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## Conference Paper

# How might we use Design Thinking for Digital Business Design and for creating Digital Business Value?

29th European Regional Conference of the International Telecommunications Society (ITS): "Towards a Digital Future: Turning Technology into Markets?", Trento, Italy, 1st - 4th August, 2018

### Provided in Cooperation with:

International Telecommunications Society (ITS)

*Suggested Citation:* Baum, Peter (2018) : How might we use Design Thinking for Digital Business Design and for creating Digital Business Value?, 29th European Regional Conference of the International Telecommunications Society (ITS): "Towards a Digital Future: Turning Technology into Markets?", Trento, Italy, 1st - 4th August, 2018, International Telecommunications Society (ITS), Calgary

This Version is available at:

<https://hdl.handle.net/10419/184931>

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#### Track 4. Understanding the dynamic nature of ICT markets

### How might we use Design Thinking for Digital Business Design and for creating Digital Business Value?

Established organisations seek to reinvent or enhance their business models at a time when the rate of innovation accelerates and a transformation, such as the current digital transformation, drives the global economic environment. Design Thinking (DT) is a new methodology that has been hailed as a method to identify, understand and solve dynamic business issues. This paper investigates how the DT methodology supports an organization in finding new ways of creating, delivering, and capturing digital business value in dynamic environments. After determining the characteristics of business model creation in dynamic environments, we demonstrate how the Design Thinking methodology can guide an organisation through a digital transformative process to capture digital business value.

#### 1. Business Models in Uncertain Environments, and Design Thinking

Advancements in technology and in particular a rapid recombination of digital technologies impact and potentially disrupt traditional markets. This moreover impacts society through altering consumption patterns, communication and social interactions. In turn, technology and social change triggers regulative responses which impact how organisations operate to create, deliver and capture their business value, which is increasingly within the digital sphere. Claudi, Daly et. al (2018) have called the above the "digital disruptive trinity" for companies.

The first pillar of the "digital disruptive trinity" which characterizes uncertain dynamic environments, is disruptive innovation in the field of technology. Brynjolfsson and And McAfee (2014) highlight how digital tools contribute to the exponential growth in technological progress. An easy recombination of those tools creates further opportunities for innovation. As an example, communication technology has broadened the reach of actors and companies for the last 25 years with cloud and microservices providing tools for easily build, run and scale activities, which previously needed large upfront investment and maintenance efforts.

The second pillar of the "digital disruptive trinity" is the societal aspect. Exponential advancements in technology, in particular digital technology, change consumption patterns, communication and social

interaction, which influence further business practices. Consumer habits and expectations gradually shift reshaping existing and forming new markets. Businesses shape and execute their strategies in response to dynamic market.

These technology and social change triggers regulative responses, the third pillar of digital disruption. Regulatory responses impact how organizations operate to create, deliver and capture Digital Business value.-The regulatory frame adjust itself to counter new or newly perceived risks. As an example, the new EU General Data Protection Regulation (GDPR), which replaces the Data Protection Directive, is a response to technology development. This regulatory change has large implications for smaller organizations.

A dynamic and uncertain environment therefore leads to a threefold decision dilemma: (a) increased technology choices, (b) which impact the acceptance by end-users, employees and stakeholders, (c) additional compliance needs to meet a changing environment. The "digital disruptive trinity" leads to the dilemma that decision processes are hampered by interconnections of these three fields, even when pro-active and re-active action becomes urgent. This hindrance applies to individuals looking for understanding and inspiration, yet in a formal setting, the paralysis in the decision-making process is amplified.

Opportunities and threats arise from this paralysis state: once successful companies cease to exist and new companies or new entrants capture shifting markets. Change in business models follow. As competitive landscapes shift, important components of business models are in the phase of reinvention or reorder. Well-executed business models and sound operational underpinnings can yield competitive advantages, which can be hard to overcome for new entrants and therefore keep competitors at bay.

Business models creation in dynamic markets are key in successful business transformation. Business model creation echo Peter Drucker's classic question: "what does the customer value?" (Magretta, 2002). To take the concept of Afuah and Tucci (2001), who focused on comprehending and analysing the determinants of business performance with emerging technologies such as the internet, a business model is a *"method [that] builds and uses its resources to offer its customers better value than competitors and make money doing so"*. In their book *"Internet business models and strategies"* (2001) they distinguish between the following components: Customer segment, Value, Scope of products/services, and activities necessary to create, perform and maintain these products or services. Afuah and Tucci (2001) address a strategic layer of linkage between the business models and a

technology driven company. In their magical triangle of business models, Gassmann (et al. 2017) used 4 dimensions to compare the most commonly used business models.

1. the Target customer or *Who is the customer group*
2. the Value proposition, or *what to offer to the customer*
3. the Value chain or *how to produce the offering*
4. the Economics or *why does it make sense from an economic point of view and why does it generate a profit.*

As described Prahalad and Bettis (1986), creating new business models need to overcome the dominant logic in the field which dominates the given business realm of activity. Creating or innovating successfully new business models therefore depends on feedback loops. Chesbrough (2010) highlights the conditions for the validity of such experiments, the highest validity are provided by real customers having “skin in the game” and paying for a product or service. Into this vacuum steps the Design Thinking methodology, created in 1992 by Buchanan, that is based on iterative feedback loops and which is characterised by an experimental approach to business model innovation.

Reflecting on industrial design tradition, Buchanan (1992) highlighted its cross disciplinary ability to combine analytical and practical approaches for problem solving in the liberal arts and design fields. He elaborates an argument from the Nobel Prize laureate Herbert A. Simon, how design is a way of thinking and how it resembles and distinguishes itself from a science. Simon referred to design as the next “artificial phenomena” (1969) as well a method to create artefacts. He departed from the approach inspired by the natural science and engineering, to emphasise the importance of a relationship between the Human and the Object in creating artefacts.

Simon (1969) referred to non-linear analytical phases for which a designer determines a problem and requirements. He distinguishes this phase from a solution for this Problem, that combines and balances a final plan which is ready for production. His seminal work *Wicked Problems in Design Thinking* (1992) describes how systemic thinking can be traced back to the practice of designers finding solutions. Although his work lacked clear steps to follow and was not a user-manual, it inspired the creation of a human-centered, iterative design process and method. He described a mindset, a cognitive process and set of skills and habits, rather than a fixed framework of steps for product creation. In the early 2000s Design Thinking became more at once more popular and more formulised, with the necessity to create better user experiences when information technology no longer targeted only experts. Design Thinking focused then on the relationships among people (Brown 2009). As the “digital disruptive trinity” accelerated, Design Thinking became a tool for innovation management in larger organisations.

Design Thinking today has the notion of enabling user-centric innovation through iterative and cooperative management practices, combining anthropological and qualitative social science research with problem-solving approaches used by designers (Carlgren 2013). Design Thinking, along with agile process management, is gaining momentum in the ICT field becoming a well established toolkit to reach desirable goals for dynamic IT projects. As an iterative approach, DT adjusts the outcome of the process to fit the identified needs of a target group. Repetition and evaluation lead to accumulated incremental improvements, embracing early failure to help avoid sunk costs. At the heart of Design Thinking therefore is experimentation but not the controlled scientific experiment to support or refute a theory but rather a natural or field experiment, in which parameters are difficult to control and to reproduce.

Design Thinking's iterative process can be conceptualised as one that oscillates between the two poles of divergent thinking and convergent thinking. Guilford (1957) coined these terms to distinguish the focused process that leads to a single, correct conclusion and an open process that generates a multitude of possibilities. As a psychologist, Guilford used these terms to describe cognitive abilities or traits of intelligence. Today this distinction has entered the theoretical and practical realm of design methodology as demonstrated by the British Design Council (2005) which named this oscillate between divergent thinking and convergent thinking by the term "double diamond".

## **2. Design Thinking as a framework to experiment with Business Models**

Design Thinking offers a framework to overcome the paralysis brought on by the "digital disruptive trinity" that allows to experiment early on with business models and collect feedback. Such feedback allows businesses to adjust or to fail early and avoid sunk costs.

Design thinking methods allow to test how an organisation creates, delivers and captures value by using digital computing technologies, which we define as Digital Business Value (DBV). The DT approach today, as laid out by Brown & Wyatt (2010) and as taught at the Hasso-Plattner Institute, has six consecutive steps: 1. "Understand", 2. "Observe", 3. "Define-the-point-of view" as the initial "problem phase", then 4. "Ideate", 5. "Prototype" and 6. "Test" in the second "solution phase". For each phase and each step, there are widely available methods and toolbox.

Design thinking is visually represented by a canvas-based framework. A visual representation simplifies the complex web of relationships and processes which constitute an organisation and the environment it operates in. Simplification makes complexity more approachable and thus is the basis

for useable tools. Yet simplification can mislead and lead to skewed decisions if important aspects are misrepresented. While not elaborating on bias and other perils, continuous testing in a diverse team can significantly lower the risk of simplification and misrepresentation.

The paper wants to test the hypothesis that Design Thinking is a valid tool to change both business and technological aspects of DBV. The paper strives to prove that DT as a creativity tool impacts positively on the way that users interact on both the business and technological layer of an organization. Thus the paper proves the usefulness of DT for creating Digital Business Value and how DT is suitable for Digital Business Design.

DT is a user-centric approach as in the initial “problem phase” the DT process is to understand the environment, empathize with the users, and subsequently single out one specific problem in the define-point-of-view step. Design Thinking allows for creativity to oscillate between contemplative and inspiration, as between divergent and convergent thinking. Divergent thinking taps into creativity to open multiple thoughts and ideas, whereas convergent thinking depends on what to exclude and what to focus on.

In the DT process the first step focuses on acquiring knowledge about an issue: insights about the general situation in which user operates, tasks and motivation, competition, and comparable situations. To understand the environment in which the DT process operates, the first step gathers information and understands the problem which is to be solved. The first crucial step of understanding of the problem determines the feasibility of the subsequent solution phase. The facilitator does not need to be a subject matter expert and can lack in-depth knowledge of a particular market or technological field. An unbiased view without an own firm conviction may enable a more open workshop environment. To experiment with business models, it is important to understand the customer behaviour, understand the context and understand how a business is placed and how it functions.

The subsequent observation step enables empathy for the client or the end-user. Observation or by proxy, interviewing the users and affected persons, builds the basis of this phase. As in anthropology, this “field research” step sets the questions and observations, helps understand the potential client better and creates a positive user experience. In the context of applying Design Thinking in new business model creation, the following lessons can be taken.

- Choose the right sample,
- Observe and ask without analysing own explanation or applying judgement,

- Collect the observations, as documentation enables results to be shared and incorporated into the next phases.

The step Define-a-point-of-view is the final step in the problem phase and determines the problem to be addressed.

The previously collected information is incorporated into a user persona. In the Design Thinking practice, this step cumulates into the formulating the How-Might-We (HMW) question. Such a question defines the exact problem the business model needs to address, and to which the following solution space tries to find a suitable answer. It concentrates on tackling on this one issue. For this paper we choose to give a title using the HMW formulation: *“How Might We use Design Thinking for Digital Business Design and creating Digital Business Value?”* To define a point of view, the following divergent and convergent sequence can be applied:

- Information need to be processed by collecting and clustering,
- Analysis and weighting of insights,
- Clustering of insights and labeling,
- Choosing the most important one or ones to formulate the HMW questions. (Lewrick et al. 2017)

The next phase is the solution phase which has three steps Ideate, Prototype and Test. The ideation phase opens the solution space, and switches from a convergent to a divergent mindset. In workshops this step strives to generate a multitude of ideas to solve the previously identified issue. In Design thinking it is not about a lone genius ideating in solitude. Group work and different techniques circle around how aspects can be substituted, recombined, rearranged, adapted, modified, altered use cases, or simply stripped away. Time, context or purpose of an existing situation can be altered hypothetically for an inspiration. Ideation is about generating many ideas, some of them can be impractical. The common understanding of "brainstorming" can be considered part of this step. This is easily adjusted to ideate about a business model based on the inputs from the problem phase.

In the second step of the final solution phase, Prototype, is where one idea is chosen and implemented in an initial makeshift manner. In workshops, potential solutions are created only in a symbolized manner. They serve as artifacts to be evaluated and tested in the next step, Testing. This has several advantages: without emotional and financial sunk cost, prototypes enable an iterative "fail early" and "fail often" mentality.

There are several lessons from Design Thinking that can be drawn on for the Prototype of a new business model. Role plays can represent processes, and draw attention to flaws during the testing phase. Lewrick et al (2017) stress the importance of prototypes that focus on the previously defined user personas, their ambitions and tasks, along with the overall context and setting. A prototype should be fit to be tested in the real world rather than a laboratory, although sketches offer a quick way to focus on the most determining part of the prototype.

To create a solution in the form of a prototype, the mindset is converging again as choices have to be made. The assumptions that drive the choices for testing need to be documented.

The final testing step that crown the DT process confronts the prototype with the reality, a predefined set of tests and ultimately with the feedback of potential users. It is the step that challenges the implicit assumptions and decisions which were made during the ideate and prototype steps. Different scenarios for the testing need to be created in accordance with the above. These scenarios need to reflect the issues and challenges previously identified. Different scenarios can cumulate into A/B testing where two or more distinct variations are compared to each other. Choices are being made and the mindset concludes to an evaluation, which can even cumulate in a binary assessment such as accepted or not. Choosing the right criteria to test is an important element to be taken into account for business model testing.

### **Conclusion:**

Dynamic market conditions disrupt current business models: the shifts in technology, consumption patterns and regulation may challenge key elements in an organisation's business.

Design thinking offers in this context a clear reference structure, well tested methods to experiment with business models prior to implement them. Fluctuating between opening up and a concentrated narrowing down are the two inherent approaches of Design Thinking. As a guiding principle, this changes business mindsets and allows to make early mistakes when feedback still can be incorporated in the business model. Design Thinking therefore offers a clear yet flexible format to the process to deliver innovation as a product.

As the heart of Design Thinking is not a controlled scientific experiment but one in which parameters are difficult to control and to reproduce, further scientific inquiry may be needed to better identify the key parameters to innovate in dynamic and uncertain environments.



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