A Systematic Literature Review on Design Thinking

Seminar paper

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Abstract

"Innovate or Die" a quote declared by Peter Drucker is more relevant than ever. The world is facing challenges on multiple sides. Be it climate change, pandemics, or the global supply chain collapse. Companies suffer from these global trends. Their only way to survive is to innovate and adapt their products or services to the constantly changing needs of their customers. Design thinking has been an approach for generating innovation that is gaining popularity.

But how can companies apply design thinking to their organization? This systematic literature review focuses on giving an overview over three key fundamental "building blocks" to successfully implement and use design thinking. The blocks were identified, named, explained, and set in relation in the following paper. The goal is to provide guidance to managers planning to implement design thinking into their organization.

Keywords: Design Thinking, Organizational Culture, Implementation, Literature Review.

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1 Introduction

Since the inception of design thinking almost seventy years ago, (Auernhammer and Roth 2021) the innovation method is steadily growing in popularity. Used as an approach to innovation, (Seidel and Fixson 2013) design thinking has left its mark on multiple layers. It can be applied in different environments like joint academia-industry research (Gonera and Pabst 2019), startups (Prud'homme van Reine 2017), or large businesses (Seifried and Wasserbaech 2019). In addition, research in design thinking is also differentiating on various levels. For example: individual level (Magistretti et al. 2021), educational level (Matthee and Turpin 2019) or on a technique level (Avdiji et al. 2020).

An approach this versatile can be overwhelming and demotivating. Therefore, this literature review aims to give managers the key factors that need to be considered before implementing design thinking into their company. With this overview managers can more easily identify requirements on an individual and organizational level that are crucial to a successful use of design thinking.

The review consists of six chapters. After the introduction, there is a short explanation of on the term "design thinking". Third, I describe the method used to identify the relevant literature for this review. Fourth, the three key findings are presented. Fifth, I discuss my findings, give practical implications and an outlook on future research. Finally, I conclude this literature review with a short summary.

2 Background

The term "design thinking" consists of two words. The first word, "design", relates to the term's origin. Brown and Kātz (2009) describes it as "the skill that designers for decades already used to match human needs with available technical resources with available technical resources within the practical constraints of business". The second word, "thinking", implies a mindset (Mishra 2021). This is especially interesting in the context of the literature debating whether there was an evolution from "design doing" to "design thinking" (Micheli et al. 2019). Unfortunately, this does not fit within the scope of this paper.

The explanation of the term "design thinking" varies from being a discipline (Brown 2008), a set of principles (Brown and Kātz 2009), an approach (Magistretti et al. 2021) or the already mentioned mindset (Carlgren et al. 2016). While the explanation differs the principal use case for design thinking stays the same: to provide innovative solutions (Brown and Kātz 2009).

The three most influential design thinking models are: IDEO, Stanford Design School and IBM (Micheli et al. 2019). In essence the models follow the same pattern: Trying to understand the problem followed by generating solutions and then end up implementing the solution iterating over prototypes (Micheli et al. 2019).

3 Literature Review

This seminar paper is a systematic literature review with the aim to give the reader an overview of what the current literature on design thinking looks like. The focus of the review lies on the use of design thinking in an organizational context.

The methodology used to select the literature is explained in the following.

3.1 Search String

To get a grasp of the topic, I did an initial search on the database "Google Scholar" using the term "design thinking". Afterwards, I tested the recommendations that Google suggested to me, which are

the most common string combinations used with design thinking. These included strings like “design thinking process”, “design thinking innovation method” and “design thinking business”. After a rough analysis of the results, I figured out that “design thinking” combined with “business” leads to the most fitting results, since this paper is part of a module called “IT-Management in the Digital Age”. Furthermore, it removed design thinking in an educational or academic setting, which especially during COVID had a big impact on the published literature.

I ended up deciding to use “design thinking” AND (business OR enterprise OR organization) as my final search string, using the most common synonyms in the latter half of my string.

3.2 Literature Search

The literature search is split up in two phases. In the first phase, I used the search string mentioned in the previous chapter on the databases AISel and IEEE Xplore. Since the major contribution to a literature review are leading journals (Webster and Watson 2002) I decided in my second phase to also include several management journals. Those were identified by applying two criteria to the “VHB-Jourqual 3” ranking. The journal had to have “management” in their title and be ranked at least as an A-tier journal.

3.3 Literature Selection

I used a four-step filtering process to select my final literature. First, I applied a date filter to my results, that they had to be published by the year 2017. This was due to the fact most of the literature on design thinking was published during the last couple of years and other literature reviews already focused on older publications. Second, I skimmed over every title, removing the ones that did not fit the aim of this literature review. Third, I read the abstracts removing results that did not fit the overall topic of management. Finally, I repeated the third step, reading the full texts of what was left over. Leaving me with a total of twelve results for this literature review. The number of results of each step are shown below in table 1.

Filtering measure	Number of results
0 Unfiltered results	338
1 Relevance by date	205
2 Relevance by title	41
3 Relevance by abstract	31
4 Relevance by full text	12

Table 1. Filtering measures with their respective number of results

As an additional approach I did the backward and forward search suggested by Webster and Watsons 2002, primarily for the background chapter to select fundamental literature in this field, which was published before 2017.

4 Findings

One of the biggest misconceptions about design thinking is to think about it just as a set of methods that can be implemented to create innovations (Prud’homme van Reine 2017). In the following chapters I explain three aspects on why design thinking is more than just a set of methods. First, I present each of my three findings. Afterwards I emphasize on the links between them.

4.1 The organization

This chapter deals with the landscape the organization needs to provide in order to create an environment fitting for design thinking. An ideal landscape for design thinking from an organizational perspective consists of two factors: culture and physical artifacts (Seifried and Wasserbaech 2019).

Starting with culture there are several characteristics that describe the culture needed for design thinking. Carlgren and BenMahmoud-Jouini (2022, p.52) clustered them into eight characteristics: "subjective & aesthetic ways of knowing", "long-term & nonlinear perspectives on time", "intrinsic motivation & sense of purpose", "flexibility & change", "relationships, empathy & emotions at work", "collaboration & inclusion", "team autonomy & informality" and "external orientation". Additionally, to clustering the characteristics their paper also points out the related challenges. These challenges occur primarily because of the differences in culture (Carlgren and BenMahmoud-Jouini 2022). An example of possible frictions could be that even though space and time is needed for "design thinkers" to share and form habits (Rylander et al. 2022), individuals and management potentially do not share the same views leading to conflicts (Carlgren and BenMahmoud-Jouini 2022).

A physical artifact (e.g., prototypes, drawings) is the direct result of using design thinking tools (Elsbach and Stigliani 2018). In the case of Seifried and Wasserbaech (2019) they conducted interviews asking leading European companies about their office architecture among other things. They concluded that office space is a tool that can support the shift of mindset, caused by implementing design thinking (Seifried and Wasserbaech 2019).

4.2 The individual

The success of design thinking is reliant on two types of individuals. First, the "design thinker". The "design thinker" is an individual that is actively doing design thinking. What Brown (2008, p. 3) calls the "Design Thinker's Personality Profile" is a list of five attributes. This list consists of "empathy", "integrative thinking", "optimism", "experimentalism" and "collaborations" (Brown 2008). This list is not about nice-to-have-attributes more so, it explains a design philosophy that is fundamental to innovation (Auernhammer and Roth 2021).

A reoccurring reason for failing design thinking is that CIOs only understand the topic on a superficial level due to the overwhelming number of approaches they need to know (Urbach et al. 2019). This is especially worrying because the support of the management is one of the most powerful means to change the existing culture (Seifried and Wasserbaech 2019). This change in culture is ideally pushed by the "design thinkers" from a bottom-up approach and fueled by the support of the management (Seifried and Wasserbaech 2019). A major obstacle for this approach is not to leave individuals behind. Notably individuals that do not have a design background can be averse of the design thinking method (Elsbach and Stigliani 2018) and are at risk of getting left behind.

4.3 The tools

There are a few different naming conventions for tools. Some papers call them "techniques" (e.g., Carlgren et al. 2016), some "methods" (e.g., Seidel and Fixson 2013) or as I decided "tools" (e.g., Micheli et al. 2019). There are three models primarily in use for design thinking. The steps I briefly summarized in the background chapter each have a set of tools. The five tools that are the most influential are: "Prototyping", "Visualization", "Ethnographic methods", "Experiments" and "Brainstorming" (Micheli et al. 2019). Brainstorming is used for generating possible solutions to problems (Randhawa 2021). Ethnographic methods result in having a better understanding of the customer (Randhawa 2021). Prototyping and experimentation help testing out ideas and to see if the idea is viable for business (Randhawa 2021). Visualization is being used to materialize ideas, discuss them and create consensus (Carlgren et al. 2016).

4.4 The links between culture, individual, and tools

In the preceding chapters I presented three aspects of design thinking. United they cover design thinking from multiple sides. Furthermore, the literature implies that there is a relation between them that reinforces each other.

First, the link between organization and tools. Depending on how the organization defines its culture it can support or impede the use of design thinking tools (Elsbach and Stigliani 2018). Vice versa, using tools contributes to the organizational culture by creating emotional experiences (Elsbach and Stigliani 2018).

Second, the link between tools and individuals. These two appear to be linked by the attributes credited to them. As I mentioned, in the individual chapter there are character traits which are helpful, if not even necessary, for becoming a "design thinker". One of those traits is "empathy" (Brown 2008). Carlgren et al. (2016) order "themes", "mindsets", "practices" and "techniques" in a list. The first row of the list has empathic as a mindset, which is the same trait Brown mentioned. The relation between tools and individuals is in the last column, which are the techniques e.g., "Ethnographic research" (Carlgren et al. 2016). This structure implies that empathy is needed for those techniques resulting in a relation between certain individual characteristics and tools. In reverse the tools can be used for developing individual attributes (Carlgren et al. 2016).

At last, the link between individuals and culture. As I mentioned earlier in this paper the best way to change the culture is a bottom-up approach starting from the individuals (Seifried and Wasserbaech 2019). On the other side the manager needs to adjust the organization in a way that it is an environment which supports the individual (Rylander et al. 2022).

The key to successfully implementing design thinking is the combined effort of culture, individuals, and tools (Seifried and Wasserbaech 2019). The result of this chapter is visualized in figure 1 (below).

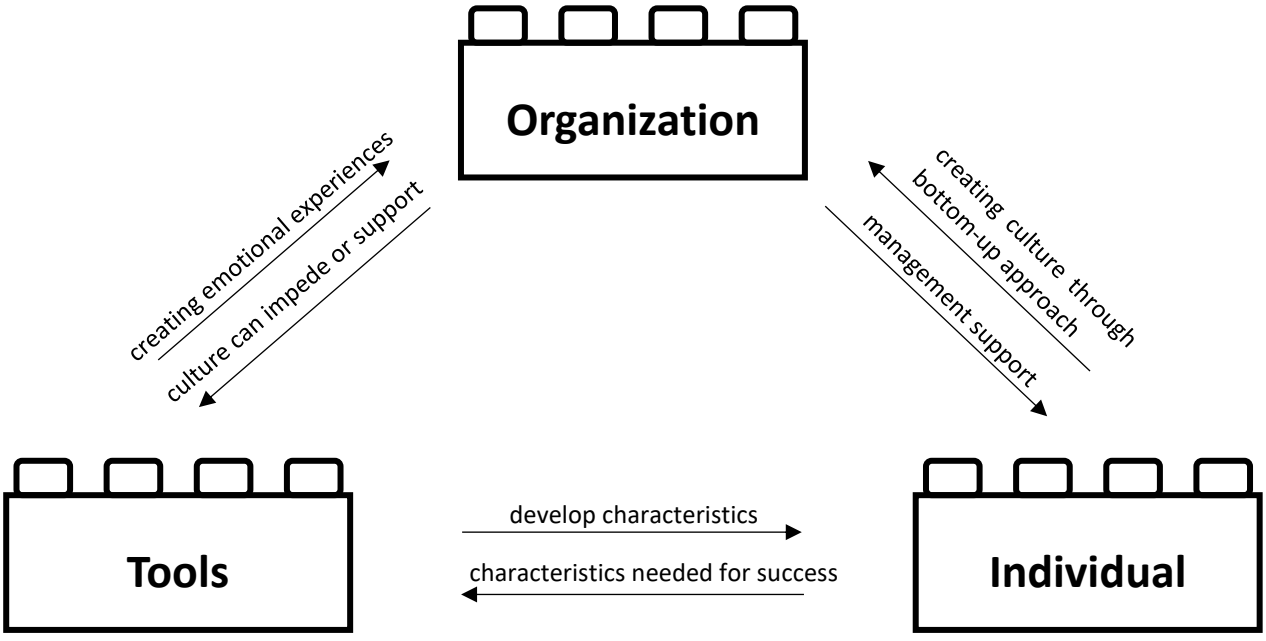

Figure 1. "building blocks" concept (summarizing Elsbach and Stigliani (2018), Seifried and Wasserbaech (2019), Carlgren et al. (2016) and Brown (2008)

5 Discussion

Design thinking is a phenomenal way of generating innovations. However, due to the different naming convention and interdisciplinary character design thinking is hard to understand. Especially CIOs appear to have problems with getting a hold on design thinking (Urbach et al. 2019).

I used the state-of-the-art literature in terms of citations (e.g., Brown 2008) and in terms of timeliness (e.g., Rylander et al. 2022, Carlgren and BenMahmoud-Jouini 2022). Therefore, this paper provides remedy by breaking down the giant that design thinking is into three key aspects. Further, I show that every aspect influences the other.

Before giving practical implications, I wanted to remind the reader that the impact that design thinking has on the organization can vary drastically. Depending on the organization, this can span a difference between design thinking being in its infancy to having design thinking tools and organizational culture align (Seifried and Wasserbaech 2019). That being said, the practitioner should not be demotivated by the hurdles of implementing design thinking. As Seidel and Fixson (2013, p. 32) aptly said: "It would be unfortunate if a design thinking approach was discarded prematurely by individual teams or entire organizations due to frustration with its implementation."

For practical implications the primary use cases for this paper are:

- As an overview of design thinking
- As a way to self-reflect whether the a) organization b) individual c) tools that are being used or planned to get used fit design thinking
- As an outline for creating a framework that fits the needs of the respective organization or individual

The field of design thinking still has plenty of room for further research. One of the more prominent gaps in design thinking is monitoring the process. None of the papers that were used for this review had an approach on how to monitor the direct benefits of design thinking. With the result of my paper being the three aspects that are most influential on successfully implementing and maintaining design thinking, research in this direction seems practical. Since every aspect can be considered a "building block" for the foundation of design thinking I raise the question: Which block should be dealt with first? Maybe approaching every block at the same time could end up being the smartest method, since they mutually interact. Further research in this direction could result in a framework for implementing design thinking. In addition, it would be interesting to see if there more blocks that are not considered in this paper (e.g., the customer).

This review is limited by a couple of factors. The biggest factor being the search string, which excluded many papers that might be relevant but could not be found because another synonym for business was being used. In addition to that, there are plenty of databases that are not included in this review. Using the "VHB-Jourqual 3" to only include A-ranked management journals, also implies that journals, which have other focuses, or a worse ranking are not considered. Finally, I was not able to get access to some of the results, which therefore are not being considered in this paper.

6 Conclusion

In order to get the following result, I filtered through two databases and multiple leading management journals. This review focused on being up to date with over two thirds of the used sources being younger than five years.

The objective of this paper was to provide the reader an overview of the latest literature on design thinking. I conclude that there are three building blocks that are fundamentally for the success of design

thinking. These building blocks, namely “organization”, “individual”, and “tools” overlap and influence each other. The relations between the building block are shown in figure 1.

Appendix A: Literature Matrix

Source	organization	individual	tools	relation
Auernhammer and Roth 2021	x	x	x	
Avdiji et al. 2020	x	x	x	
Carlgren and BenMahmoud-Jouini 2022	x	x	x	x
Elsbach and Stigliani 2018	x	x	x	x
Gonera and Pabst 2019			x	
Magistretti et al. 2021	x			
Micheli et al. 2019	x	x	x	x
Mishra 2021			x	
Rylander et al. 2022	x	x	x	x
Seifried and Wasserbaech 2019	x	x	x	x
Urbach et al. 2019			x	
Prud'homme van Reine 2017	x	x	x	

References

Auernhammer, J. & Roth, B. 2021: The origin and evolution of Stanford University’s design thinking: From product design to design thinking in innovation management. — *J of Product Innov Manag* 38 (6): S. 623–644. DOI: 10.1111/jpim.12594.

Avdiji, H., Elikan, D., Missonier, S. & Pigneur, Y. 2020. A Design Theory for Visual Inquiry Tools. — *JAIS* 21 (3): S. 695–734. DOI: 10.17705/1jais.00617.

Brown, T. & Kātz, B. 2009. *Change by design. How design thinking transforms organizations and inspires innovation.* Harper Business, New York.

Brown, T. 2008. Design thinking. — *Harvard Business Review* 86 (6): 84-92.

Carlgren, L. & BenMahmoud-Jouini, S. 2022. When cultures collide: What can we learn from frictions in the implementation of design thinking? — *J of Product Innov Manag* 39 (1): S. 44–65. DOI: 10.1111/jpim.12603.

Carlgren, L., Rauth, I. & Elmquist, M. 2016. Framing Design Thinking: The Concept in Idea and Enactment. — *Creativity and Innovation Management* 25 (1): S. 38–57. DOI: 10.1111/caim.12153.

Elsbach, K. & Stigliani, I. 2018: Design Thinking and Organizational Culture: A Review and Framework for Future Research. — *Journal of Management* 44 (6): S. 2274–2306. DOI: 10.1177/0149206317744252.

Gonera, A. & Pabst, R. 2019. The Use of Design Thinking in Transdisciplinary Research and Innovation Consortia: Challenges, Enablers, and Benefits. — *jim* 7 (3), S. 96–122. DOI: 10.24840/2183-0606_007.003_0006.

Magistretti, S., Ardito, L. & Messeni Petruzzelli, A. 2021. Framing the microfoundations of design thinking as a dynamic capability for innovation: Reconciling theory and practice. — *J of Product Innov Manag* 38 (6), S. 645–667. DOI: 10.1111/jpim.12586.

Matthee, M. & Turpin, M. 2019. Invited Paper: Teaching Critical Thinking, Problem Solving, and Design Thinking: Preparing IS Students for the Future. — *Journal of Information Systems Education*: Vol. 30: S. 242-252.

Micheli, P., Wilner, S. J. S., Bhatti, S. H., Mura, M. & Beverland, M. B. 2019. Doing Design Thinking: Conceptual Review, Synthesis, and Research Agenda. — *J Prod Innov Manag* 36 (2): S. 124–148. DOI: 10.1111/jpim.12466.

Mishra, Oly. 2021. Design Thinking and Bricolage for Frugal Innovations during Crisis. — *jim* 9 (3): S. 1–26. DOI: 10.24840/2183-0606_009.003_0002.

Randhawa, K., Nikolova, N., Ahuja, S. & Schweitzer, J. 2021. Design thinking implementation for innovation: An organization's journey to ambidexterity. — *J of Product Innov Manag* 38 (6): S. 668–700. DOI: 10.1111/jpim.12599.

Rylander Eklund, A., Navarro Aguiar, U. & Amacker, A. 2022. Design thinking as sensemaking: Developing a pragmatist theory of practice to (re)introduce sensibility. — *J of Product Innov Manag* 39 (1): S. 24–43. DOI: 10.1111/jpim.12604.

Seidel, V. P. & Fixson, S. K. 2013. Adopting Design Thinking in Novice Multidisciplinary Teams: The Application and Limits of Design Methods and Reflexive Practices. — *J Prod Innov Manag* 30, S. 19–33. DOI: 10.1111/jpim.12061.

Seifried, J. & S. Wasserbaech, C. 2019. Design Thinking in Leading European Companies—Organizational and Spatial Issues. — *jim* 7 (1): S. 80–107. DOI: 10.24840/2183-0606_007.001_0006.

Urbach, N., Ahlemann, F., Böhmann, T., Drews, P., Brenner, W., Schaudel, F. & Schütte, Reinhard. 2019. The Impact of Digitalization on the IT Department. — *Bus Inf Syst Eng* 61 (1): S. 123–131. DOI: 10.1007/s12599-018-0570-0.

van Prud'homme Reine, P. (2017): The culture of design thinking for innovation. In: *jim* 5 (2), S. 56–80. DOI: 10.24840/2183-0606_005.002_0006.

Webster, J.; Watson, R. T. 2002: Analyzing the Past to Prepare for the Future: Writing a Literature Review. In: MIS Quarterly (26:2), xiii–xxiii. DOI: 10.1.1.104.6570.