The Origins of Design Thinking and the Relevance in Software Innovations

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Abstract. This paper argues that the methods used in the trending buzzword Design Thinking have deeper roots and bigger application potential, beyond product development IDEO and the Stanford University d.school style. The conscious combination of these Design Thinking methods and rapid iteration sessions is also of value when deploying it to software development. It is a powerful approach for requirement discovery and hence becomes relevant when developing novel solutions. This argument is supported by the case of SAP AppHaus and their experience on implementing the Design Thinking process for HANA related software development. Here Design Thinking forces to holistically explore a solution space with the customer, but also to bring different internal disciplines together early. Hence anybody who is interested in software innovations might want to consider the core ideas behind Design Thinking.

Keywords: Design thinking · Software development · SAP case study · Product discovery

1 Introduction

This paper provides an introduction and justification of the activities behind Design Thinking. Although the "buzzword-factor" of Design Thinking has increased in recent decades[1] the methods applied origins from older academic research fields such as the design research group of Stanford University, Social Science, and Mechanical Engineering. Hence it is more than a brief management trend praising post-its, pipe cleaners and play dough, but in combination a powerful method for developing radical innovations. First we present the origins of the most domesticated Design Thinking Rules: Empathize; Define; Ideate; Prototype and Test. Moreover, we provide the reader with insights from Silicon Valley based SAP AppHaus and argue why any Software Innovation could benefit from the Design Thinking process.

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[1] According Google Trends the number of google searches on *Design Thinking* is 10 times higher today than 10 years ago.

2   The Research Domains Behind Design Thinking

The d.school Bootcamp Bootleg describes 5 essential activities covering the process of Design Thinking; Empathize, Define, Ideate, Prototype, Test. Below we briefly describe the origins of these activities.

Empathize and Define. In Design Thinking you are to empathize with not only the end-user, but also any stakeholder of you product. You are looking for relevant pain points to address in your solution. One should be able to put him/her-self in the place of a stakeholder and understand their motivations and frustrations. This demand for understanding and empathy are traditional skills required in the field of anthropology and sociology. Actor Network Theory was introduced in the early 80's and argues the value of seeing problems in the context of actor-networks and identifying the misalignments in this network (Callon 1984, 1986; Latour 1996). This is the basic idea behind need finding and the holistic approaches taught in Design Thinking.

Ideate. Ideation originates from the field of creativity research and the ability to consciously focus on either divergent or convergent processes (Runco and Okuda 1988). Ideation covers developing several solutions to an initial challenge. It is not enough to stop at the first idea at hand, but instead one have to explore the solution space. Onarheim and Biskjaer (2015) describe ideation as much more than just a eureka moment. They argue that one of the most important skills when ideating are to be aware of your creativity constraints that are surrounding the context and might you constrain you.

Prototype and Test. Prototypes make ideas tangible. This changes the design dialogue from abstract to concrete. Bringing in a physical object to talk about is the principle of *boundary objects* introduced by sociologist Star and Griesemer (1989). They argue the value of bringing stakeholders together around a boundary object opening up for viewpoints across disciplines and interests.

Moreover in Design Thinking prototyping are a strategy to learn. In this way it relates to active learning or action research, where you built representations or small experiments to challenge and test context hypotheses (Berg 2004; Bonwell and Eison 1991; Cameron 2009). Hence you get feedback on your ideas very early on in the project. The process of testing specific ideas as hypotheses origins from the scientific method it self with Karl Popper as the main spokes person (Popper 1959).

3   The Case of SAP AppHaus

Agreeably Agile Development and the Design Thinking process are similar. Both favor user involvement, rapid prototyping and testing. Yet Design Thinking is for discovery hence requirement defining. Agile development methods take a starting point in coding for semi-well-defined requirements. Hence the two methods compliment each other - Design Thinking fitting the early stage of product discovery followed by Agile processes when the right "it" has been defined. To illustrate this claim, the case of AppHaus Silicon

Valley is being presented. The insights were kindly provided through a semi-structured interview with Design & Innovation Executive Philipp Skogstad from SAP AppHaus.

Design Thinking for Product Discovery, Early Co-Collaboration and Business Strategy Considerations

At SAP Design Thinking is a core nominator for the early stage product development. The core values of implementing design thinking have been to allow rapid iterative development involving the three-dimensional product core; customer, technology and business. This allows much faster to reframe the actual problem of the customer. SAP's benefit of Design Thinking is to gain the holistic overview of a problem. Hence a project always starts with a discovery phase conducting research on customers, end-user as well as current technological solutions. In order not to start coding immediately several future interactions are physically prototyped through role-plays and paper wireframes. SAP even developed the tool *Scenes* that allow a tangible dialogue among customers, developers and designers. Through story-boards and scenes the dialogue reflect future scenarios rather than detailed specifications[2].

> *"One of the core values when implementing Design Thinking in our development process was actually not only to bring in external stakeholders early on in the process, but actually to get programmers and UI designers to meet earlier as well. This improves the understanding of specific design choices and to what degree certain solutions are flexible. This saves us a lot of time."* Philipp Skogstad SAP

Involving customers early on in the development influenced the communication topics as well. Helping the customers seeing the bigger context of their products transformed the dialogue from being product to strategy or underlying problem focused.

> *"First you might see yourself having a meeting with the people from product development. Next time you find your self being brought to business strategy meetings."* Philipp Skogstad, SAP

This indicates that Design Thinking is more than a process to develop innovative products, but a mindset that allow you to explore and foresee uncertainties as well. This is supported by recent scholars arguing that design thinking covers a much broader field than solely product development (Cooper et al. 2009).

Implementing Design Thinking

SAP made strategic efforts to implement the exploring and testing mindset of Design Thinking. Their core initiative covers the so-called three P's: *People*, *Process* and *Place*. *People* means making sure you are working in an interdisciplinary environment. *Process* means having a conscious knowledge on which methods to use when and being able to switch between methods taken from Design Thinking as well as Agile Development processes. In SAP Design Thinking is hence not something to stand alone, but it complemented supported by process such as Agile Development. *Place* covers having a physical workspace that creates and atmosphere of openness to idea sharing, experimenting and prototyping. At SAP they aimed at creating an art studio rather than a gallery.

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2 https://experience.sap.com/designservices/scenes.

"Many companies fail at creating such a space and end up with fancy chairs etc. like an art gallery. We seek to create the feeling of an art studio where you are allowed to test, experiment and get things dirty," Philipp Skogstad, SAP

4   Conclusion

In this paper we describe the original research fields behind the methods applied in the Design Thinking Process in order to remove the term from a brief buzzword to a credible innovation method. We argue that though these methods are not new, the favor of rapid iteration and stakeholder involvement supports the exploratory mindset any innovator needs in the early stages of product development. They are powerful in defining the product requirement that in term form the foundation for applying agile development methods. This description is supported by the case of Silicon Valley based AppHous that in their daily work successfully apply Design Thinking methods for product discovery and agile method for test and implementation.

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