while attendees were invited to identify potential alternative theoretical contributions. During the second phase of the digital workshop, three teams of co-authors (i.e., BLUE, RED and ORANGE) collaboratively created a map connecting Design Thinking frameworks (e.g., strategy, process, and practice-based) mentioned in the manuscripts with the innovation management theories discussed during the first phase. Finally, the three teams discussed future research directions answering the following questions: (i) What are the research directions aimed at deepening the connections with established theories and frameworks? (ii) How can the research results be revisited according to the paradigmatic transitions within which we are living (e.g., COVID, digital transformation)? (iii) What are the research directions aimed at exploring new subjects and establishing new connections with theories and frameworks?



Figure 1: Boards collaboratively conceived by three teams during the digital workshop (11th - 12th September 2020)

The digital workshop facilitated the development of a detailed analysis of the references cited by the 16 submitted papers that produced a picture of the breadth of theories, frameworks, and literature streams leveraged by the authors, as a relevant sample of the scientific community's interest in Design Thinking. This analysis allowed participants to reflect on innovation management theories and frameworks they relied upon and consequently to evaluate the variety of perspectives they adopted. As clearly stated in the call for papers, the purpose of the Special Issues was to critically reflect on the opportunities and limits of Design Thinking

through the theoretical lenses provided by innovation management literature. The 1,406 references cited by the 16 manuscripts submitted to the Special Issues and invited to be reviewed included 954 papers, 243 books, 51 book chapters, and 158 other sources (see Figure 2). As can be seen, there is a growing interest in Design Thinking, especially after 2008.

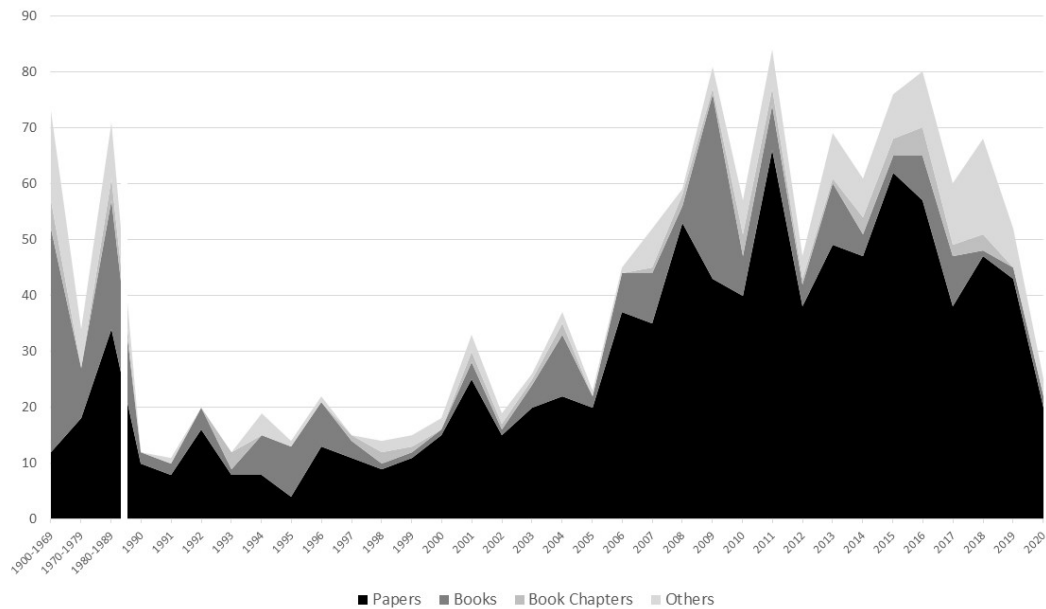


Figure 2: References cited by the 16 manuscripts submitted to the Special Issue

The 954 references belonging to the “Papers” category (67,9%) have been published in 196 journals. The 17 most cited journals cumulatively produce 548 references (57.4%): 9.7% from Journal of Product Innovation Management (#1), 5.9% from Harvard Business Review (#2), 5.0% from Design Studies (#3), followed by 4.9% from Design Issues (#4), and 4.1% from Creativity and Innovation Management (#5) to complete the top five journals (see Figure 3).

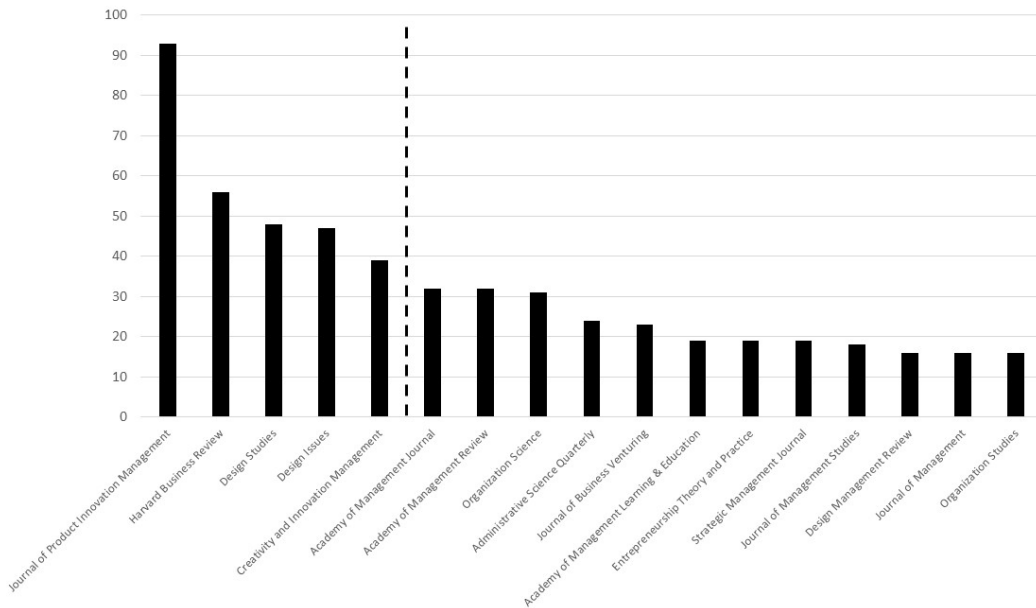


Figure 3: Seventeen most cited journals cumulating 548 references (57.4%)

Focusing on single references, it was possible to identify fourteen references (i.e., 12 papers and two books) that are cited by more than half of the analysed manuscripts (see Appendix A). Examining the frequency of authors mentioned in the 1,406 references cited by the 16 manuscripts submitted to the Special Issue and invited to be reviewed, 44 authors (out of 1,517 total cited authors – 2.9%) received more than eight citations (averagely 0.5 citation per paper) that accumulated 651 citations (out of 2,808 total author citations – 23.2%). Classifying the 44 authors previously mentioned according to the main research field explored by each of them, the distribution of the 651 citations among the following research fields (see Figure 4): Design + Innovation (38.3%); Design (28.3%); Innovation (10.9%); Organization (13.6%) and Entrepreneurship (9.5%). This analysis shows the 16 manuscripts largely rely on research largely operating in the design and/or innovation fields, while marginally referring to scholars involved in alternative research fields. In the following rounds, authors were invited in enrich the adopted perspectives in order to clarify the theoretical contribution with the possibility of introducing alternative theories.

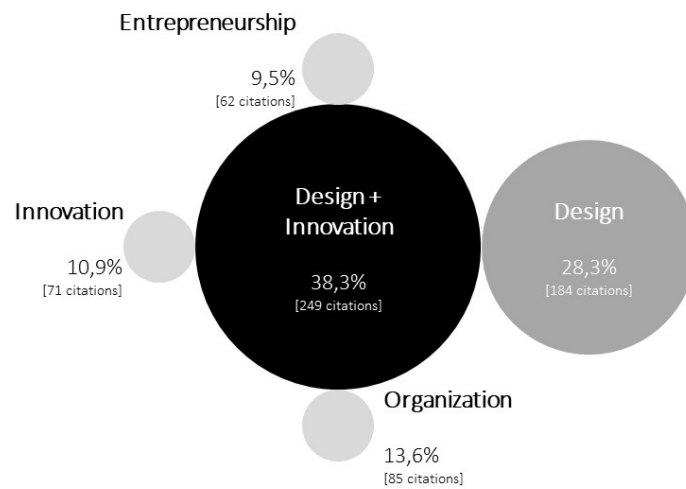


Figure 4: Distribution of 651 citations of the 44 most cited authors and their research fields

4. Framing the Papers included in the Special Issue

As previously mentioned, the Special Issues aim to enrich the scientific debate around Design Thinking and, more specifically, connect Design Thinking with the landscape of innovation management theories. Table 1 provides an overview of the papers included in the Special Issue highlighting the innovation management theory in each paper (papers are listed in Table 2 in alphabetical order of the first author's last name). By classifying the papers included in the Special Issue according to their reliant theories and associated research field, the richness of the viewpoints is highlighted that nurtures the debate around Design Thinking (see Figure 5). From an entrepreneurial theory such as *Effectuation* to organizational theories such as *Sensemaking* and *Cultural Fit*, from innovation theories such as *Abduction*, *Ambidexterity*, and *Reframing* to theories such as *Dynamic Capabilities* and *Decision Making* that cross several research fields (e.g., innovation and organization), the field is likely to benefit from the perspectives within this Special Issue.

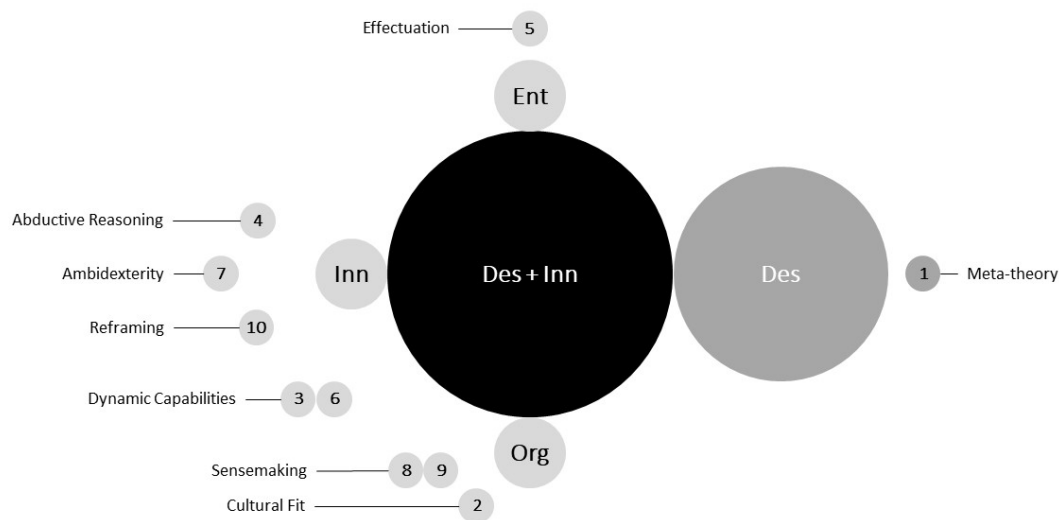


Figure 5: Positioning of the Papers included in the Special Issue based on underlying Theories and associated Research Field

Relying on multiple theoretical lenses, Auernhammer and Roth (2021) outlines the origin and evolution of Design Thinking. They address two significant criticisms: theoretical grounding and construct clarity. More specifically, Auernhammer and Roth (2021) investigates the evolution of the design philosophy and practices developed at Stanford University from 1957 to 2005 through document analysis. From a theoretical point of view, different than other studies, the authors demonstrate that design philosophy is deeply rooted in humanistic psychology theories, particularly on creativity and human values.

The next three papers in the Special Issue rely on innovation theories: Garbuio and Lin (2021) explores the role of *Abductive Reasoning* in problem finding; Randhawa et al. (2021) interpret Design Thinking as a way to balance exploration and exploitation – consequently, relying on *Ambidexterity* Theory; Wang (2021) conceptualizes Design Thinking as a powerful approach aimed at *Reframing*. Garbuio and Lin (2021) examine the role of two types of abduction in problem finding: explanatory abduction and innovative abduction. Moreover, they identify impediments to both types of abduction and investigates the contribution provided by Artificial Intelligence (AI) to mitigate those impediments. Contrasting with deductive and inductive approaches that dominate problem solving, Garbuio and Lin (2021) argue that explanatory and innovative abduction are appropriate for generating innovative problem-finding ideas. Based on an in-depth longitudinal case study concerning a leading Australian property development firm, Randhawa et al. (2021) examine how middle managers leverage design thinking to respond to inertia generatively, and how this process helps shift the cognitive frame of the organization toward ambidexterity. More specifically, they explore three Design Thinking practices adopted by middle managers to transition the organization's

cognitive frame from an explorative to exploitative, and then ultimately to an ambidextrous innovation frame: (i) creative problem solving, (ii) sprint execution, and (iii) creative confidence. Interpreting Design Thinking as a powerful approach to reframe the addressed challenge, Wang (2021) conducts a grounded theory study addressing the role of Design Thinking in developing an innovative digital theatre. The paper inductively develops a theory explaining the Design Thinking of redesigning a traditional product into an innovative digital product as a digital reframing process, where designers take the frames of digital technologies and rethink existing products (frame-taking), merge the frames into the product under design (frame-merging), and propose a new frame to interpret the resultant product (frame-giving).

Two papers included in the Special Issues rely on theories at the intersection of innovation and organization research fields: Cautela et al (2021) investigates the role of *Dynamic Capabilities* in achieving design excellence; Magistretti et al. (2021a) propose framing and advancing Design Thinking as a *Dynamic Capability* for innovation rooted in lower-level aspects, namely microfoundations. Cautela et al. (2021) investigates two types of dynamic capabilities and their relationship with design excellence: user-centered design (UCD) and meaning innovation (MI). The results suggest that managers seeking to build dynamic UCD capabilities prefer designers with holistic thinking capabilities over those with ideation and envisioning capabilities and value user involvement throughout the design process. In contrast, managers seeking to build dynamic MI capabilities search for designers with holistic thinking and envisioning capabilities and avoid ideation capabilities. They also consider the value of involving users in the design process to be limited. According to Magistretti et al. (2021a), with few exceptions, studies about Design Thinking are mostly entrenched in practice rather than theory-driven research. Therefore, this paper provides a theory-based framing of Design Thinking for innovation and a critical review of the Design Thinking literature to reconcile theory and practice. Magistretti et al. (2021a) conduct a systematic literature review that unveils the dynamics of Design Thinking and the context-specific capabilities to innovate.

Three papers included in the Special Issues adopt organization lenses to enrich the debate around Design Thinking: Carlgren and Ben Mahmoud-Jouini (2021) investigate the *Cultural Fit* between design thinking and the adopting firm through qualitative studies; Rylander Eklund et al. (2021) contend that the absence of a theory of practice prevents a deeper understanding of the contribution of design thinking to innovation, and propose an theoretical perspective where design thinking is interpreted as *Sensemaking*; Verganti et al. (2020)³ adopt a *Sensemaking* perspective as well and propose a framework for understanding the design and innovation in the age of Artificial Intelligence. According to Carlgren and Ben Mahmoud-Jouini (2021), increasing interest in the use of Design Thinking in innovation has called into question its integration in organizational settings. They abductively propose a cultural archetype of Design Thinking comprising eight

³ This paper has been published in 2020 in the format of Catalyst paper.

dimensions: subjective and aesthetic ways of knowing; long-term and non-linear views about time; intrinsic motivation and sense of purpose flexibility and change; relationships, empathy, and emotions at work; collaboration and inclusion; team autonomy and informality; and external orientation.

As noted by Rylander Eklund et al. (2021), Design Thinking is based on designers' creative ways of working and is defined as a formal method for creative problem-solving aimed at fostering innovation by harnessing "the designer's sensibility and methods." The basic premise is that design "thinking" can be extracted and separated from the situated practice of designing in the studio. This approach has given rise to a widely accepted nomenclature for describing design which has improved communication between designers and managers, leading to massive interest in adoption of design thinking in management settings. According to Verganti et al. (2020), at the heart of any innovation process lies a fundamental practice: the way people create ideas and solve problems. This "decision making" side of innovation is what scholars and practitioners refer to as "design." The paper relates that, as creative problem-solving is significantly conducted by algorithms, human design increasingly becomes an activity of sensemaking, that is, understanding which problems should or could be addressed. This shift in focus calls for new theories and brings design closer to leadership, which is, inherently, an activity of sensemaking.

Finally, one of the papers in the Special Issue focuses on an entrepreneurship theory: according to Klenner et al. (2021) Design Thinking and *Effectuation* theory may enrich each other. It is based on a qualitative study drawn on 41 in-depth interviews with Australian designer-founders with the aim of providing a theoretical perspective and empirical insights into the relationship between the behavioural practices of Design Thinking and the cognitive principles of effectuation.

N	Title	Authors	Research Objective(s) / Question(s) / Hypotheses	Methodology	Empirical Setting	Main Contributions	Theory
1	The origin and evolution of Stanford University's design thinking: From product design to design thinking in innovation management	Auernhammer J, Roth B	Evolution of the design philosophy to clarify the design thinking construct	Historical Research	Evolution of the design philosophy and practice developed in Stanford's Joint Program in Design (JPD) and Design Division from 1957 to 2005	<ul style="list-style-type: none"> - Design Thinking is grounded in psychological theories of creativity, visual thinking, and human values - Conceptualization of design as the creative response to a human need 	Meta-theory (e.g., humanistic and gestalt psychology theories, creativity, visual thinking)
2	When cultures collide: What can we learn from frictions in the implementation of design thinking?	Carlgren L, Ben Mahmoud-Jouini S	Identify a design thinking cultural archetype. Highlight the challenges associated with this cultural archetype that arise from its lack of fit with the adopting firm	Qualitative Case Study Research	13 case studies of design thinking implementation in large established firms (complemented with data collected during eight workshops with design thinking practitioners and scholars)	<ul style="list-style-type: none"> - Characterization of design thinking by providing a detailed cultural archetype - Recursive relationship between organizational culture and design thinking implementation - Challenges encountered by firms when adopting Design Thinking, extending the research on difficulties linked to cultural misfit when implementing new practices - Interplay between cultural fit, legitimacy, and the implementation climate 	Cultural Fit
3	Microfoundations of dynamic design capabilities: An empirical analysis of "excellent" Italian design firms	Cautela C, Simoni M, Moran P	<p>H1a The ideation capabilities of designers are positively associated with user-centered design (UCD)</p> <p>H1b The ideation capabilities of designers are negatively associated with Meaning Innovation (MI)</p> <p>H2 The holistic thinking capabilities of designers are positively associated with both UCD and MI</p>	Survey Research	106 Italian firms recognized for their products' "design excellence" during the 2011–2016 period	<ul style="list-style-type: none"> - Development of a theoretical conceptualization of Design Dynamic Capabilities where microfoundations – recognized as designer skills and active user involvement - are related to the corporate-level capabilities - Identification of Design Dynamic Capabilities and the active user involvement associated with two main design approaches: User-Centered Design (UCD) and Meaning Innovation (MI) 	Dynamic Capabilities

			<p>H3a The envisioning capabilities of designers are not associated with UCD</p> <p>H3b The envisioning capabilities of designers are positively associated with MI</p> <p>H4a Active user involvement at the organizational level is positively associated with UCD</p> <p>H4b Active user involvement at the organizational level is not associated with MI</p>				
4	Innovative idea generation in problem finding: Abductive reasoning, cognitive impediments, and the promise of artificial intelligence	Garbuio M, Nidthida L	<p>What is the role and process of abduction in problem-finding innovative idea generation?</p> <p>What human cognitive weaknesses impede in problem-finding innovative idea generation?</p> <p>How AI can alleviate these through design-thinking perspective?</p>	Conceptual Research		<ul style="list-style-type: none"> - Abductive hypotheses in Design Thinking are generated as part of innovative idea generation in the problem-finding space through three stages: problem search frame, abductive hypothesis generation and abductive hypothesis evaluation - Mental models, cognitive load, and an example of cognitive biases, confirmation bias, impede abductive hypothesis generation - AI can assist humans to identify anomalies in the data, yielding insights that explain them 	Abductive Reasoning
5	Entrepreneurial ways of designing and designerly ways of entrepreneuring: Exploring the relationship between design thinking and effectuation theory	Klenner NF, Gemser G, Karpen IO	Explore the relationship between Design Thinking and Effectuation theory	Qualitative Study based on Interviews	41 in-depth interviews with Australian designer-founders	<ul style="list-style-type: none"> - Design thinking practices enabling designer-founders to enact the cognitive principles of effectuation - Ways in which designer-founders interpret effectuation principles through the professional values and norms embodied in design thinking 	Effectuation

6	Framing the microfoundations of design thinking as a dynamic capability for innovation: Reconciling theory and practice	Magistretti S, Ardito L, Messeni Petruzzelli A	How can Design Thinking be conceptualized based on theories to unveil its relationship with innovation? Rooted in a theory driven rather than a practical approach, how does DT relate to a firm's innovativeness?	Systematic Literature Review		<ul style="list-style-type: none"> - Conceptualization of Design Thinking as a dynamic capability to (steadily) innovate, further framed by looking at the microfoundations of dynamic capabilities - Reconciling theory and practice and making the theory more relevant to managers by anchoring and framing the more practitioner-oriented outcomes of the DT for innovation literature 	Dynamic Capabilities
7	Design thinking implementation for innovation: An organization's journey to ambidexterity	Randhawa K, Nikolova N, Ahuja S, Schweitzer J	How do managers leverage Design Thinking for innovation to support their organization in its shift to achieve an ambidextrous innovation portfolio?	In-depth Longitudinal Case Study Research	Urban, a leading, publicly listed Australian property group that owns and manages commercial offices, retail centers, and residential and industrial properties both in Australia and internationally	<ul style="list-style-type: none"> - Process model of how middle managers can respond to inertia toward exploration and, in doing so, shift the organization's cognitive frame to an ambidextrous innovation orientation - Design Thinking for innovation helps shift organization-wide cognitive frames toward ambidexterity - Middle managers can respond to inertia with strategic flexibility—adapting the design thinking approach and structures and by allowing strategy to emerge over time - Design thinking practices can be deployed in a phased manner to attain an ambidextrous innovation portfolio 	Ambidexterity
8	Design thinking as sensemaking— Developing a pragmatist theory of practice to (re)introduce sensibility	Rylander Eklund A, Navarro Aguiar U, Amacker A	Deeper understanding of the nature of designers' creative practice and their sensibility	Conceptual Research		<ul style="list-style-type: none"> - Sensemaking rather than problem solving is the basic logic underpinning the practice of designing and highlights imagination and improvisation as core activities - Definition of designers' sensibility as a skill and disposition developed through practice and supported by studio culture 	Sensemaking

						<ul style="list-style-type: none"> - Development of a pragmatist theory of practice which explains the critical role of sensemaking and sensibility in Design Thinking in order to clarify the relationship between practice and innovation in design thinking 	
9	Innovation and Design in the Age of Artificial Intelligence	Verganti R, Vendraminelli L, Iansiti M	How Artificial Intelligence is (and will be) shaping the practice of design	Qualitative Case Study Research	Netflix and Airbnb (complemented with analyses of Microsoft and Tesla)	<ul style="list-style-type: none"> - While AI does not undermine the basic principles of design, it profoundly changes its practice. Problem solving tasks, traditionally carried out by designers, are now automated into learning loops that operate without limitations of volume and speed. - As a consequence, human design increasingly becomes an activity of sense making, i.e. understanding which problems should or could be addressed. This shift in focus calls for new theories and brings design closer to leadership, which is, inherently, an activity of sense making 	Sensemaking
10	Digital reframing: The design thinking of redesigning traditional products into innovative digital products	Wang G	How does the reuse of digital technologies enable the redesign of a traditional product into an innovative digital product?	Qualitative Case Study Research	TopTech's (pseudonym) four-year design project of a digital theater	<ul style="list-style-type: none"> - The design of digital innovation does not necessarily start with an overarching product - Reframing involves the dynamics for integrating old frames with new frames, rather than simply replacing the old with the new - Proactively reshaping customers' understandings of a traditional product and the new digital product is an integrative process for the design of digital innovation - Designers can use digital technologies as reframing resources to promote artefact-frame coevolution 	Reframing

Table 1: Overview of the Papers included in the Special Issue and related theories

5. The Future of Design and the Role of Design Thinking

More than 20 years have passed since the 1999 broadcast of the IDEO “Deep Dive” video. The world has changed. Design has become popular in business. Scholars have investigated its nature and, as seen in this Special Issue, they have started to better position it within the realm of innovation management theories. Additionally, the world looks significantly different than at the dawning of this century. Just to mention a few disruptions: in 1999 there was no iPhone, the Sustainable Development Goals of the UN were far from being articulated, and COVID-19 had not changed the way we look at life. What is the role of Design Thinking in this new world? Will it continue its expansion and diffusion into new domains as it did in the past decades: from products, to services, to experiences, to business models? Or, will it be supplanted by new paradigms? The answer is probably both. On one hand, we already observe applications of Design Thinking into new spaces, such as organizational change, leadership, and even personal development. Design Thinking is clearly expanding. On the other hand, the change in future scenarios compared to 20 years ago is so dramatic that we cannot assume that Design Thinking will keep its central dominant role. While the papers presented in this Special Issue assist in projecting a path forward, we speculate even further on the possible trajectory of studies in design and the future role of Design Thinking. Subsequently, we introduce the framework of Figure 6, that provides a map of possible territories of the practice of design. Two important dimensions are suggested to examine the future of design paradigms: the world view of the practitioner and the focal concern.

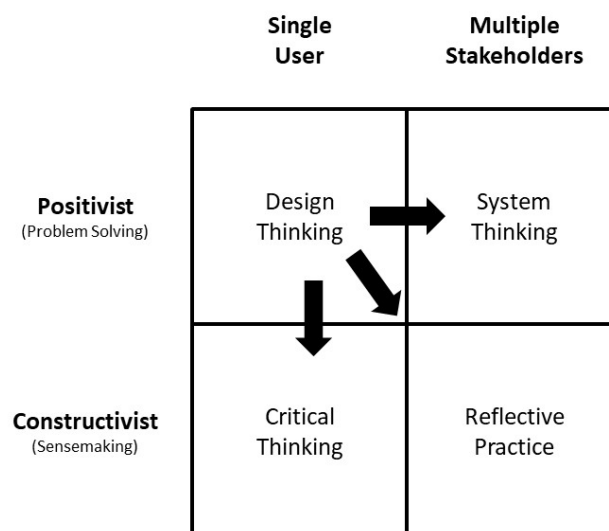


Figure 6: Paradigms for the practice of design

First, we organize design paradigms according to the perspective of the view of reality: positivistic versus constructivist. Positivism assumes that design problems exist “out there” in reality. They can be understood and univocally identified with the proper approach and tools. This is the dominant perspective in problem-solving (typically practiced in engineering schools), where problems can be well-defined, depending on the available information, and then solved. The probability of finding a good solution depends on the breadth of the solution space explored, hence, the important role of ideation and quantity of ideas. Alternatively, constructivism assumes that problems are not “out there” - they are socially constructed. Everyone wears a lens through which to look at reality. Hence, different people look at things differently, in terms of what matters and what is irrelevant, how things are connected, and interpretation of the design space. The constructivist approach to design does not simply require an understanding of the problem. Rather, the problem is “constructed” through interpretation and therefore the problem is designed along with designing the solution. In other words, the problem is an output, not an input, of the design process. Second, we could organize design paradigms in relation to the number of users they address. Some design paradigms, typically from product design, address situations with a single user perspective. Other design paradigms, for example in urban design, where there is a coexistence of users of buildings, people in mobility, policy makers, businesses, etc., address situations with multiple stakeholders.

We now position different design paradigms on this map. Early design paradigms typically address problems that are relatively simple to identify, but relatively complex to solve. They therefore take a positivistic perspective in the context of single users. Consider, for example, designing the first refrigerator. There is a user with a clear need; it is easy to understand a person’s need to refrigerate food. The challenge of finding a solution is complicated. It demands high technological expertise that requires a great deal of modelling. Engineering design provides the models and deductive logic to address these problems. In a way, innovation management supports this practice by providing organizational models for product development: how to understand user needs, how to create solutions, which phases to follow, and how to integrate different expertise.

Design Thinking belongs to the realm of positivistic problem solving with a strong user perspective. It rapidly supplanted classic engineering design and innovation management approaches with the diffusion of digitalization. Why has this occurred? First, because as explained earlier, digitalization makes technologies more advanced than humans. The big challenge is how to make this overabundance of technologies accessible and usable for people. User-centeredness therefore becomes essential and Design Thinking provides the ability to be the bridge between technologies and humans. Second, because digital technologies are pervasive, they enter any territory of personal life as well as business, from products to organizational

processes, and to services. Incorporating digital innovation in an extreme variety of processes implies that innovation has left the close locus of the R&D laboratory and diffuses to all stages of the value chain. The consequence is that everyone is concerned with innovating and designing. For example, a person may be a pharmacist who is not a professional innovator, but manages a pharmacy and is trying to reinvent the experience of what it means to be serviced in a pharmacy. Hence, there is a need for a design paradigm that can be used by “non-experts” and “non-professional” innovators. Design Thinking provides exactly this: a set of design methodologies that can be readily learned and practiced by anyone. In a way, Design Thinking has made design so simple, that the non-experts remain non-experts since the technique is static – no progression in expertise is required or desired.

With this shift at the beginning of this century, Design Thinking has therefore dominated the space of problem solving, i.e., of the design practice addressing single-user problems with a positivistic perspective. However, relevant changes in the context are transforming the nature of the design practice, challenging the capability of Design Thinking to address future challenges. The first relevant change is that dramatic transitions are questioning the inner nature of how we see problems, what is critical, what makes sense. The challenges are less likely to be addressed with a problem solving perspective. Indeed, Design Thinking, with its iterative nature starting from what is “out there”, has an intrinsic path-dependent nature (Norman and Verganti, 2014). The more it focuses on the existing problems and digs in deeper, the more it remains trapped in an incremental design trajectory: it tends to solve the problems of the past, rather than imagining a new future. The dramatic transitions in our present require us to reconstruct and imagine not only the solutions, but also the frames we use to interpret life, i.e., not to frame (classical Design Thinking), but to re-frame.

The second relevant transition is that ideas are instantly available or easily found. This has become evident with the diffusion of the web/internet that provides easy access to ideas and talent wherever they are. Artificial Intelligence has further corroborated this tendency. Solutions are not only easily accessible but they are developed by the problem solving loops of algorithms. As problem solving increasingly moves to machines, the quintessential activity of human design shifts to sensemaking (Verganti et al., 2020). Finally, the third dramatic shift is that most challenges that design addresses today, such as creating solutions that address Sustainable Development Goals, or applying design for organizational transformation, are what we call wicked problems. These are ambiguous problems with multiple stakeholders, with conflicting interests, and with different frames. There is not just one user, not one customer. Unfortunately, Design Thinking was not intended for multi-stakeholders and multi-framework contexts with the subsequent need for sophisticated practitioners. Actually, we need to accept that its extreme “userism” has handed us a world that is not more sustainable than 20 years ago. With Design Thinking, design has come close to business, but

maybe at the expense of its attention to society and a long-term sustainable vision. System thinking and system design, for example, are more suited for this new context.

The papers included in this Special Issue discuss the matches and mismatches between Design Thinking and innovation management theories in order to advance our understanding and enrich the scientific debate around Design Thinking. Despite the value of these studies for both scholars and practitioners, the Special Issues indicate several areas of investigation, and therefore represents a useful platform to outline research challenges. The set of avenues for future research presented in this section deeply relies on the framework reported in Figure 6. Thus, Table 2 examines possible questions for the practice of design and with consideration of both embedded shifts: positivistic versus constructivist (world view), single user vs multiple stakeholders (focal concern).

Contextual Shift	Topic	Example of Research Question
from Positivist to Constructivist	Sensemaking	RQ1: How does sensemaking occur in the context of design projects?
	Reframing	RQ2: How can innovation spur from designing a new problem instead of solving an existing one? How problems are reframed (rather than simply framed) in design?
	Speculative and Moral Design	RQ3: How can Design Thinking or alternative design paradigms spark the imagination of desirable and meaningful futures?
from Single User to Multi-Stakeholders	Design with Multiple-Stakeholders	RQ4: What are the limits of Design Thinking in facing challenges with multi-stakeholders? Is a user-centered perspective still valid when challenges are systemic?
	System Thinking	RQ5: How system thinking differs from Design Thinking and to what extent it enables to better address complex systemic challenges?
	Organizational Transformation	RQ6: Can Design Thinking be an effective paradigm to support organizational transformation? When? What are its advantages or limitations?

Table 2: Examples of Research Questions

6. Conclusions

To properly position Design Thinking in the landscape of innovation management theories, the scientific debate around Design Thinking requires deep understanding about its nature and critical reflections about its limits. The journey of the Special Issue and this editorial article represent first attempts to clarify the relationship between Design Thinking and design: while design is a practice, Design Thinking represents one out of many paradigms (i.e., a set of specific principles, methods and tools to practice design). In other words, Design Thinking can be interpreted as one specific paradigm for the practice of design. The ten papers included in the Special Issues significantly enrich the scientific debate around Design Thinking through exploring its matches and mismatches with several theoretical lenses: abductive reasoning, ambidexterity,

reframing, dynamic capabilities, cultural fit, and sensemaking. The framework proposed in Figure 6 aims at mapping alternative paradigms for the practice of design and highlighting the challenges faced by Design Thinking in moving from positivist to constructivist as well as from single user to multi-stakeholders.

The implication of these reflections is that Design Thinking, with its positivistic and single user perspective, may struggle to address new contexts, especially because its principles of user-centeredness and uncritical ideation. We expect that the evolution of the Design Thinking paradigm, as well as the emergence of new design paradigms, will need to embrace these new perspectives. Examples are provided by the established “reflective practice” (i.e., Donald Schön’s books: “The Reflective Practitioner” 1982, and “Frame Reflection” Schön and Rein, 1994) or more recently, by the perspective “Design as inquiry” perspective, deeply explored by Ann Pendleton-Jullian and John Seely Brown in “Design Unbound” (2018). These views build on the capability to make sense of a design problem among multiple stakeholders. This approach is especially salient at this moment where design is moving from solving problems for products or services into addressing organizational change. Many are struggling with how to design for leadership, for redesigning organizations, and for driving transformation. Consultancies are using design in this way - applying design to transformation in a way similar to constructivism. Consequently, we need to take a hard look at the current practice of Design Thinking in order to understand its context and address its limitations.

The good news is that transformational problems can be examined in terms of design. Reflective practice can assist us because leadership is looking for new ways to lead transformation - and design has this power. We have observed a renewed interest in many organizations with mission statements because leaders want to change the world. Unfortunately, most mission statements look the same so new approaches are needed. Alternatively, an organization may have a brilliant original, mission statement. It desires to change the world but may forget that the most important way to create meaning and drive world change is by making products and services that are more meaningful. That is the reason why organization exists. This is exactly what design is – why it exists. It is about creating new meaning. It is also contains the ability, the power, of transferring this meaning, not from just a mission statement, but really everything “down to the ground”. Again, organizations exist to offer products and services that make a difference in peoples’ lives. We must connect these two things - the wheel of power and the wheel of transforming leadership - into the capability to create meaningful products and services. This is where design has a great future to help organizations transform themselves. We believe Design Thinking has a continued role if it is able to embrace the new challenges.

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Appendix A: Fourteen Central References

Author(s)	Year	Title	Journal	Volume, Number and Pages / Press	Number of Citations
Brown T	2008	Design Thinking	Harvard Business Review	86 (6): 1–10	13
Martin R	2009	The design of business: Why design thinking is the next competitive advantage	na	Boston: Harvard Business Press	13
Micheli P, Wilner SJ, Bhatti SH, Mura M, Beverland MB	2019	Doing design thinking: Conceptual review, synthesis, and research agenda	Journal of Product Innovation Management	36 (2): 124–48	12
Brown T	2009	Change by design: How design thinking transforms organizations and inspires innovation	na	New York: Harper Business Press	10
Dell'Era C, Cautela C, Magistretti S, Verganti R, Zurlo F	2020	Four kinds of design thinking: From ideating to making, engaging, and criticizing	Creativity and Innovation Management	29 (2): 324–344	9
Kolko J	2015	Design thinking comes of age	Harvard Business Review	93(9): 66–71	9
Liedtka J	2015	Perspective: Linking design thinking with innovation outcomes through cognitive bias reduction	Journal of Product Innovation Management	32 (6): 925–38	9
Buchanan R	1992	Wicked problems in design thinking	Design Issues	8 (2): 5–21	8
Carlgren L, Rauth I, Elmquist M	2016	Framing design thinking: The concept in idea and enactment	Creativity and Innovation Management	25 (1): 38–57	8
Dorst K	2011	The core of 'design thinking' and its application	Design Studies	32(6): 521–532	8
Elsbach KD, Stigliani I	2018	Design thinking and organizational culture: A review and framework for future research	Journal of Management	44 (6): 2274–2306	8
Norman DA, Verganti R	2014	Incremental and radical innovation: Design research vs technology and meaning change	Design Issues	30 (1): 78–96	8
Seidel VP, Fixson SK	2013	Adopting design thinking in novice multidisciplinary teams: The application and limits of design methods and reflexive practices	Journal of Product Innovation Management	30 (1): 19–33	8
Verganti R	2008	Design, meanings, and radical innovation: A meta-model and a research agenda	Journal of Product Innovation Management	25 (5): 436–56	8