Adlan Kurakayev

Design Thinking for Digital Transformation

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Author(s): Adlan Kurakayev

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In recent years widespread of technologies have led to significant changes in the business world. Technologies have affected the way companies create value, how they operate and how they reach their customers. With a rapid success of disruptive technology driven startups and companies that are constantly driving innovation, for traditional companies focus on successful integration of technology has become a major factor of survival. This fact has allowed a new form of transformation to emerge – Digital Transformation, transformation that helps businesses in adapting to the digital age. As traditional companies try to adapt technologies and drive innovation, often the lack of understanding on how strategically implement digital transformation lead to losses. To avoid failure companies need to develop their understanding of Digital Transformation to more than just an integration of technology but to an adoption of strategic mindset that can help in building organizational structure, reevaluate value delivered to customers and embed innovation creation into its processes.

One of the solutions that can help companies to approach digital transformation with the right mindset might be design thinking. Design Thinking is a human-centered approach that has been popularized with more companies implementing it for driving innovation within. It's main difference to traditional problem-solving approach is on focusing and understanding, internalizing people's needs, in holistic ideation and continuous implementation of feedback to perfect the product.

This thesis describes and evaluates design thinking approach as a tool for accelerating digital transformation process. In the literature review section first digital transformation phenomenon – its definition and fields of impact that it has affected are introduced. Second, design thinking – its definition, process and implications are described.

The end of literature review section leads to evaluation on how design thinking accelerates and drives digital transformation which was obtained by reviewing experience of top Design Thinking organizations. Next, it introduces description of common challenges that they face adapting Design Thinking and guiding principles that help them to overcome those challenges. After reviewing literature and obtaining theoretical background the empirical case of TII (Technology Innovation International) is overviewed.

As a result, main findings from literature review findings are introduced and compared to TII's case. At last for TII basic guidelines are given on design thinking's adaptation for digital transformation process based on theoretical background obtained. Thesis concludes that Design Thinking as a human-centric, holistic and systematic approach to problem solving showed itself as a great addition to Digital Transformation.

Adaptation of Design Thinking approach for TII showed to have the potential in accelerating Digital Transformation process, as it provides clear systematic guidelines on how to act in digital age. Creating a detailed human-centric plan, actuating elements of digital enterprises structure and making fast and decisive decisions can help traditional organization to survive, overcome common challenges and move forward in a digital era of constantly shifting environment of technologies and customer desires.

Foreword

"In the name of Allah - The Most Gracious, The Most Merciful"

The idea of this thesis came as result of observations that were made by being a trainee in two companies. At Unimed in Russia and CEMIS in Finland, I was in both presented with the tasks to commit to their digital transformation process.

The clear contrast between Russian and Finnish general cultural attitude towards digital transformation process had spawned my interest on how the culture of decision-making affects the process of innovation.

By thinking about both cases and how decision-making affects the digital transformation process I found design thinking a systematic approach that is meant to change the culture of a traditional company and can possibly make a transition to digitality easier.

I want to express my gratefulness to Allah for providing me with patience to finish this work and for blessing me with great parents that always have supported me.

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List of Abbreviations

TII = Technology Innovation International

IDEO = Innovation Design Engineering Organization Academic

AI = Artificial Intelligence

IT = Information Technology

IoT = Internet of Things

UX = User Experience

POV = Point of View

CDO = Chief Digital Officer

EU = European Union

MVP = Minimum Viable Product

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1 Overview of Thesis Structure

This overview describes and evaluates design thinking approach as an approach for successful digital transformation. In the literature review section, the thesis introduces the reader to digital transformation phenomenon - its definition and the fields it has affected. After that, it will describe design thinking - its definition, process, and implications. This will lead to a description of how design thinking could accelerate and drive digital transformation by reviewing the experience of top design driven organizations, a description of common challenges that they face adapting design thinking to their digital transformation process and guiding principles that help them to overcome those challenges.

After the literature review and summarized findings, an empirical case study of TII (Technology Innovation International) is presented and described. Next, the discussion section provides a comparison and recommendations based on the findings of the literature review and the case study on Technology Innovation International. In conclusion, the main results of the comparison are highlighted.

The goal is to describe both design thinking and digital transformation, analyze how the design thinking process is used to accelerate digital transformation and give a new perspective on the case of TII alongside the guidelines based on the knowledge obtained from the literature review.

1.1 Methodology and Literature

The method used in this case is literature review and the analysis method used is a qualitative approach. The review is made by combining academic and business literature, reports, online articles, books and journals.

1.2 Introduction

The rise of technologies has significantly shifted the way we perceive the world today. The Digital era has introduced us with technologies that have provided us new ways of communication and interaction, ways to access, analyze and store data that have not only affected our day-to-day lives but also reshaped the business world in unprecedented speed. This phenomenal speed has benefited numerous tech-driven start-ups and made them into market leaders in their field, while at the same time many traditional companies have struggled to adapt to this change and were left behind. This growing need for change and adaptation of technologies has been recognized by in the business world as digital transformation.

As traditional companies try to adapt technologies and drive innovation, often the lack of understanding on how strategically implement digital transformation leads to losses. To avoid failure, companies need to develop their understanding of digital transformation to more than just an integration of technology but to an adoption of a strategic mindset that can help building an organizational structure, reevaluate the value delivered to customers and embed innovation creation into its processes.

One of the solutions that can help companies to approach digital transformation with the right mindset might be design thinking. Design thinking is a human-centered approach that has been popularized with more companies implementing it for driving innovation within. Its main difference to traditional problem-solving approach is on focusing and understanding, internalizing people's needs, holistic ideation, and continuous implementation of feedback to perfect the product.

Understanding digital transformation, its impacts and how to strategically approach it using design thinking can help traditional companies to understand the phenomenon of digital transformation on a much deeper scale and help them to approach it with the right mindset.

2 Literature review

The primary goal of this literature review is to describe topics first from a wider viewpoint and familiarize the reader with various interpretations on the concepts of digital transformation and design thinking. The second aim is to analyse common patterns in the descriptions of the concepts to provide more detailed descriptions. The literature review is conducted by selecting and combining literature from books, academic journals, articles and reports.

2.1 Introduction of Digital Transformation

In recent years widespread technology and internet has led to significant changes in the business world. Technologies have affected the way companies create value, how they operate and how they reach their customers. With the rapid success of disruptive technology driven startups and companies that are constantly driving innovation, focus on a successful integration of technology has become a major factor of survival for traditional companies. This fact has allowed new forms of transformation to emerge – Digital Transformation, transformation that helps businesses in adapting to the digital age. (Rogers 2016; Gupta 2018)

Digital transformation has attracted much attention in both the academia and business world. It is important to mention that Digital transformation is a recent phenomenon and it has not yet been fully conceptualized. Authors and researchers have various opinions and views on digital transformation and how it could be defined and described. (Bharadwaj 2013)

The following subsection of the literature review will describe digital transformation phenomenon – its definition and the fields it has affected.

2.2 Definition of Digital Transformation

Dr. George Westerman, a research scientist with the MIT Sloan Initiative on the Digital Economy has proposed the following definition of digital transformation: “Digital transformation — the use of technology to radically improve performance or reach of enterprises” (Westerman, 2011)

Some authors have further expressed their opinion to state that digital transformation is beyond just an integration of a technology to a business and the definition should include the strategic aspect of digital transformation. "Digital transformation is not about technology—it is about strategy and new ways of thinking. Transforming for the digital age requires your business to upgrade its strategic mindset much more than its IT infrastructure." (Rogers 2016)

Supporting this view definition is formulated by Anandhi Bharadwaj. "Digital Transformation is an organizational strategy formulated and executed by leveraging digital resources to create differential value" (Bharadwaj, 2013)

2.3 Impacts of Digital Transformation

David Rogers introduces in his book "Digital Transformation Playbook" his 5-Domain model as a model for categorizing and describing fields of impact that digital transformation has made on the business world – impact on Customers, Value, Competition, Data and Innovation. Similar fields of impact are described by authors such as Bharadwaj, Gupta and Westerman. The following section will describe the impact that digital transformation has made on those fields by presenting and combining findings from both academic and business literature (Rogers 2016; Bharadwaj 2013; Gupta 2018).

2.3.1 Customers

For every business, understanding the customer is a key priority for achieving success. The importance of digital transformation is that it reimagines the relationship between seller and buyer. This reimagining is defined by an increased emphasis on a lasting relationship between companies and customers; this relationship is a shift from a short-term interaction with the customer to a lifelong process that involves continuous improvement in order to meet customer's needs. As IT has become a big part of customer's life, more and more companies have realised that they must adapt to this reality and create a long-term digital marketing strategy. (Rogers 2016; Jobber, Lancaster 2017)

In his book, Rogers emphasizes the fact that customers are no longer just mass market; they are a dynamic network in which companies must engage in. Digital social media marketing tools are a major advancement that have changed the way companies find ways for engaging with their customers. (Gupta 2018). Rogers introduces and compares the traditional Mass-Market model with Customer Network Model (Figure 1). Customer Network Model visualizes the connections that could be built between various digital platforms and customers. Connections create a network in which customers can play a role of influencers to further promote companies' brand, while Mass-Market (Figure 2) model on the contrary allows the only one main influencing voice to be produced from company to customers.

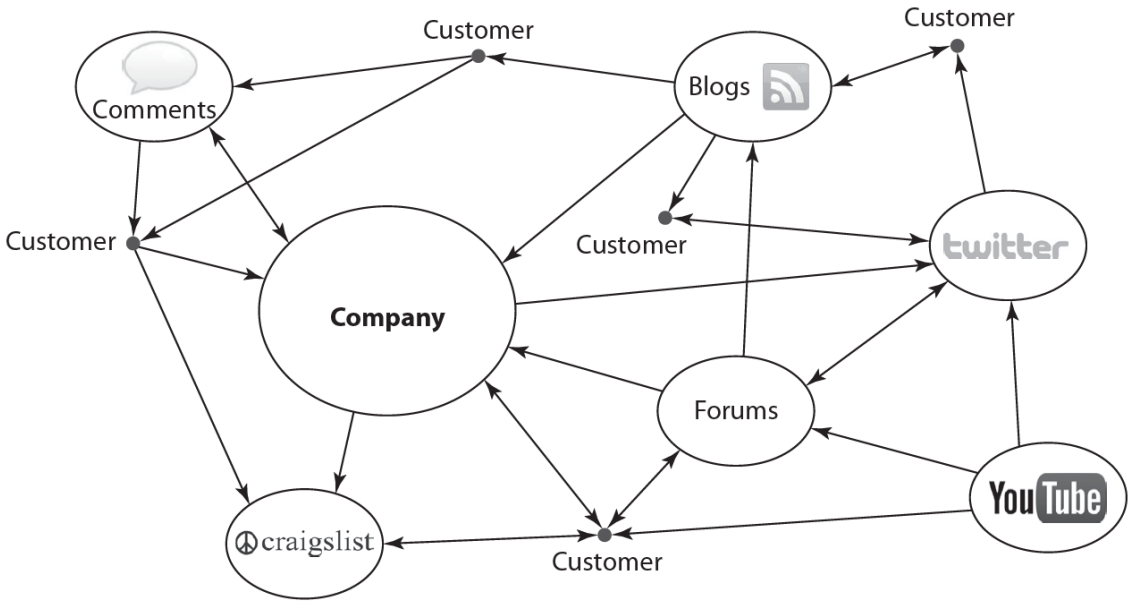

Figure 1: Customer Network Model (The Digital Transformation Playbook P.22)

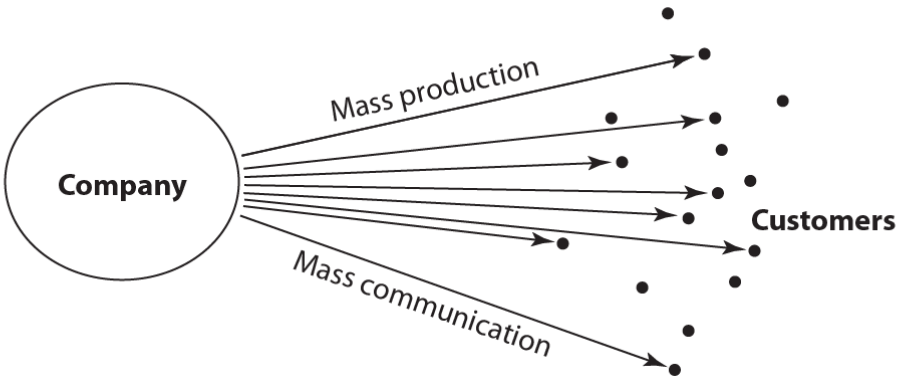

Figure 2: Mass-Market Model (The Digital Transformation Playbook P.23)

This change in a relationship between seller and buyer has also affected the way modern brands are perceived by customers; branding now has a less dominant influence on customer choice although it is still holding its significance. Social media and online communities are used by customers to consult and interact with companies online. That way a company can provide an impression regarding their brand to their customers, which in the long run becomes the foundation of the brand image. (Jobber, Lancaster 2017)

According to Rogers, it is important to understand the effects of digital transformation to marketing behaviors of customers. Spread of new digital channels has advanced the understanding of a traditional approach to marketing. The Digital marketing funnel model by Rogers illustrates the process that consists of techniques and tactics that can help to gather customer base and nurture them so they can share their experience. The Digital marketing funnel is a step forward from the traditional digital funnel and the core differences are in the addition of Loyalty and Advocacy. Spread of customer networks is used to encourage Loyalty and Advocacy. The added steps make the model into a loop in which loyal customers that advocate for their brand of choice using customer networks become one of the primary marketing goals for modern companies in their marketing strategy. (Rogers 2016)

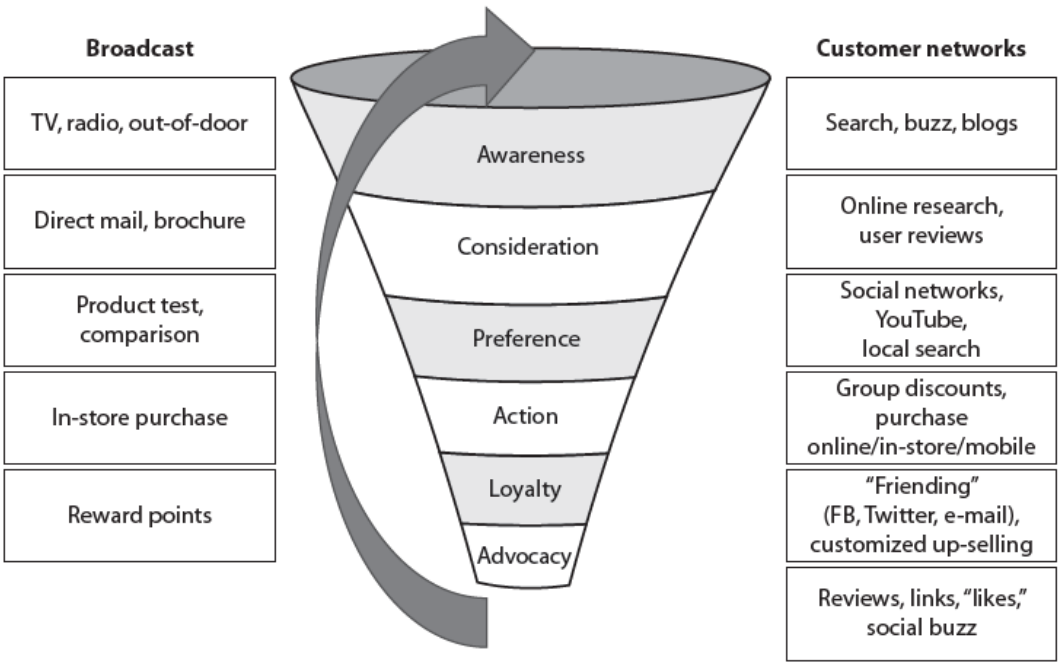

Figure 3: Digital Marketing Funnel (The Digital Transformation Playbook P.26)

Gupta describes that an increased understanding of the modern customer in a digital age has allowed companies to introduce more insightful and advanced marketing strategies. For traditional businesses striving for digital transformation the reconnection with customers has been a major point that Gupta had to address. In “Driving Digital Strategy” he explains how new digital reality has opened a new possibility for marketing. Gupta introduces some marketing strategies that highlight the difference between traditional and digital marketing. (Gupta, 2018)

From search to purchase

The possibility of a detailed analysis for a customer journey from the moment customers searches product online to the moment of buying and later reviewing the product, had allowed for more advanced marketing strategies. In digital era, advertising had gone beyond just limiting to one channel and traditional channels are nowadays are more often used for creating an awareness and providing information, but main priority goes to SEM, SEO and social media marketing. SEM, SEO and social media marketing allow seller to affect customer decision even at the early stage of customers journey and even after the product has been purchased in order to encourage Loyalty and Advocacy, something that traditional channels before were not able to achieve at a mass scale. To successfully understand what channels should be chosen and used in order to map customer journey so called “omni-channel” view of the customer is created. “Omni-channel” view of customers allows to understand and prioritize channels based on customer preferences.

Personalization and Retargeting

Use of algorithms and data tracking had allowed customization and personalization of ads. By analyzing users’ preferences and previous actions firms can narrow focus on their specific target group. As customization had allowed to adapt advertisement based on users’ specific qualities, such as for example their cognitive styles. Another example will be retargeting as it is utilizing similar data analysis principal, and it tries to offer back what buyer was searching for but didn’t buy. There are much more possibilities for analysis and adaptation of user behavior that leads to result of an effective targeting.

Social Media and Virality

Social Media has solidified itself as an effective marketing channel as studies show that consumers are much keener to trust other users rather than traditional channels. Social media has also introduced the phenomenon called virality; sudden spread of information that is shared by a mass number of users. Virality has become a very desirable opportunity for marketers for mass promotion as it does not require high amount of investment and is highly effective.

2.3.2 Competition

Digital era had shifted a standard notion of competition as only win or lose situation. Instead, digitalization reintroduced competition as a dynamic mix of both cooperation and competition and introduced business models that have transformed the shape of industry. (A. Swaminathan, J. Meffert 2017)

An introduction of a platform business model driven by technology opened many new opportunities for companies to transform their businesses, which reshaped the current state of business industry. Platform business model is a “model that uses technology to connect people, organizations, and resources in an interactive ecosystem in which amazing amounts of value can be created and exchanged.” (G. Parker, M. Van Alstyne, S. Choudary, 2016 p. 10)

Innovations such as digital platforms had become an increase factor for the possibilities of a strategic cooperation between business rivals. (G. Parker, M. Van Alstyne, S. Choudary, 2016)

With an advent of digital technologies, a classical notion of collaboration between competitors as only win-lose situation had transformed to a possible win for both sides as more and more businesses can utilize digital potential to provide benefit to both themselves and their competitors. Strategy of so called “co-opetition” is as relevant as ever. “Co-opetition” introduced by Adam Brandenburger and Barry Nalebuff in 1997 is described as a “strategy that includes simultaneous cooperation and competition between two or more firms, which cooperate in some activities while competing in others.” (S. Shah, A. Jha 2017)

Case of edX is one of the brightest examples of successful co-opetition. In 2012's rivaling Harvard University and Massachusetts Institute of Technology had announced a partnership to provide free online courses for students all over the world. Online platform was called edX, the partnership had made a wide range of courses from both educational facilities available to anyone with the possibility of certification for a fee. As a result, collaboration with competitor both MIT and Harvard benefited from partnership and provided increased value for their target group. (CNN, 2012)

Edx's case was made possible because of a rise of a platform-model businesses and the rapid growth of businesses such as Amazon, Google, Facebook, that became an example for whole world of what great potential platform model can hold. At the same time for traditional companies' in a new business world driven by platform businesses, threat of a rapid growing asymmetric challenger had become as real as ever. Asymmetric competitor is defined as a "challenger that is going after the same customers with a different pricing model and a completely different means of distribution." One of the brightest cases in modern business history on how asymmetric threat shouldn't be treated is the case of Blockbuster and Netflix.

In 2004, Blockbuster was a lead movie rental company in the United States. With 8000 stores and its traditional rental for movies with charging late fees to customers that didn't return movie on time it had gained a massive amount of revenue. (A. Swaminathan, J. Meffert 2017)

During the dominance of Blockbuster, small start-up company called Netflix that had come up with a new DVD online service model that utilized digital service subscription for ordering of movies online had approach Blockbuster in order to offer partnership for running Blockbuster's brand online for exchange of a promotion for Netflix services in Blockbuster's stores. Blockbuster had declined Netflix's offer which resulted in the rise of Netflix's services into a by 2018 a 28-Billion-dollar business and Blockbuster's inevitable bankruptcy. (G. Satell, 2014)

Blockbuster case is a great example of how relying on an unchanging value can result in disruption caused by asymmetric challenger. That is why in the digital age every traditional company must widen their vision of competition and monitor all asymmetric threats. (Rogers, 2016)

Blockbuster / Netflix case can be defined as case of a digital disruption, The Digital Disruptive Intermediaries report from University of Sydney (K. Riemer, U. Gal, J. Hamann, B. Gilchriest, M. Teixeira, 2015 p.6) gives following definition to digital disruption, "digital disruption refers to

changes enabled by digital technologies that occur at a pace and magnitude which disrupt established ways of creating value within or across markets, social interactions and, more generally, our understanding and thinking." And as digital disruption becomes more prevalent in business world it had not only been affecting the classic notion of competition, but also a classic understanding of a supply chain. According to G. Satell digital disruption had caused changes in business relationships as the spread of big digital platforms had become the force for disintermediation. As defined by W. Kenton "Disintermediation is referred to removal of the middlemen or intermediary from business transaction" (Investopedia, 2019)

Digital disintermediation has caused a major shift in a media distribution. This massive shift started from music industry, when Apple introduced their new song-selling service iTunes. iTunes introduced new concept for listeners, in which instead of buying whole album they could purchase specific songs they like for a base price that is less than a dollar. iTunes became extremely successful and had disrupted CD selling business and eventually completely taken over. Nowadays CD selling business is almost not-existent as more convenient subscription-based services such as Spotify and Apple Music have completely replaced physical drives, which is a complete disintermediation of music industry. Similar cases are with the newspaper publishers as Facebook and other social media services were chosen by masses as more convenient and cheaper option for reading news. With technological advancement number of disintermediated industries are growing such as hotel industry, banking, movie industry with the potential to reach even healthcare industry.

With the disintermediation, digital platforms and services that replace traditional intermediaries are transforming themselves into a new intermediary. This phenomenon is called intermediation, as business manages to develop platform to such a large scale that other businesses must use it in order to reach their customers. Digital platforms such as amazon.com, YouTube, Airbnb and many more had become new intermediaries' businesses are using as a new intermediary between them and their customers. (P. B. Nichol, 2016)

2.3.3 Data

Coming of a digital era had not only redefined the way companies use their data it had also elevated the value of a data as an asset. In todays' technology-driven world data is recognized as one of the most valuable assets business can possess. With new ways that data can be accessed, analysed and stored, data plays a major role in innovation capabilities of organizations. Data analysis improves understanding of a customer base which affects companies' short-term and long-term strategy. It allows businesses to continuously learn and grow basing their decisions not on their intuition, but on gathered factual information. (Rogers, 2016)

The amount of generated data had significantly increased in last two decades. Increase in data is a result of a growing number of new digital sources that are collecting people's information such as social media, online shops, browsers, and other various apps and platforms. This technological change allowed the phenomenon of the "big data" to grow exponentially and gain a massive attention from business world.

Term "Big data" appeared in the mid-1990s in tech circles and has been described as "large, diverse sets of information that grow at ever-increasing rates. It encompasses the volume of information, the velocity or speed at which it is created and collected, and the variety or scope of the data points being covered. Big data often comes from multiple sources and arrives in multiple formats." (T. Segal, 2019)

Big data is classified as unstructured data, data that is harder to interpret by standard programs and can't be easily fit into spreadsheets. Increased processing power and new technological developments such as machine learning allow to organise and get a lot more value from unstructured data by software that can identify patterns in data that are later examined and analysed by human managers. (B. Marr, 2017)

Much of the Big Data's rise is attributed to growth of IoT (Internet of Things), IoT involves all devices that collect and transmit data by Internet. These are smartphones, PC's, tablets, sensors and much more, now with the increasing list of devices that are getting connected to the internet it can even include TV or refrigerator. Currently there are 30.73 Billion IoT devices and It is predicted that by 2025, the number of IoT devices may grow more than twice. (Statista, 2020)

Another factor that lead to increased usage of Big Data is easier access and storage of data with an aid of cloud computing. Businesses today are not required to make heavy investments in their own storage infrastructures in order to access and store data, as they used to. Cloud computing applications provide seamless access and use of the data with all the processing power residing in the cloud. Cloud services provide companies with agility over the storage of data and with increased protection from data breaches and system shutdowns which makes it an attractive option for businesses. (Subiksha, 2018)

Ai (Artificial Intelligence) is another technological trend that has a huge potential of changing industries as we know them, ranging from business to healthcare. AI is using computer to simulate human thought patterns and aim it to uses such as for example understanding a language or recognize objects in a picture. One of more common usages of AI are chatbots, AI- support assistants that can answer questions that users ask, by providing preloaded information according to their request. Chatbots are more simplified version of what real potential AI can hold, according to Jim Kaskade, CEO of Conversica, a leading AI technology firm based in California AI's, " AI's real potential lies in more advanced assistant that can help to attract and retain customers through imitation of human-like personalized interactions." (Business Reporter, 2020)

Accessibility of technologies for data collection, storing, analysis and interpretation is having a massive impact on business world. More and more business leaders now trust in data and have bright understanding of it's potential in gaining competitive advantage. As various methods of data application are progressing, it is the change of perception from business world that has occurred. In today's customer-oriented world, data related to customers has become one of the most valuable intangible assets that businesses are striving to possess. (A. Swaminathan, J. Meffert 2017)

With the recognition of data's value as an asset, more and more companies are allocating their resources to focus on digital transformation and looking for a new ways to adapt and integrate data into their business strategy. Essentially, they are looking ways to develop so called "data strategy". Data strategy can help company to analyse their core needs and focus data efforts where they are most needed. According to Bernard Marr - strategic and technology advisor to governments and companies regarding data, in his book "Data Strategy", he describes five common ways that can help to understand how data can be used to achieve organizational objectives and deliver business strategy.

Improving decision making

Improving decision making has been one of the most widespread way of using data. Companies that are basing their decisions on data are ending up with making smarter decisions that move them closer and faster in achieving their strategic objectives.

Understanding customers and trends

Analysing customers and identifying current trends using collected data allow companies to gain better insights on how to approach their target group and predict their preferences.

Providing smarter services and products

Understanding customers and trends let companies to further develop their services and products. Constant implementation of new features and fixes by adapting customer's feedback is driving market to create smarter products and services.

Improving internal operations

Optimizing internal operations, increasing effectiveness or improving cost efficiency is something that many businesses are striving for. Data had significantly increased access in analysis of internal processes and made it easier for companies to integrate improvements into their process for boosting effectiveness.

Creating additional value

Depending on the data company possesses, data can be monetized in order to create additional value. (B. Marr, 2017)

2.3.4 Value

Traditionally, company's value proposition as soon as it had established market success was treated as constant. But, in an environment of rapid development of technology and shifting customer needs, focusing on delivering same value proposition, is no longer enough. As technology lead to changes of a consumer behaviour and emergence of new competitors, businesses realised that if they do not take advantage of a new opportunity to offer value to customers, someone else might do it. (Bharadwaj, 2013; Gupta, 2018; Rogers,2016)

Delivering new value requires company to radically transform its business model. That involves rethinking customer experience, internal operations and economic formulas. It may involve reassessing the nature of competition and reconfiguring value chain to deliver a substantial efficiency advantage against competitors. (Westerman, 2017)

In the book "Leading Digital" by G. Westerman, D. Bonnet and A. McAfee, authors presented a research on how digital transformation affects reinvention of value by introducing five broad archetypes that are used for categorization of different cases for business model reinvention.

Reinventing industries

Due to new possibilities that technology opened to businesses, in the last two decades reinvention of an entire industry in which business operates became a possible option. It is a complex process, that requires significant effort and it has a high degree of potential failure, but due to a widespread of the platform economies, nowadays more companies have potential to succeed.

Originally more prevalent in a software companies multisided revenue models' have been utilised to link sellers and buyers and increase flexibility of pricing options by introducing them to a distribution platform that provides all the tools that they need. One of the first companies that fully exploited the potential of multisided platforms were in gaming and banking industries. Software companies such as video-game console makers Microsoft's Xbox and Sony's PlayStation have a long experience in connecting game developers and users. Another example will be PayPal - connecting merchants to customers. (Bharadwaj, 2013)

Companies that fully utilize all the benefits of platform economies are commonly known as sharing economies. Uber for taxi, Airbnb for hotel businesses, and many more add to the list of platform businesses that reshape their industries. Success of platform-driven start-ups gained attention from big traditional companies to respond with the platforms of their own.

Platforms that gained significant number of users may create a barrier for another platform to enter. Well-executed platform has substantial chance of reshaping an industry in which they operate in or carve their own niche.

Substituting products or services

Second archetype involves cases when transformation is essential as the product or service that company is selling is being substituted by new digital technology.

This archetype is especially relevant to phenomenon of physical media substitution by digital analogues. As digital era had introduced remote ways of obtaining and sharing content, more and more information-based businesses such as newspaper, magazine, movie, music industries had to rethink their value proposition of offering content in physical form and adapt it to a digital format. (Bharadwaj, 2013; Gupta, 2018)

Creating new digital business

For a large business finding new sources of value creation may be problematic, as main drivers of innovation are new market players and start-ups. But it is not always the case, as some large companies with thorough research and customer-centric attitude have utilized their current assets and introduced new ways of value creation mainly through implementing platform strategy. In most cases using technology companies are enhancing already existing experience for their customers.

Reconfiguring value delivery method

Not for all companies delivering new value and finding new sources of value creation are the main priorities. Some companies are looking for optimizing and reconfiguring business model to enhance effectiveness and convenience of value delivery.

Rethinking value propositions

Reinvention of business model should not necessarily be an answer to upcoming threat from disruptive competitors with desire to enter a new market. More and more companies are trying to combine various strategies of utilising technologies and innovative models just to reinforce their already existing presence in their market.

2.3.5 Innovation

Digital era and the rise of IT-driven companies with their software based organizational structure and approach to innovation has shown significant results and has affected the way traditional companies think about implementing innovation. (Bharadwaj, 2013)

With traditional approach that was solely focusing on the finished product, it was rather problematic to constantly test ideas as feedback channels were limited. Assessing and choosing ideas were based on factors such as hierarchy of managers involved, intuition and analysis. With primary focus on avoiding market failure, market feedback was received late in the process.
That is radically different to approach that successful companies are utilizing in order to continuously drive innovation. The digital company operates focusing on the process, experimenting and learning from failure, starting with small budgets and increasing budget as initial idea shows potential. Decisions that companies in digital era make are based on data and not intuition with focus on real customer needs.

For traditional companies to adopt experimentation and rapid learning-based process to harness innovation, thorough, detailed individual digital strategy is a must. Such radical organizational strategy requires major shift in companies' culture and learn to balance between following structured roadmap and ability to quickly adapt to upcoming challenges.

According to Anand Swaminathan and Jeffery Meffert, for company to enter digital world and to be able to gain ability of adapting to challenges, three principles need to be followed. First, is to channel investments only if team and its experience are convincing. Second, is to build detailed business plan. Third, is to link budgets to specific targets and milestones, rather than utilizing periodic planning in allocating budget. (A. Swaminathan, J. Meffert 2017)

3 Design Thinking

The following subsection of literature review describes Design Thinking approach by introducing its definition, process and common implementations.

3.1 Design Thinking Definition

Currently there is no single definition of Design Thinking that can be accepted as common, with various interpretations by different authors and organizations. Numerous definitions represent different views on design thinking's process, but core idea of design thinking being human-centered approach to finding solution remains constant.

Plattner', Meinel's and Weinberg's definition of design thinking is recognized by educational institutions such as Hasso-Plattner-Institute in Potsdam and at Stanford University in Palo Alto states that "The Design Thinking approach is a systematic, user-oriented approach to solving real-life problems." (Plattner et al., 2009)

More widely popularized definition of Design Thinking is used by IDEO's Tim Brown, presented in Harvard Business Review article has more focus towards business and innovation elements of Design Thinking's approach.

"Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success." (Tim Brown, 2009)

3.2 Human-Centered Design

One of the core differentiating principles that is constant among various interpretations of Design Thinking problem solving approach is human centricity. Term human-centered design has been popularized by IDEO, a company that relies solely on Design Thinking to create innovation.

Don Norman is an engineer and a cognitive psychologist who has made a significant impact to popularize human-centered design provides the following definition in his book “The Design of Everyday Things”, “Human-centered design is a design philosophy. That stands for a good understanding of people and the needs that the design is intended to meet. This understanding comes about primarily through observation, for people themselves are often unaware of their true needs, even unaware of the difficulties they are encountering.” (Don Norman, 2013)

Indeed, understanding what customers want by not simply asking them, but by prioritizing a defined process and system that can provide understanding of customers on a deeper scale is what makes Design Thinking unique and differentiates it from traditional problem-solving approach which already assumes that understanding of user has been reached and is only focused on resolving an issue based on these assumptions. (study.com, 2018)

Formulated by Tim Brown as a three-step process that involves insight, observation and empathy, it is the first integral part of Design Thinking that defines its human-centric focus (Tim Brown, 2009)

3.3 Process

Process of Design Thinking involves logical sequences of techniques and recommendations that is used to guide and accelerate project development process. Design Thinking being holistic approach to problem-solving has being open for interpretation of its process. One of the more popular, widely taught Design Thinking models are made by Stanford´s Design School (d. School), IDEO’s CEO Tim Brown’s model and model presented by Jeanne Liedtka and Tim Ogilvie from “Designing for growth” book.

Brown's model (Figure 4) presented originally in 2008 in Harvard Business Review article had been introduced as three-step model. Tim Brown is the CEO and president of IDEO, an innovation and design firm that utilizes and promotes Design Thinking by designing and scaling product, partnering with organizations and building tools for practising human centered design. (IDEO). Described in his book "Change by Design" as "three spaces of innovation" model has more felxible definition and describes core phases of Design Thinking process as Inspiration, Ideation and Implementation. Brown's model is presented more like recommendation for companies and organizatins to understand and implement core ideas of Design Thinking.

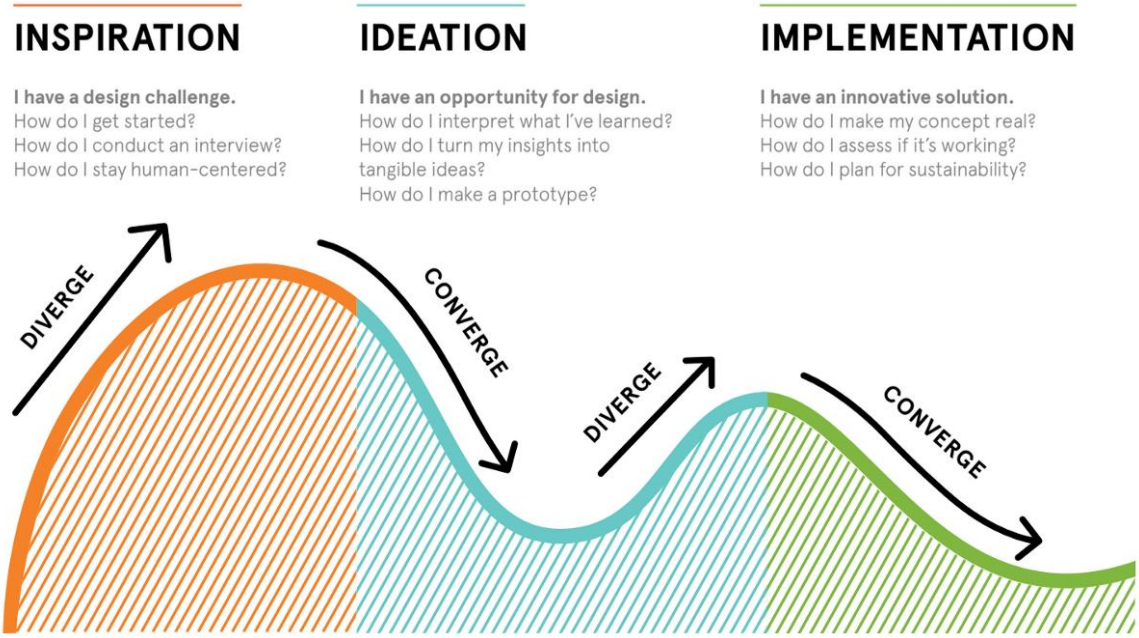

Figure 4: IDEO Design Thinking Process (The Field Guide to Human-Centered Design 2015, p.13)

Stanford's d. school (Figure 5) model presented in 2010. It involves five steps that are: Empathizing, Defining, Ideating, Prototyping and Testing. Hasso-Plattner Institute of Design at Stanford (d. school, 2010), leading university in teaching Design Thinking has widely popularized this interpretation of model, specifically in academic circles. With more detailed description, the model has been a good foundation for creating innovation projects for the education field.

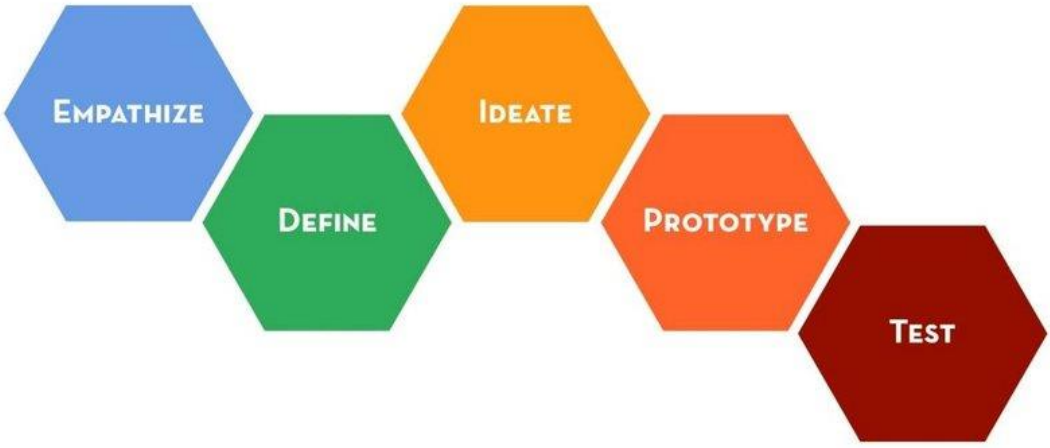

Figure 5: Stanford d. School Design Thinking Process (Stanford d. School 2010, p.6)

Jeanne Liedtka's and Tim Ogilvie's (Figure 6) model was introduced in the book "Designing for Growth" (2011). These authors from Virginia University have presented an approach that involves four phases and ten techniques. The model was made as result of an analysis of 22 organizations that are known for utilizing Design Thinking. With the tools and techniques presented in the model, the model provides a practical example of a way to a successful implementation of Design Thinking.

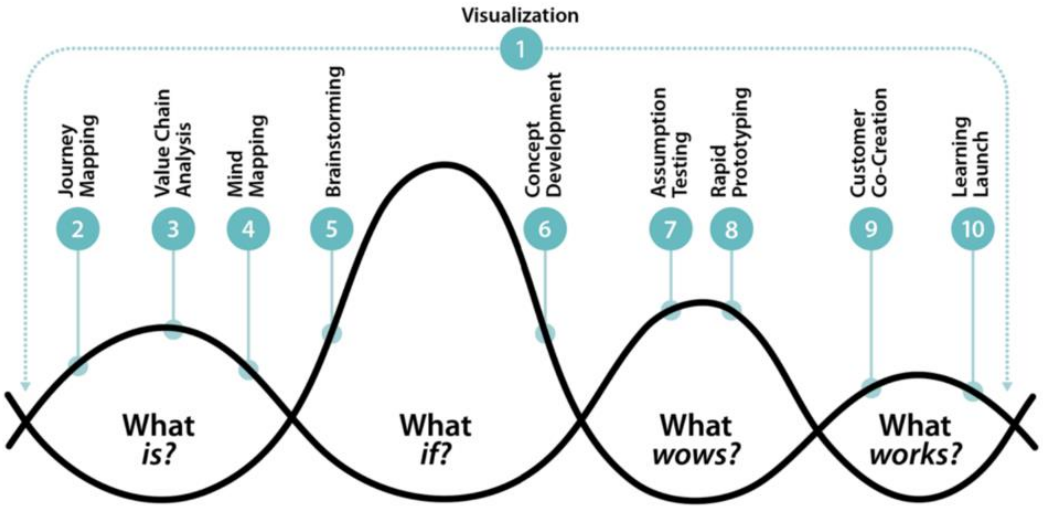

Figure 6: “What Works?” (Liedtka and Ogilvie 2011, p.37)

After the analysis of Design Thinking process from the three models mentioned above, the following steps could be presented as common amongst the various interpretation of DT models:

3.3.1 Empathizing and Understanding

As defined by Tim Brown (2009) “Empathy is the effort to see the world through the eyes of others, understand the world through their experiences, and feel the world through their emotions.” Empathy is the foundation of Human-Centered design and one of the key differentiating factors from traditional problem-solving approach. According to d. School model, building empathy involves three stages.

The first stage is observation. The observation of user behavior allows to identify and internalize the context of a problem in order to focus precisely on people’s needs. Observation is the first step in order to familiarize yourself with user behavior, their environment and their habits. (d. School, 2010) It leads to interpretation of captured information for gaining insights that will be translated into products. (Tim Brown, 2009)

The second stage is engagement. Engagement involves actual interactions with users in a form of interviews or surveys. Those interactions help to identify emotions of users, their needs that they may be or may not be aware of and steer innovation efforts based on those interactions. It also involves determining who to observe and what research techniques to employ that can point towards the right solution.

The third stage involves immersing oneself in the user’s experience. In addition to gaining observation and feedback, achieving personal experience can significantly improve understanding of users. (*d. School, 2010)*

Liedtka and Ogilvie (2011) in their model described several design thinking tools that can aid the empathy and understanding process:

- **“Journey mapping”** tool allows to follow customers journey and develop deeper understanding on their live and problems, it allows to evaluate initial idea’s potential for value creation.

- **“Value chain Analysis”** tool at empathy stage helps to asses’ capabilities and opportunities for a financial potential of an idea.

- **“Mind mapping”** tool helps to structure collected information for an easy and convenient access, to search for patterns and interpret them into a valuable insight.

3.3.2 Define and Diverse Team

In a define phase, collected and interpreted data is used for framing design challenge. It is important to correctly define challenge in order to tackle correct problems and guide design thinking process. In d. School model (2010) design challenge is specified as a point of view (POV). Point of view that is built on understanding of users, their behavior and helps to address their problems. A good point of view is described as one that provides focus and frames the problem, it allows to narrow down team’s focus and inspire it to come up with ideas specific for that problem.

With design challenge framed successfully as preparation to the ideation phase, it is important to focus on building a good multidisciplinary team. This step can be described as aligning mixed views and perspectives of team members towards achieving common goal. Having teams that have diverse specializations in the process leads to more wide and insightful view on the problem.

3.3.3 Ideation

In order to come up with right solution using multidisciplinary teams it is necessary to have defined ideation process. Defined by d. School (2010) “Ideate is the mode of your design process in which you aim to generate radical design alternatives.”. In this process it is important to generate a lot of ideas and go through selection process.

Iteration process involves building up ideas in collaborative environment using combination of divergent and convergent thinking on different stages. Divergent thinking is used during ideation phase and is based on imagination it helps Design Thinkers to come up with multiple options to create choices. Convergent thinking on the opposite is used to narrow down options and select the best ones. During ideation phase rules are applied to boost the process. (Liedtka & Ogilvie, 2011)

Goal of ideation process is to systematize creative process in order to raise level of successful ideas using previously gained insights. According to d. School (2010) model understanding of your team's strengths and weaknesses with smart management during process is significant. In the beginning obvious solutions must be discussed, but it is important to build up from those and strive towards unexpected and innovative solutions.

Several methods mentioned by Liedtka and Ogilvie are commonly used during the process for successful outcome.

- **"Brainstorming**" is described as a tool that can harness unexpected result in unstructured environment. It involves members tackling problems in collaborative environment, it helps to come with initial ideas. Lack of structure to this process doesn't allow it to become key tool for ideation.

- **"Concept development"** tool helps to achieve this structure to the process and further develop initial ideas. It takes the output gathered in "Brainstorming" and further develops idea by asking more questions and putting more details for further concept development.

Tools that can physically aid the process are included in IDEO's report (2015). "Visualization" is encouraged to quickly reflect ideas by drawing on whiteboard, post-notes or sketching.

3.3.4 Prototyping

Prototyping is the process of transferring and testing ideas in the real world. (d. School, 2010) Process helps to feel idea and observe if it has the potential to become solution to a problem that was approached. By visualizing a concept, thinking about details and observing people's reaction, it becomes much easier to understand how to further develop the concept or either reject it altogether in order to move on to a new, more promising one. (Liedtka & Ogilvie, 2011)

Significance of prototyping for Design Thinking as a fundamental way for testing ideas is highlighted in Tim Brown's book "Change by Design" (2009) "This shift from physical to abstract and back again is one of the most fundamental processes by which we explore the universe, unlock our imaginations, and open our minds to new"

Depending on idea and product needed prototypes can be developed in a various form. If it is tangible object it can be a paper mock-up, or 3D printed object. For intangible objects like services, virtual experiences and organizational structures following forms might be used:
(Tim Brown, 2009)

- **Storyboards**
  Series of images, cartoons or text blocks can help to visualize and reflect idea in a form that is simple and understandable for everyone.

- **Diagrams**
  Diagrams are great way to conceive idea in structured form. Diagrams are good to showcase network, process or customer journey. (d. School, 2010)

Today, with availability of various visualization software and services prototyping of intangible products has become a very convenient an easy way for visualization.

At initial stage prototype should not require a lot of investment and time, this aspect helps to quickly learn and collect feedback from people for analysis. (Tim Brown, 2009) So the main objective of prototype is to learn rather than "test" unfinished product. Learning involves deepening an understanding of your environment and users. (Liedtka & Ogilvie, 2011) Last step of prototyping leads to cyclical testing phase to improve and fix chosen solutions. (d. School, 2010)

3.3.5 Testing

Next step after selecting and developing of a prototype is testing. Testing allows to get feedback from users that can be utilised further in order to develop solutions and fix mistakes, it also allows to deepen knowledge of a user. (d. School, 2010)

Feedback

Getting feedback is an integral part of Design Thinking as it reflects core idea of Human-centric design approach. Constant feedback in testing process helps to build an understanding of result that is desired by target group.

Refining

Constant integration of collected feedback into a prototype after initial analysis further refines ideas and pushes prototype forward until it takes form that is as close to desired result as possible. (IDEO, 2015)

Learning

Launching testing cycle of collecting and integrating user feedback allows significant increase in knowledge of your users. It helps to further develop empathy through observation that can be a great experience in developing future prototypes and products. (d. School, 2010)

3.3.6 Launching

After testing and evaluation of the prototypes, best prototype is selected. Selection leads to launching stage which involves intensive stress testing in the market.

There are several suggested Design Thinking methods described in **IDEO's** Field guide to Human-centred design that can aid launching process:

- **"Live Prototype"** described as method that is used for brief stress testing which helps to understand feasibility and viability of an idea. It involves going to real environment and testing solutions in a real world and it can last from couple days to a week.

- **“Roadmap”** method allows to further develop a plan of an already tested prototype by collective decision-making on responsibilities, timeline and milestones of the project.

- **“Staff your project”** methodology is described as choosing right staff for a project but in comparison to Diverse Team step it has to be much more focused on targeted specialists, it means adding new team members that have more expertise on specific discipline.

- **“Resource Assessment”** method suggested to be taken together with **“Roadmap”** and **“Staff your project”** tools as it is intended to focus on feasibility of a solution. It is important to focus on evaluation of resources to enhance practical implementation.

Another additional aspect of Design Thinking described by Liedtka and Ogilvie (2011) is development of a business model that can integrate the prototype to a market.

3.4 Implementations of Design Thinking

Design Thinking has a wide spectrum of implementations that is showcased by increasing number of successful design-driven companies.

Companies such as Apple, Alessi, and Nintendo had been drivers and populators in implementation of Design Thinking as a product innovation tool, which has placed product development focus on aesthetic, visual and usability aspects of their products. This shifted priority had led to high demand and rapid growth of the industry of customer centric products. (Brown, 2009)

Another major implementation of design thinking as an organizational and services innovation tool had been attributed as one of the causes for a rapid growth of a wide range of companies. Companies that highlight their design-driven direction are Apple, Pepsi, IBM, Nike, Procter &

Gamble, SAP and they have been outgrowing S&P 500 form 2005-2015 by 211% according to Design Value Index created by the Design Management Institute. (Figure 7) (Jeanene Rae, 2016)

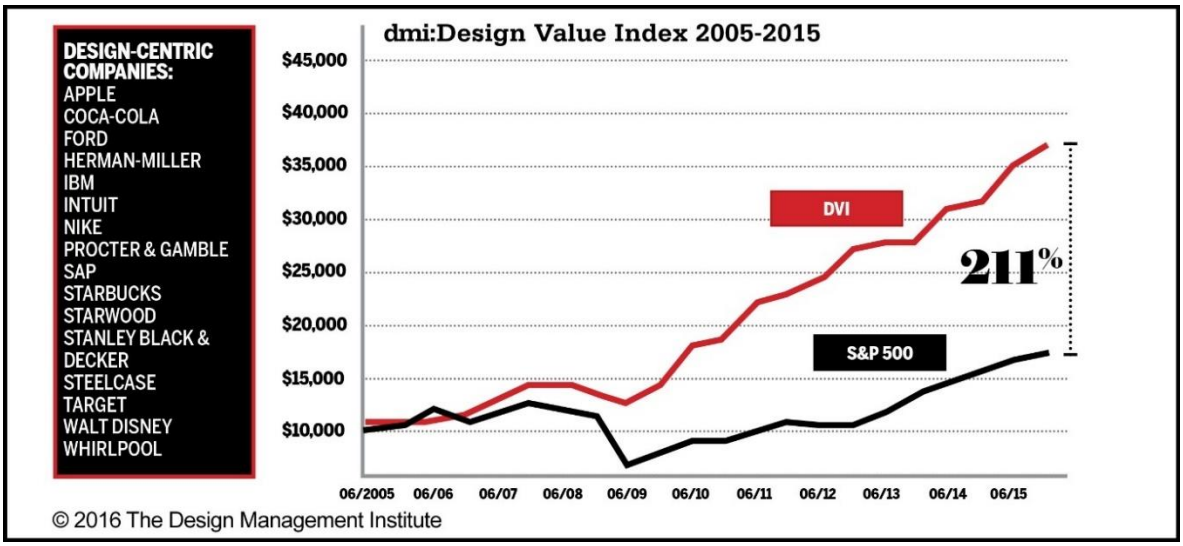

Figure 7: “dmi: Design Value Index” (” The Power & Value of Design Contionues to Grow across the S&P 500”, 2016, p.5)

One of the evidences for an increased attention to Design Thinking as a strategic tool for innovation is in acquisitions of design consultancies from a large consulting firms such as McKinsey, Accenture, PwC, and Deloitte. (Figure 8) (Thomas Lockwood, Edgar Papke 2018)

Figure 8: "Design/Creative agency acquisitions" ("Innovation by Design" 2018, p.14)

Design Thinking has also been widely utilized to enhance teaching and learning and was integrated into curriculum of primary and secondary schools by some universities such as Rotman University and Stanford University. (IDEO, 2009) Design Thinkg as a teaching and learning approach is more commonly used and applied in teaching business and entrepreneurship. (Dunne & Martin, 2006)

4 Design Thinking for Digital Transformation

Following chapter describes problem that companies that are looking for digital transformation face and how design thinking might be a solution to this problem by overviewing cases of design thinking integration of leading design-driven companies for enhancing digital transformation process. In the end challenges that companies trying to adopt this approach face would be summarized and presented with ways to overcome those challenges by reviewing numerous interviews of companies and consulting agencies and business literature.

4.1 Problem with Digital Transformation

Digital transformation had altered the way businesses think about their customers and interaction with them, it had helped to reassess attitude towards competitors, rethink the value and implications of data as an asset, reconsider how companies approach their value and innovation are developed and delivered. As companies around the globe have recognized this massive impact that digital transformation had through these couple of decades, they understand that the change in some shape or form might be already not an option but a necessity that has the potential to open up new possibilities. (A. Swaminathan, J. Meffert 2017)

Complexity and unfamiliarity that companies willing to commit to digital transformation face often leads them to hasty decision that can cause losses in short run and failure in the long run. The transition to digital is not an easy one, as digital world is in constant shift and requires right understanding and strategy. Most traditional companies have been focused on analytical thinking and linear problem-solving. This mindset that thrived from Industrial Revolution and was prevalent for past century showed effectiveness on solving predictable and complex linear problems that were arising over a long period of time. But this approach has shown its weakness in our time, where our shifting digital environment had showed necessity in creative thinking to at the first place find the right problem that is worth solving. That is why there might be a need in a creative framework that can drive innovation within business and guide its strategic decisions. (Talsom, 2017; A. Swaminathan, J. Meffert 2017)

Numerous authors consider design thinking to be the answer to this problem. As its wide-reaching implementations and holistic mindset can provide its own individual creative framework to

companies in order to move forward in digital world. Design thinking adapted to digital transformation showed to minimise the uncertainty and risk of innovation by engaging customers with its primary focus on prototyping, testing, failing, learning and profiting. Additionally, to market research and previous experience, customer-centric focus allows company to base its decision on the real needs of customers. McKinsey reports the best results come from constantly blending user research – quantitative (such as conjoint analysis) and qualitative (such as ethnographic interviews) with market-analytics. (R. Pennington, 2018)

4.2 Design Thinking frameworks for Digital Transformation

For a company to fully realize the opportunities that digital transformation powered by design thinking provide, forming individual digital strategy is a must. The benefit that design thinking can provide it is that its holistic approach can be adapted to effectively guide strategy creation. Design-driven companies are effectively showcasing that by integrating design and design thinking deep into their organizational structure, creating their own frameworks, hiring designers and design researchers and educating their employees. (Thomas Lockwood, Edgar Papke 2018)

Companies such as SAP, Dell, and IBM had fully integrated design thinking into their processes which gave them perspective to evaluate and share their experience. With success that design thinking helped them to achieve, they became an advocate for this approach, by introducing frameworks that helped to guide their own digital transformation process. To introduce how integration of design thinking is used to drive digital transformation, cases of mentioned companies will be described using information from their reports:

One of the brightest examples of such integration might be IBM's case. **IBM** is an "American multinational technology company that produces and sells computer hardware, middleware and software, and provides hosting and consulting services in areas ranging from mainframe computers to nanotechnology" (cbronline.com, 2020). IBM's increased focus on cloud-first and AI strategy that became extremely successful was a result of embedding design thinking into companies' processes.

Karel Vandenburg, director of IBM Design and the head of IBM Studios Canada had led integration of design thinking by building a culture of design across all of IBM, starting with product divisions to sales teams. Flexibility and holistic approach of design thinking allowed IBM to introduce unique view of how design thinking can be implemented within their own company. One of the main results of IBM's unique vision of Design Thinking was named IBM's Enterprise Design Thinking. Enterprise Design Thinking was created as the result of IBM's commitment to enhance the classic design thinking framework with a set of management practices and rituals that drive alignment and decision making across global and cross-functional teams. IBM's increased commitment to design thinking, had led them to launch an online service that helped clients to utilize IBM's design thinking methods by themselves (innov8rs, 2017; IBM, 2020)

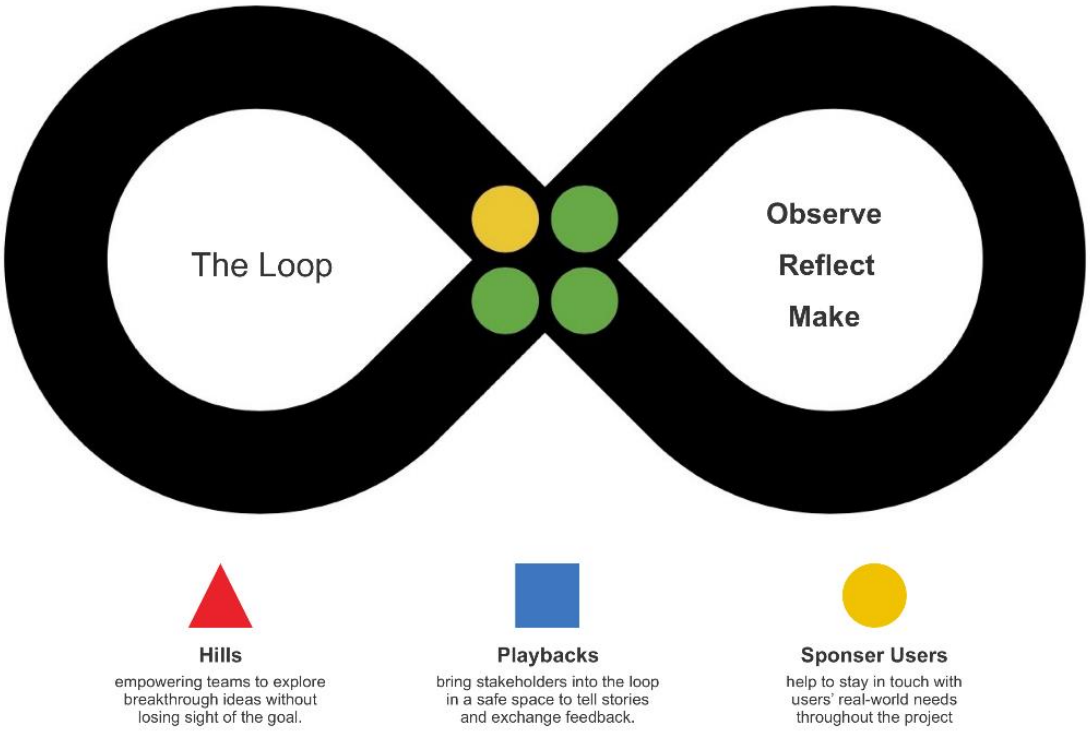

Figure 9: "The Loop, The Keys" (IBM's Design Thinking Field-Guide 2016, p.4)

IBM's **"**The Loop" model (Figure 9) presented in 2013 and described in IBM's Design Thinking online service for learning Design Thinking, has been introduced as continous three-step model of Observing, Reflecting and Making. IBM's own interpretation of Design Thinking additionally to "The Loop" incudes ,"The Keys" that is introduced as the model that intoduces guiding principles for effective team forming by alligning them to specific problems. "Hills key" inloves allignment of complex teams around understaing of most important user outcomes to achieve.

“Playbacks key” involves offerign a shared workspace that is ready for the design thinking process to extended team and stakeholders needs. “Sponsor users” key requires deep involvement of users to increase the speed and close the gap between assumptions and user’s reality. (ibm.com, 2020)

SAP, one of the largest European multinational software corporation specialising in enterprise software for manging business operations and customer relations is another company that has effectively adapted Design Thinking into their processes to drive digital transformation. As mentioned in their report, SAP’s journey of Design Thinking started from 2004, after SAP’s founder’s decision to fund Hasso-Plattner Institute of Design at Stanford University (the D. school). After funding, 35 design thinkers we involved into a process of making design thinking a strategic priority for SAP. After witnessing results, design thinking was spread across many internal groups.

Since 2012, SAP focused on introducing design thinking to their customers by having consistent co-innovation projects and workshops related to topics of customer experience, workforce engagement, supplier relationships, the Internet of Things (IoT), and the digital core. By adapting design thinking, SAP’s increased attention to UX (User Experience - the overall experience of a person using a product such as a website or computer application, especially in terms of how easy or pleasing it is to use.) had dramatically improved SAP products. That change had helped them to gain recognition in design community and turn their weakness into a unique selling proposition. (SAP report, 2016)

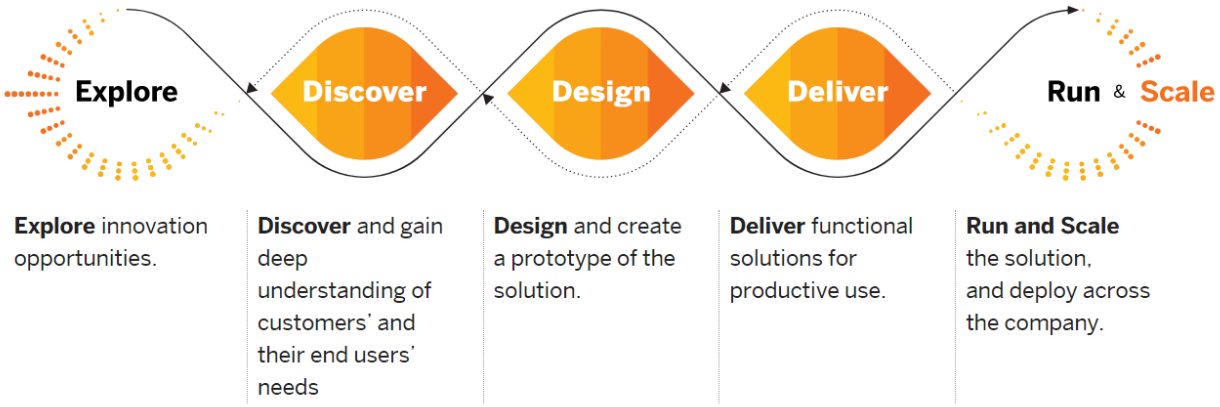

Figure 10: “SAP’s Design Thinking model” (SAP, 2020)

SAP's Design Thinking model (Figure 10) presented originally in 2012 and described in SAP's Human-Centered Approach to Innovation report, is based on d.School model. Five-step model introduces three explore, discover and design steps as an "envisioning of a future phase", deliver step as" bringing concept to live phase" and "Run & Scale phase" as a phase that helps to assure that SAP's solution is deployed across the company. (SAP, 2020)

Dell's a leading computer technology company with 145, 000 employees around the world -understands the value of design thinking and implements it across different teams and units. Dell's Digital Business Services unit had been offering consulting services to their customers to enable digital transformation by utilizing design thinking. In their report they emphasize the impact that design thinking had on helping them to come up with new solutions like, introduction of new products using wearable technologies, development of a microfinance product and a new healthcare models for community care. Dell had enhanced classical design thinking model by adding the importance of agile methodology as a part of design thinking. Method is known to generate more relevant use case and provide a continuous loop of results that is understood by users and stakeholders. (V. Jain, 2016; A. Savina, M. Suzuno, 2020)

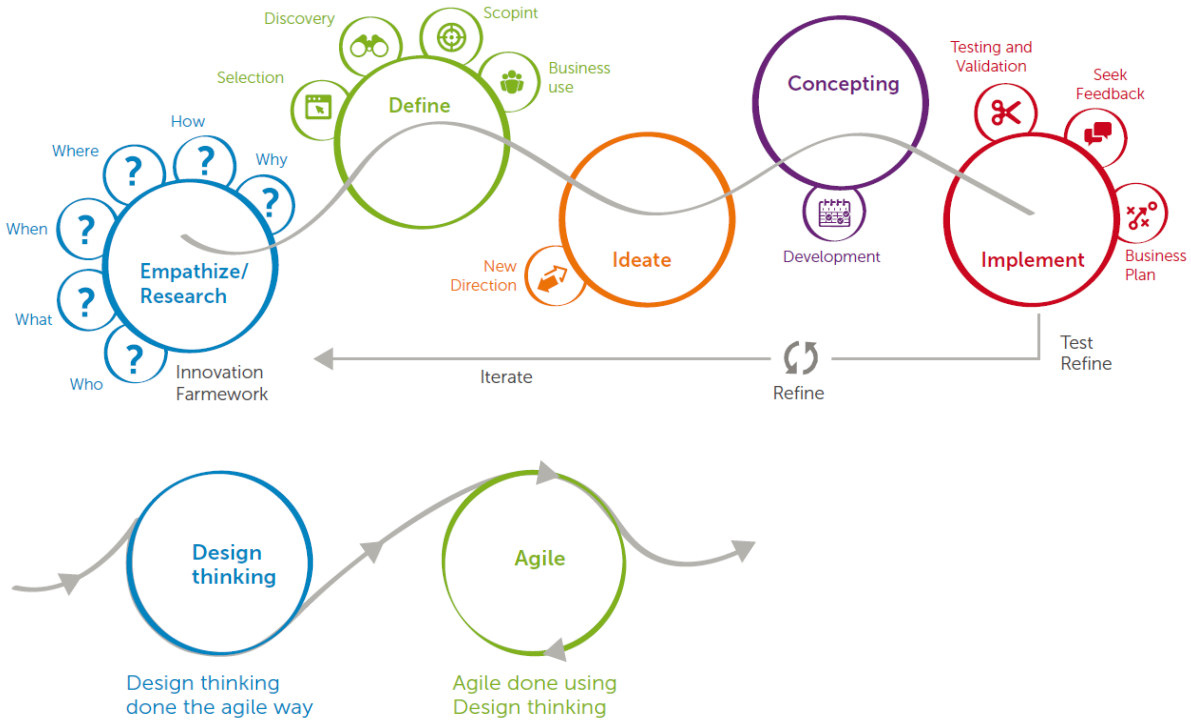

Figure 11: "Dell's Design Thinking model" (Utilizing Design Thinking for Digital Transformation 2016, p.5)

Dell's Design Thinking model (Figure 11) presented in 2016 at its core replicates d.School's 5-Step model, but with an addition of Dell's business process that inovles observation of business scope at "define phase" and creation of a business plan at "implementation phase". One of the additions to model highlights the significance of agile methodology integration while doing design thinking and vice versa. (V. Jain, 2016)

4.3 Common challenges of adaptation

IBM and consulting companies dealing with adapting design thinking for organizations - Globant, Devbridge Group, TetraVX in their interviews have formulated and discussed problems and challenges that organizations integrating design Thinking for digital transformation might face (R. Pennington, 2018; D. Richardson, 2019).

- Design thinking requires time

  All the key steps in the process of design thinking require resources and commitment which may often is problematic in deadline-driven environment.

- Organizational silos limit collaboration

  For design thinking to have an effect it is important that everyone in organization understands that seamless collaboration across members of organization from top to bottom plays a significant role in design thinking. One of the major preventive factors for collaboration is overreliance on hierarchical organizational structure.

- Late transformation

  For a lot of companies' big factor that forces them to seek change within organization are financial problems. That may be problematic as stable financial situation and comparison to companies own benchmarks often give the false sense of security. As in digital era the threat of disruption is always present, it is important for a company to start seeking innovation guiding practices before it is too late.

- Culture

  For a company it may become problematic to accept a customer-focus direction as it requires major shift in companies' culture. A lot of companies are failing to understand the necessity of a culture shift which results in a poor performance of design thinking integration.

- Importance of human-centrism

  Human-centric focus is the main priority of design thinking's approach. But in the world, where success is measured by financial metrics it is often quite easy to lose human element which means that it should become a number one priority to keep human-centric focus at all stages of design thinking process.

- Leaders

  IBM's study shows that leaders that are reluctant to fully accept new ways of working are a highly common barrier for effective change.

4.4 Overcoming challenges

This subsection would summarize and presented findings on guiding principles that can help companies to overcome most common blockers to speed and scale in implementing design thinking for digital transformation. Using interviews, reports of SAP and IBM and study by Anand Swaminathan and Jorgen Meffert in which they analyze and introduce strategic keys required for succesful digital transformation. (A. Swaminathan, J. Meffert 2017; D. Richardson, 2019; SAP, 2016)

- Making a detailed plan

First, it is very important to initiate and lead digital transformation process with design thinking approach, as it provides a comprehensive view of problems that might be missed using other transformation models or innovation tools. It's significant to realize that design thinking and digital transformation takes time, so that initially set objectives may not remain current.

Second significant point it is that human-centric voice must be central to any digital transformation initiative, which is often a neglected aspect in digital transformation initiative. Having a member of a development team that is fully committed in obtaining the voice of the customer should be prioritized as it increases focus and commitment of organization to human-centric focus.

Third, for design thinking to work it is important that people at the bottom and top of the organization are connected. That means that all voices in organization should be heard and analyzed, it may require search for members that are reluctant to accept new ideas. That problem could be solved by forming digital competence center or by hiring talented workers that have deep understanding and experience of digital transformation.

- Digital enterprise model adoption

For a traditional company striving for digital transformation, establishing and modifying workspaces in which design thinking process can take place is the first step in developing digital corporate culture. Introducing flexible working hours, office landscape in which teams feel comfortable with all the required equipment.

One of the key drivers of transformation culture to digital specific for prototyping is the shift in funding. Common to digital world, micro-funding attached to milestones rather to yearly planning has shown significant results in effectiveness. As an example, the success of MVP (Minimum Viable Product) among target customer group can be used as a milestone for further investments. This investment model is particularly hard to adopt for traditional companies, as often failing projects are getting funded to save reputation of those responsible, which is an obvious waste of resources and time.

Leadership in digital transformation should be encouraged at all stages, as for its success leader should be directly involved in key initiatives. Advent of digitization demands the person at the top, the CEO to be the trigger of change in the corporate change. One of the ways that is becoming increasingly popular is the use of social media. Creative, inspiring and authentic communication can have a significant impact across organization.

Company's leadership is also responsible for giving enough freedom to unit or workers such as CDO (Chief Digital Officer) that are responsible for digital transformation initiative. As restrictions are a common blocker to successful transformation initiative, CDO's must be ready to prove their position and leaders should be ready to accept it.

- Decisive actions

One of the most important traits of successful implementation of design thinking process are leaders that take decisive action. In the constant shifting digital era, speed is one of the crucial characteristics, that is why leaders should actively seek ways to improve their processes such as integration of MVP or Agile.

5 Literature Review Key Findings

In this chapter the key findings from the literature review section are summarized and presented.

- Digital Transformation is an Undefined Concept

The first key finding related to digital transformation is that as a phenomenon it has not yet been fully conceptualized.

As a recent phenomenon that has drawn attention from both the academic and business world, digital transformation has various definitions and concepts. Definitions can vary from simpler ones that focus on the technology integration aspect to more complex that indicate the need in the shift of the strategic mindset.

In the literature review finding is indicated by introducing variety of opinions of different authors that tried to put their own effort in conceptualizing digital transformation phenomenon. Choice to combine academic articles, business literature and company reports was to introduce common patterns between various perspectives to give wider perspective on digital transformation.

- Digital Transformation has a Wide-Reaching impact

Second key finding related to digital transformation that it has a wide-reaching impact on organizations.

This impact had affected almost every aspect of business. Digital transformation had an impact on the way businesses think about their customers by introducing new channels, technologies and strategies that have shifted customer-seller relationship from short term interaction to life-long process. It had shifted a standard notion of competition by bringing new models and strategies for partnership with competitors. Digital disruption became a common phenomenon. As many industries were disintermediated, new intermediaries replaced them in supply chain. Fast development of technologies had increased role of data for business and in todays' technology-driven world data is recognized as a one of the most valuable assets business can possess. Environment of rapid development of technology and shifting customer needs had forced businesses

to reassess their attitude towards value that they are delivering and think on strategies to reinvent or improve it using newly opened possibilities. Altogether the changes had affected how companies think about innovation and how they implement innovation. More and more traditional businesses are adopting process in which innovations are continuously implemented and tested.

In the literature review finding is indicated by combining models of authors such as Bharadwaj, Westerman, Gupta and Rogers that tried to conceptualize digital transformation and developed their own frameworks in which they try to categorize fields of impacts that digital transformation had. In literature David Rogers' 5 Domain model for categorizing fields of impact that Digital Transformation is making was chosen which includes: Customers, Value, Competition, Data, Innovation as almost similar field of impacts were described by other authors.

- Design Thinking is a Human-Centred Approach

First key finding related to design thinking that it is a solely human-centred approach.

Human-centric focus of design thinking is referred to prioritising customers' needs before everything. Needs that not necessarily identified by customers themselves but identified by understanding customers through observation in order to detect their true needs, which they even might be unaware of. Human-centric focus is unique as it differentiates it from linear, traditional problem-solving.

In the literature review this finding clearly indicated across whole chapter of design thinking. It is a core principle that remains constant across all different definitions and models of design thinking. All three authors of design thinking part included in literature review highlight empathy and understanding of customers as a key foundation of their human-centric models.

- Design Thinking is a Holistic Approach

Second key finding related to design thinking that it is a holistic approach to problem-solving.

Design thinking remains constant across all models at its core values of human-centrism and at core phases of the process which involve observation of people, idea generation based on

information collected from people and finally prototype generation with implementation phase. Its holistic property allows design thinking to be integrated as a model in which the steps and ways of implementation can be variously adapted depending on organization goals and vision.

In the literature review this finding is indicated by presented alternate interpretations of design thinking's definition from different organizations and educational institutes. This aspect is also highlighted by introduced various models of design thinking from authors like Tim Brown, Stanford D. School, Jeanne Liedtka and Tim Ogilvie. Models depending on the purpose of use each have their own specifications, steps and tools.

- Design Thinking is a Systematic Step-by-Step Process

Third key finding related to design thinking that it is a systematic step-by-step approach.

Design Thinking models are built as a logical sequence of techniques, tools and recommendations that are meant to be followed and used. Commonly models involve step-by-step process where each stage has a dedicated implementation purpose. Even though design thinking is a holistic approach that can have a various interpretation of its process, all models have core stages which are people observation, idea generation based on information collected from people and final implementation phase.

In the literature review this finding is indicated in description of the models in which each model has its own step-by-step structure depending on the use case. Tim Brown's model is depicted as three-stage model that is more like a recommendation for companies to implement core ideas. Stanford's d. school model is illustrated as five-step model that has more common implication of being used as an educational model for other organizations. Liedtka's and Ogilvie's model has four-stages with ten techniques; it is a model that has more business implications.

- Design Thinking's can be effectively adapted to accelerate Digital Transformation

First key finding related to utilizing design thinking that it can be effectively adapted for digital transformation processes.

Design Thinking's being human-centred, holistic and systematic approach had shown its effectiveness as an approach for boosting and guiding digital transformation process. Human-centrism allows design thinking to minimise the uncertainty and risk of innovation by engaging customers in the process. Holistic aspect gives design thinking a flexibility of being easily adapted. It gives an opportunity for organization to create their own frameworks and form individual digital strategy that will be aligned to organization's goals and vision. Systematic aspect of gives organization more structured view on design thinking's process to choose and highlight what models and steps can better suit organization's needs in digital transformation.

In the literature review finding is showcased by introducing and analysing several companies that have effectively adapted design thinking for their own digital transformation initiative. Each company have provided their own framework of design thinking based on popular models. IBM has introduced IBM Enterprise Design Thinking and "The Loop" and "The Keys" models that helped them to guide their both external strategy to a successful shift to customer-centric direction and internal strategy with more focus on effective team building. SAP had based their model on d. School five-step approach that resulted in an increased attention to UX (User Experience) design of their products and helped them to gain recognition in design community and improve the quality and desirability of their products. Dell in their model had signified an importance of business processes by highlighting business use and business plan steps and described how agile method can be a great addition to design thinking's process.

- Adapting Design Thinking to Digital Transformation is not an easy task

Second key finding related to utilizing design thinking is that though it can be effectively adapted for digital transformation it is certainly not an easy task to accomplish.

Design thinking's adaption process for digital transformation has its own challenges that organization often must deal with. Key issues that organizations meet are related to time and resources. Design thinking as an approach requires long time planning and commitment to its human-centric principles, which is often a problematic factor for companies that are not willing to drive a culture

shift within. Which is the next biggest challenge, as organizations that have traditional culture and organizational structures may face reluctance from part of leader and employees. This issue is commonly solved by educating employees on design thinking principles and giving more authority and freedom to unit or worker responsible for digital transformation. Last key issue that companies face it is late and slow decisions in the transformation process, which results often in a failure or weak outcome. Design thinking for digital transformation requires decisive and fast actions as speed is one of the crucial characteristics for a successful change.

In the literature review finding is showcased by combining number of interviews and reports in which leading design-driven companies and consultancies describe their problems and challenges that they commonly face when implementing design thinking for digital transformation. Reports of SAP and IBM and study by Anand Swaminathan and Jorgen Meffert highlight number of guiding principles and ways of overcoming those challenges from their experience and by analyzing experience of others. In the literature review three main guiding principles are first, creating a plan in which human-centered focus would be at the center of all decisions. Second, is by actuating digital enterprise which means adapting workspaces, organizational structure and funding of digital businesses. And third by scaling forcefully, which means to make sure that decisive actions are take and processes are always getting sought to become faster, for example by integration of Agile or MVP.

6 Technology Innovation International (TII) Empirical case study

In this section, empirical case of TII will be introduced. Description of the process and achieved objectives will be described.

6.1 Overview

During my practical training in CEMIS (Centre for Measurement and Information Systems) as project research trainee, I was presented with the task to analyze website of an organization from Luxemburg named Technology Innovation International. After analysis key objective for a website was to come up with initial ideas of improvement.

Organization was dealing with technology transfer, organizing events and seminars and handling projects funded by EU. Website presented is meant to be a platform in which visitor could ask question to an expert online related to technology transfer and receive consultation after subscribing as a member for a fee. On the other side, expert could become a member in order to gain access to customer base of the platform and provide consultation services online for a bigger fee.

From initial impression of a website's, idea was sustainable and had potential, but it lacked in technical realization. After having Skype meeting with secretary of an organization key problems were formulated. Main points from meeting were that website lacked in visitors and members, so possible causes of problems and solutions were discussed. It was mentioned that similar types of website should be analysed with all possible ways to market the website itself. In the end, two weeks were given to analyse selected issues and come up with an analysis on the matter. One of the key findings from meeting was that the website was ordered in a local web-design company as an already complete product with about half a year of development.

During the time of independent research, initial focus was on deepening my understanding of TII as an organization its operations, history, and structure. Next step was to research similar platforms and strategies that they utilize in order to attract more visitors and het more

members. It was followed by the analysis of a website, analyzing aspects like visuals of the website, its text and functions.

After independent research was complete it was evident, that alongside obvious technical improvements, complete digital transformation strategy was required. And to introduce this strategy as a task it was necessary to analyze and introduce TII's possible new value proposition model, analyze competition, target customers and ways to approach them, ways to new uses and better monetization of data and key innovation improvements from technical perspective.

As result analysis and propositions were described in report that was called TII Communication Hub strategy. Report was well received by chairmen of organization as an alternative development strategy. In the next subsection results of proposed digital strategy would be summarized.

6.2 Digital strategy

Focus for proposed TII's digital transformation strategy was on transferring organization's lengthy experience in providing high-quality consultation services to a digital dimension. To achieve this, it was proposed to first focus on building a strategy in becoming reliable innovation communication platform that connects both experts and firms, second to focus on monetization and promotion.

To build a reliable innovation communication platform it was suggested to improve value proposition by diversifying membership model, lowering starting fees. Last key proposition in value improvement was to introduce job board feature, which will allow firms to post vacancies on the platform for students and researchers to apply for them.

Creating more diverse subscriptions would help to capture more target groups, such as new experts, firms and students. Lowering fees for subscriptions will make entrance for visitors more accessible which will lead to increased number of membership and visitors. Job board feature would create an encouragement factor for experts and students to seek for potential professional connection, job or traineeship. After building customer base it would be easier to introduce new features and further think on the ways of marketing them to target groups.

To validate strategic direction and improved value proposition, potential competitors in professional platform market were analyzed. From analysis of a major and smaller platforms such as LinkedIn, MyBuilder, EBN Network, InnoGet it was clear that they are always looking for ways to ease an access for users at start. They offer all necessary tools and content to satisfy both employees and employers demand in order to create comfortable environment for communication. Additionally, an analysis of a smaller platform such as EBN Network showed that a platform of a smaller scale can be successful in implementing the strategy of an innovation communication hub that suits the needs of the target market , which is a definite encouraging factor.

After formulating improved value proposition and analyzing competition, it was important to come up with direction for a strategy in attracting new members. One of the key points from report was that before prioritizing attraction of the new members it was important to focus on current members of TII. Initial analysis showed lack of activity amongst current members, which is a blocker for new members. As a solution it was proposed to first thoroughly research current members of TII and offer them all necessary tools for comfortable experience. At first stage it is important to continuously monitor their feedback and integrate it accordingly. Focusing on customers' needs and desires, constantly optimizing the platform was suggested as the main priority before marketing could be implemented.

After developing and establishing communication platform, as a marketing strategy it was proposed to focus on social media channels to create awareness and to market platform to a target group. Social media presence of EBN Network was analyzed to present how successful communication hub platform is building its brand image and marketing. Key elements of building successful social media presence for communication hub were - constant content, news from partners, providing information on on-going and future events. As a secondary channel after establishing social media presence, it was proposed to buy advertisement in social media networks and focus on spreading brochures at innovation related events.

As the main task was to suggest how website can be improved, it was necessary to review website from technical perspective and introduce obvious changes that could be implemented first, and ones that are more complex later. After analyzing similar platforms, number of changes in different categories were proposed. It was suggested to work on visuals of the website: to make better placement of text blocks and text itself simpler and more attractive from user's

standpoint. Second category of improvements were regarding features that could be implemented such as in-build messaging app, job board and update profiles. In the end, after reviewing website and observing minor technical problems they were presented together with possible solutions. The main conclusion after reviewing website from technical perspective was that in these more complex types of platforms there is a definite need in prioritizing of UX (User Experience) before the development process, as it can significantly improve customers desire to use the platform and stay on it.

7 Discussion

In this section, the key findings from the literature review are compared to TII's case. Finally, basic recommendations are given regarding TII's case on the adaptation of design thinking for the digital transformation process based on the theoretical background obtained.

7.1 Comparison of Literature Review Findings to Empirical Case and Guidelines

In the following subsection, goal will be to set literature review findings in relation with described empirical case. First, it includes qualitative analysis that introduces new perspective on TII's case based on theoretical background obtained. Second, it includes guidelines on how to implement design thinking for digital transformation in order to prevent common problems that traditional companies willing to transform are facing.

- Identifying TII's empirical case

Described empirical case of Technology Innovation International aligns to the various opinions of authors on Digital Transformation's definition and can be identified as a Digital Transformation case. As digital transformation is found to be an undefined concept, different definitions can be applied to the various stages of TII's digital transformation case.

TII is a traditional organization in its culture and structure with a lengthy experience of dealing with technology transfer, organizing events and seminars, handling projects funded by EU. When faced with digital disruption threat organizations decision was to innovate by ordering a communication hub website.

TII's case is a clear case of digital transformation, definition of Dr. George Westerman supports this statement:

"Digital transformation — the use of technology to radically improve performance or reach of enterprises"

As technology was integrated soon organization faced with a problem that was a lack of visitors. To find what was the result of this problem next decision was to understand how website could've been improved. By being introduced to this task as a trainee alongside technical improvements,

new digital strategy was suggested and accepted by chairmen as an alternative strategy direction. Strategic aspect of Digital Transformation is highlighted in definition of Anandhi Bharadwaj.

“Digital Transformation is an organizational strategy formulated and executed by leveraging digital resources to create differential value”

- Improving digital strategy by understanding Digital Transformation’s wide-reaching impact

TII’s case showcases the need for companies to understand wide range of digital transformation impact fields in order to create full digital strategy.

TII’s decision to create a website was a decision of technology integration for innovation as an answer to digital disruption. But as challenges with the website were faced, need for more strategic approach to digital transformation became evident. Web-platform requires customer and business strategy, analysis of competition and reassessment of value proposition. Deeper understanding of Digital Transformation and its fields of impact on almost every aspect of business gives an overview perspective and allows company to make a more complex and effective digital strategy.

In the literature review, the main aspects that must be considered when implicating Digital Transformation strategy are described when each field of impact is introduced. Below are recommendations proposed in the digital strategy for TII based on findings from each impact field.

Customers

With the new channels, technologies and strategies that the digital era has introduced it became important to thoroughly study customers on their preferences. After understanding “Customer Network model” (Figure 7) of the target group, multiple channels and technologies must be chosen with the focus in establishing long-lasting connection with customers. For TII’s case it was proposed to focus on social media channels and on building strong brand image that will be informative, will create awareness and will resonate with a target group. (Rogers, 2016)

Competition

View on competition have been reassessed as digital era brought new possible consideration for strategic cooperation through platform model, even with competitors. When introducing digital

strategy for TII, one of the emphasis was on analysis of potential competitors. It allowed to highlight core characteristics and strategic directions that are common in platform market for professionals in order to help TII to create its own strategic direction and improved value proposition. (A. Swaminathan, J. Meffert, 2017; G. Parker, M. Van Alstyne, S. Choudary, 2016)

Value

With introduction of new possibilities that technological advancement has offered, companies are looking for ways to reintroduce and enhance their value proposition. As TII's traditional value proposition was in providing high-quality consultation services, it was suggested in the digital strategy to fully utilize all possibilities that platform model introduces and prioritize making Communication Hub into a reliable innovation platform that would connect members, researchers, entrepreneurs by offering the right functionality and tools. (Westerman, 2017)

Data

Data now is viewed as one of the key assets company can possess, so evaluation on possible new implications on how data can be monetized and utilized should be reassessed. In TII's case data about members that are available for consultation was already recognized as a key asset, but the organization was looking for ways to integrate new digital value delivery methods. (B. Marr, 2017)

Innovation

Constantly shifting environment of technologies and human desires introduced a need for organization in continuous drive of innovation in order to survive and move forward. For TII ordering a website was a first step in innovation effort, but as website had faced challenges in a form of a lacking visitors the need for continuous improvement became evident. In digital strategy the factor of continuous innovation in order to meet customer need is repeatedly emphasized. (A. Swaminathan, J. Meffert, 2017)

- Improving decision-making using's customer-centric, holistic and systematic Design Thinking approach

TII's case introduced a perspective on the significance of early decision making for organization's innovation output.

TII's decision of ordering a consultation website was a right answer to digital disruption threat from a linear-thinking perspective. The problem was identified as a need of the website for consultation and it was solved. But as company faced problem with website realization, and lack of visitors, it may showcase the significance of adopting customer-centric process behind the decision-making which became prevalent in a digital era.

Weakness of linear thinking for digital transformation is indicated in literature review:

"But this approach has shown its weakness in our time, where our shifting digital environment had showed necessity in creative thinking to at the first place find the right problem that is worth solving" (A. Swaminathan, J. Meffert 2017)

With proposed digital strategy Communication Hub report the role of continuous process of improvement with customer-centric focus was emphasized as it allows constant adaption to shifting customer needs and digital environment. Introduced in literature review design thinking is described as a possible answer to this challenge.

Customer-centric approach of design thinking allows for more insightful decision-making with the focus on customer needs. Holistic aspect can help company to seamlessly connect their own vision and goals to Design Thinking's methodology. While systematic step-by-step aspect of Design Thinking provides more structured perspective and guidance on the process of thoughtful decision making with the focus on customer needs.

- Adapting Design Thinking process for TII's Digital Transformation

TII's case gave a perspective on how traditional decision-making mindset can negatively influence the digital transformation process.

In the literature review, design thinking is introduced as a possible solution that can help organization to shift its traditional culture from focusing purely on linear problems and finding ways to deal with them, to focusing on customer needs and continuous improvement system based on feedback obtained. Design Thinking can be a great addition to Digital Transformation process as showcased by a design-driven companies that are implementing Design Thinking across their organizational structure and in strategic direction. It can help in increasing the speed of decision making, its quality and provide deeper customer understanding.

Adaptation of design thinking is not an easy task, as it requires time and resources. The findings of the Literature review from reports of design-driven companies and a study by Anand Swaminathan and Jorgen Meffert highlight common challenges that companies face and common ways of overcoming them. With TII's attempt to move forward with their digital transformation, there are several guiding principles derived from literature review that must be followed in order to successfully adapt Design Thinking to Digital Transformation.

First, it is important to make a detailed plan that will be created around customer needs based on research. Digital strategy for TII was an attempt to introduce a possible development scenario that will guide plan creation based on the needs of customers.

When integrating design thinking approach, it is important throughout the whole process of Digital Transformation to not lose a customer-centric focus. To avoid losing it, experts that are fully committed to customer voice should be hired. For TII's further development of its digital transformation experts from outside should be involved as they can transfer their digital innovation expertise and experience into TII's traditional culture.

Second, actuating of the digital enterprise with its structure, environment and leadership style can significantly advance digital transformation process. For TII suggested platform strategy may involve building a development team that would constantly work on a platform by analysing feedback, implementing features and fixing bugs. Alongside development team, current structure could be adjusted to digital enterprise style by allocating new responsibilities that are connected to platforms strategic development.

Third, for design thinking to work it is important for leaders to take decisive actions as it may involve radical decisions that are changing companies' structure, culture and leadership style. This factor is important as the changing digital environment requires monitoring customer needs, analysis of competition, continuous innovation integration and speed which is the crucial factor that comes into play. That it is why for TII the adoption of design thinking system and alignment to its own strategic goals and vision can help organization to survive and move forward by seeking and integrating new tools that can enhance companies' performance and results.

8 Main findings

To conclude the final output that was obtained from findings of literature review and comparison with TII' case, main findings would be summarized and presented as follows:

Findings of Digital Transformation

- The first finding on digital transformation as result of reviewing definitions and interpretation from different authors was that digital transformation is still largely viewed as an undefined concept.

- The second finding on digital transformation as a result of researching various attempts of authors on categorizing fields of impacts that digital transformation has an effect on is that it has a wide-reaching implementation.

The first finding helped to identify TII's case as the case of digital transformation, which was identified using definitions from George Westerman and Anandhi Bharadwaj. The second finding helped to introduce the ways how digital strategy of TII could be enhanced using the description and findings of each impact field.

Design Thinking findings

- The first finding on design thinking as result of reviewing different authors' definitions and descriptions is that at its core it is always described as a human-centric approach.

- The second finding on design thinking as result of reviewing three popular design thinking models that have various interpretations of the process, clearly showcases it as a holistic approach - flexible for adaptation.

- The third finding on design thinking as a result of researching three design thinking models introduced it as a systematic step-by-step approach to problem solving.

All three findings helped to highlight the core attributes of design thinking and how those attributes can uniquely contribute in improving TII's decision-making process.

The Findings of Design Thinking for Digital Transformation

- First finding on adapting design thinking for digital transformation as a result of reviewing reports of top design-driven companies has showcased that it can be effectively adapted and produces significant results.

- Second finding on adapting design thinking for digital transformation as a result of researching interviews and study showcased that adaptation of design thinking to Digital Transformation process is not an easy task and requires guiding principles to be followed in order to overcome commonly faced challenges.

First finding helped to introduce the experience of other companies in adapting design thinking for digital transformation to validate its use for TII's transformation. Second finding indicated that guiding principles can be effectively aligned to TII's digital strategy for a successful integration of design thinking to digital Transformation process.

8.1 Conclusion

Digital era has introduced a rapid change of the business world which has evolved a phenomenon of digital transformation. As a recent phenomenon, it has showed to be yet an undefined concept and a number of authors both from the academic and business world provide their own perspective on what can be defined as digital transformation. From reviewing the literature on digital transformation of an organization, it can be concluded that often it is described as a complex and long process that impacts a wide range of fields. One of the key fields that digital transformation has affected is the way companies perceive and approach innovation. As studies have showed, in a digital era, organizations must prioritize the needs of customers when integrating innovations.

Traditional companies - in order to keep up with a rapid change - are looking for ways to integrate innovations as an answer to the digital disruption threat. As traditional companies try to adapt technologies and drive innovation, often the lack of deep understanding how strategically implement digital transformation leads to new challenges as a result. That has showed to be the case with TII, as the company's decision to create a communication hub platform met a challenge in a form of lacking visitors and technical issues.

To help companies in developing a right mindset for decision-making, more and more companies are integrating design thinking in order to overcome those challenges. Design thinking being human-centric, a holistic and systematic approach to problem solving has showed itself as a great addition to digital transformation process, as was found in the literature review from researching leading design-driven companies. The research highlights how companies utilize the flexibility of design thinking and create their own design thinking frameworks for digital transformation.

The adaptation of design thinking approach for TII showed to have the potential in accelerating digital transformation process, as it provides clear systematic guidelines on how to act in the digital age.

Creating a detailed human-centric plan, actuating elements of digital enterprise's structure and making fast and decisive decisions can help a traditional organization to survive, overcome common challenges and move forward in the digital era of a constantly shifting environment of technologies and customer desires.

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