

EXPLORING MEASUREMENTS TO QUANTIFY THE SUCCESS OF DESIGN THINKING IN STARTUP ENVIRONMENTS

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Introduction. The digitalization and globalization of the world are progressing at a rapid pace, resulting in new work environments and increased pressure on companies to create innovative portfolios of products and services to remain competitive (Litvinenko, 2020). The transformation from a seller's market to a buyer's market has placed the customer at the center of entrepreneurial decision-making, leading to increased demands for appropriate products and services (Porter, 1989). In addition, innovation is now expected to come from all departments within a company, rather than just the research and development department (Quinn, 2000). This increase in complexity poses a particular challenge for start-up companies, which often have limited capital and are at risk of quickly disappearing from the market if they cannot find profitable markets for their products and services (Giardino., Wang, & Abrahamsson, 2014). To address this problem, new approaches have been developed to enable customer-centric development of products and services, which can help to reduce the risk of failure for start-ups (Nobel, 2011). However, there has been limited attention paid to defining goals for innovation projects and measuring the success of these innovation methods (Perrin, 2002). This is an important area of research, as it can help to improve the chances of success for start-up companies and enable them to better navigate the rapidly changing business landscape.

Used methodology. The present study aims to investigate the success measurement of Design Thinking in startups. As a part of the research process, a comprehensive literature review will be conducted to examine the current state of knowledge on the topics of innovation, Design Thinking, and the measurement of innovation and Design Thinking. This review will allow us to understand the existing debates, theories, and research gaps in these areas, and will inform the development of relevant and meaningful research questions for the survey instrument. These research questions will be used to test hypotheses. Empirical survey research is then conducted. According to Bhattacharjee (2012), this data collection technique has many advantages, including facilitated respondent participation and the ability to collect data remotely. An online survey will be conducted among a sample of US startups, including both quantitative and open-ended questions. The survey results will be analyzed using descriptive

statistics (Fisher, & Marshall, 2009) to generate new insights on the methods and practices of startups using Design Thinking and especially on the methods and practices to evaluate the success of such projects. In addition, expert interviews will be conducted using the grounded theory methodology (Walker, & Myrick, 2006) to provide a qualitative analysis of the survey results and explore the practical applications of Design Thinking in the startup context. A diverse group of interview participants will be selected to ensure a range of perspectives. The interviews will take place between May and June 2019. Six experts in the field of Design Think will be interviewed. The study aims to contribute to the existing literature on the management of startups and the use of Design Thinking, by providing new insights and practical guidance for startups seeking to implement Design Thinking in their organizations.

Literature review. Design Thinking is a method that has gained significant attention among various types of organizations, including start-ups, medium-sized enterprises, and large corporations (Kelly, 2006). Studies have shown that Design Thinking can effectively address complex problems and generate innovative ideas within companies (Martin, 2009). This approach utilizes a human-centered and iterative approach to problem-solving, which allows for the creation of practical, effective, and desirable solutions. In summary, the growing popularity of Design Thinking is due to its ability to foster creativity and drive innovation in the face of complexity (Shamiyeh, 2012).

What is Design Thinking. In science, there is no consensus on how Design Thinking can be defined. Many researchers describe Design Thinking as an approach that aims to solve problems and develop new ideas. The goal is to find solutions that are convincing from the user's point of view. In contrast to other innovation methods, Design Thinking is not described as a method or process, but as an approach based on the three equal basic principles team, space, and process (Cross, 2001). The classic Design Thinking approach is divided into five phases. These phases are Empathize, Define, Ideate, Prototype and Test (Plattner., Meinel, & Leifer, 2010).

Why Design Thinking is used. The underlying problem of this study is that many companies and especially young startups fail to deliver products and services which match the demands from customers (Feinleib, 2011). Consistent customer orientation is particularly decisive for the success of a start-up company. However, it turns out to be a challenge to identify the customer's needs precisely and to develop a suitable offer. One approach to better understand customer needs and to develop a suitable product through a high number of iterations and with a clear focus on customer needs and expectations is Design Thinking (Ries, 2014). Design Thinking has established itself especially in technology companies and has shown some successful results through examples like AirBnB (Joffrion, 2018), Apple (De Souza Soares, 2016) or SAP (Luka, 2014).

Applying Design Thinking to problems. Design Thinking can be applied to many issues. However, through many years of application in practice, but also in science, some types of problems have been found that can be solved with Design Thinking particularly efficiently and purposefully. These problem types are “Unclear Problems” and “Wicked Problems”. For unclear problems, both the problem and the solution are unclear. This structure makes it possible to first explore the market and then find out which problems exist to then find a solution. In this area Design Thinking can be applied well because it helps to describe the problem and then iteratively find a solution (Lindberg, Meinel, & Wagner, 2011). A Wicked problem is distinguished by the fact that many people have a different view of the problem. Therefore, a common understanding of the problem must be developed. Design Thinking helps with these kinds of problems because it supports the whole process and can work out a variety of solutions (Lindberg, Meinel, & Wagner, 2011).

Challenges of Design Thinking. Many leaders still have reservations about the Design Thinking approach, which stands in the way of wider adoption. These reservations are among other things based on the lack or low level of success control of Design Thinking. Many executives and employees find it difficult to quantify the added value of innovation methods, approaches, or frameworks (Davila, Epstein, & Shelton, 2012). Even though Design Thinking has already become widely accepted, it is no exception to this rule. In addition, there is little research on the actual expectations of managers about the results of Design Thinking and the influence on their decision making.

Brief scientific novelty. In previous work, methods to measure Design Thinking have already been determined. It was found that success stories have proven to be the current way of communicating the success of Design Thinking (Schmiedgen et al., 2016). The existing studies usually analyze larger companies and do not take an exact stand for the management of start-ups. For this reason, it makes sense to check which requirements start-up managers have for measuring the success of Design Thinking and to develop an iteration for startups based on the existing frameworks. Startups differ from large companies in their dynamic composition as well as their budget. While large companies usually have many long-term employees, start-ups usually consist of young people that do not yet have much experience. A review of the appropriate metrics or procedures for the measurement of success of Design Thinking in startup environments would help to explore the possibilities and limitations.

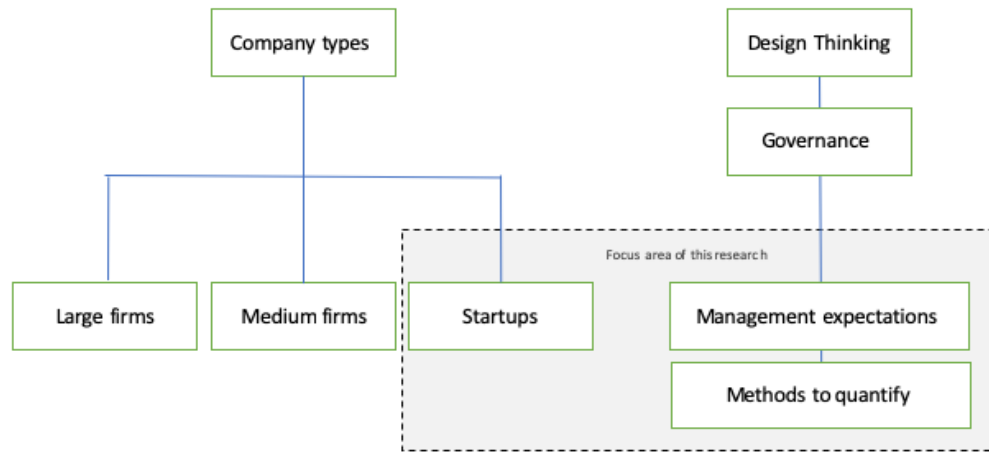


Figure 1. Focus area of this research

This research aims to identify the challenges and opportunities associated with the governance and measurement of Design Thinking in start-ups. To achieve this, the study focuses on the perspectives and experiences of start-ups and compares them to those of larger and medium-sized companies reported in previous research. Specifically, the study explores the expectations of management and the methods used to quantify the success of Design Thinking in start-ups. To address the barriers that prevent the widespread adoption of Design Thinking, the research also investigates potential solutions and tools that can enhance the benefits of this approach. In practice, most Design Thinking projects are not measured at all. And as there is only little documentation about Design Thinking projects the total number as well as the share of companies which use the Design Thinking method can only be estimated (Royalty, & Roth, 2016). Several studies investigated the percentage of companies using Design Thinking, but results vary widely among different samples considered in the study (Dym et al., 2005). Findings may differ significantly between samples of family businesses and startups, between US and Germany, between small and large companies and many other characteristics (Dorst, 2011). Research has shown that Design Thinking is applied in many parts of the world and is becoming more widespread (Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013). Within the USA and China, Design Thinking already seems to have established itself (Leifer, Plattner & Meinel, 2013). Many technology companies have also adopted a strong user-centric development approach and are pursuing an increasingly iterative approach to develop products according to the needs

of their customers (Liem, & Sanders, 2011). However, Germany and many other European countries tend to have a successor position rather than being at the forefront of innovation in a worldwide comparison (Kollmann, 2016). Especially the industry type, the technological complexity of the company as well as the country of the headquarter of the company may have an influence on the introduction of Design Thinking and methods for measuring innovation in departments, working groups and the entire company. Based on the existing research, a research gap can be identified. This research gap is described below.

The Research Gap and Research Questions. Design Thinking projects are only partially or inaccurately tracked at start-ups. Thus, success and failure of such projects is usually only documented to a limited extent (Jobst et al., 2012). Especially in dynamic startup environments, there is still no research on the measurement of Design Thinking. The work should contribute to clarifying the following research questions and help to measure Design Thinking in start-up environments.

RQ1: How is Design Thinking practiced in startup companies?

RQ2: How does the measurements of the success of Design Thinking in startups differ from larger companies?

RQ3: What measurement methods are used by startup leadership in Design Thinking?

RQ4: Which key figures are measured in Design Thinking for start-ups?

RQ5: How can a system be introduced in startups to make Design Thinking more measurable?

Analysis. An online survey was administered to collect data on the use of Design Thinking and the measurement of its success, particularly among start-up companies. A total of 113 participants completed the survey. In addition, six expert interviews were conducted to gather additional insights on the measurement of the success of Design Thinking. The results of the survey and interviews were analyzed to address the following research questions.

RQ1: How is Design Thinking practiced in startup companies? This study found that start-ups tend to prioritize efficiency and rarely use Design Thinking as a standard process. While the Design Thinking approach can be time-consuming, it may produce better results for products. However, start-ups rarely continue to follow this approach after establishing themselves in the market, and they often do not systematically measure or document the results of Design Thinking. These findings highlight the challenges that start-ups face in adopting and effectively using the Design Thinking approach.

RQ2: How does the measurements of the success of Design Thinking in startups differ from larger companies? Start-ups measure even less frequently and broadly their

Design Thinking process than large companies. However, this can be explained by the fact that the current frameworks and tools do not have the functions for a decent evaluation in a reasonable time. This publication was able to show that large companies have better processes and therefore measure more key performance indicators (KPI) as start-ups. Start-ups, on the other hand, like to use only a small amount KPIs. Mostly these KPIs are especially important for their investors. For this reason, it can also be shown that primarily investors are the once, who introduce performance reviews and management systems in start-up companies. Especially the figures from the due diligence can be found more often at start-up companies.

RQ3: What measurement methods are used by startup leadership in Design Thinking? This study found that most start-ups do not use a formal method for measuring the Design Thinking process and often lack precise documentation for innovation projects, which makes it difficult to evaluate their success. Among the start-ups that do measure performance, growth and employee motivation are important metrics. The phases of prototyping and testing are also considered valuable indicators of potential market success, while traditional business metrics are given less emphasis. These findings suggest that start-ups may prioritize different performance measures than larger companies, and may place greater emphasis on the specific stages of the Design Thinking process.

RQ4: Which key figures are measured in Design Thinking for start-ups? The data generated from the Design Thinking process can be organized into three categories: Corporate culture, corporate strategy key figures, and Design Thinking process key figures. Corporate culture indicators include the employees' experience level with Design Thinking, their motivation, learning outcomes, and the quality of collaboration. Corporate strategy key figures focus on growth, customer trust and loyalty, and cost management. Design Thinking process key figures include the quality and quantity of information gathered in the Empathize phase, the accuracy and relevance of personas created in the Define phase, the diversity and quality of ideas generated in the Ideate phase, the effectiveness of prototypes in the Prototype phase, and the perceived usefulness of the prototype or product in the Test phase. These indicators can be used to evaluate the success of the Design Thinking process and inform decision-making in start-up companies.

RQ5: How can a system be introduced in startups to make Design Thinking more measurable? The interviews conducted in this study emphasized the importance of simplicity and ease of implementation of the measurement process of Design Thinking in start-ups. Effective communication is also critical to ensure that all employees are aware of the target values of the Design Thinking project. Additionally, the measurement framework for Design Thinking in start-ups needs be flexible and adaptable, as these companies are typically diverse and dynamic. These findings

highlight the need for a measurement approach that is easy to use and responsive to the unique needs of start-ups.

Conclusions. Every company needs to collect more data to better control the innovation processes while using the Design Thinking approach. Innovation is quite a complex process. For this reason, it is important to precisely define the various requirements for the Design Thinking project in advance. This is especially the result of the survey of 113 startup founders and managers in startup companies. Only if the objectives have been clearly defined is it possible to measure the success of Design Thinking in startup environments. If the definition of goals is poor or inadequate, the measurements cannot lead to success. Customer-centric development is also particularly important for the success of the project. This was shown both in the interviews and in the surveys. For this reason, it seems advantageous for startups to focus on evaluating the success of the Test Phase within the Design Thinking process. This approach allows the development of products and services that are tailored to meet the specific requirements of the customer, which can enhance their satisfaction and overall success. Overall, research on the measurability is still relatively in its infancy and many topics are promising for further research. Since Design Thinking operates precisely between technology, people and business, there are many approaches to further research in this diverse field.

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This study has some limitations that should be taken into consideration when interpreting the results. First, the scope of this study is limited to technology companies that offer their products and services via the Internet. While this is a significant portion of the technology industry, it does not include companies that operate primarily through other channels such as retail stores or physical distribution networks. Second, the sample size of this study is relatively small, with only 113 respondents and six expert interviews. While the data collected from these sources can be valuable, a larger sample size would likely provide a more accurate representation of the population being studied. Finally, this study is focused on German and US-based start-up companies, which means that the results may not be directly applicable to companies in other countries. The cultural, economic, and regulatory differences between countries can have a significant impact on the way that businesses operate, and therefore the results of this study may not be fully transferable to other contexts.