Design Thinking for Business:

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Part 1: What is Design Thinking

Design thinking has been redefined and reimagined due to the varied application across arrange of industries**.** There has been a shift in the relation to the way problems are perceived and resolved. Design thinking has changed the way problems are approached to further the development of innovation (Dorst, 2010). Recent constructs of design thinking are modelled around a multi-level structure of *CPA (*Capability, Practices and Ability) where 6 key design thinking principles apply to them (Karpen, Gemser & Calabretta, G 2017).

The principles used in design thinking are aimed at solving design problems. The principles can be applied to various lenses and contexts ranging from the service industry, manufacturing and other business models. A Human centred approach to design is aimed to solve problems through the experience of various stakeholders and how the product aims to benefit a community. This is achieved by taking a humanized approach where we draw on the experience and understanding of the community the product is aimed at. This is achieved by meeting the consumers' needs and requirements. Through using the human centred approach to design problems can be solved through knowledge and discussion rather than assumption (Brown and Wyatt, 2010).

Radical Collaboration or co-creative and inclusive design to problem solving, the aim of radical collaboration as principle aims to utilise the various skills and perspectives of a wide variety of people. Having a variety of perspective allows design problems to be solved from a range of angles. Having a diverse team ranging from internal groups such as managers and specific teams, as well as external groups like that of suppliers and customers can help develop solutions to the problem (Luchs, Griffi and Swan, 2015).

Where there is a problem in design steps must be taken to transform existing to conditions into preferred ones. This design principle that targets this problem is referred to as Transformative design. If a problem is discovered in a project/business design being able to acknowledge the current problem can allow for change towards something positive. Steps can be taken to improve complex processes by prototyping systems, conducting research and surveys to help achieve the desired process. Transformative design is not a traditional method for re-design and can result in varied outcomes. However, due to unexpected outcomes can result in the creation of new ideas and processes that can be beneficial. (Karpen, Gemser & Calabretta, 2017)

The process of design in any industry can be susceptible to change over time. The important of design thinking is knowing that design is emergent. As solutions are created to solve a problem it is not uncommon for new issues to arise and new goals to be redesigned. Problem solving is not a linear process in nature. Solutions coevolve with the problem. Dependent on the problem, trial, error and experimentation of potential solutions will be tested. Whether the first solution is a success or not, a new avenue must be taken in order to achieve a set goal or reimagine that goal in order to overcome the design flaw (Tschimmel, 2012).

Design concepts can be difficult to understand and visualise due to their nature and complexity. Because of this it is important to acknowledge that design is expletive and explicit. In a matter of 'showing and not telling' to convey your ideas is important to the design process. Being able to visualise and physically see how information can be transformed through the aid of images and porotypes can help conceptualise ideas. Where symbols and language can constrict how ideas are conveyed to others, visual representations can help further convey individual ideas. Using multimodal communication is essential to the development of ideas when trying to problem solve. (Karpen, Gemser & Calabretta, 2017)

Ultimately design is a holistic and contextual. A product or service has an impact on the consumer and all stakeholders involved. Products and services are created to solve problems found within an ecosystem. Designs are implemented to solve these problems. Design transcends the consumerism. Designer acknowledge that the products plays a role in the relationship and interaction of the consumers. This means the product or service has impact on social, physical and the information systems that it encompasses. To understand the consumer, we have to understand the context which required a holistic perspective to overcome problems. (Luchs Griffin and Swan, 2015)

Based on the research into design thinking, design thinking can be defined as a human-centred approach to solving problems. Design thinking doesn't see consumerism as selling a product but examines a product in a holistic manner. Understanding that a product impacts the community and ecosystem that it resides in. The product is a result of the communities needs in order to improve their experience.

Part 2: Benefits of Design Thinking

Design thinking has the potential to benefit a range of project in the work place is applied appropriately. From a managerial perspective various framework in design thinking can play a paramount role in understanding and solving issues in projects and help redefine project goals. In relation to the multi-level of service design, there are numerous benefits associated with the principles that make up the design (Ward, Runci and Morris, 2009).

The benefit of taking a human centred approach to design is beneficial for the both the seller and the consumer. Being able to adopt your audience mind set and empathise with them will allow your product to reach a wider audience. This means the product you are selling has a purpose serves a purpose to the consumer. The more relevant and relatable the product is to the consumer in relation to solving a problem the more likely you are to sell your product in a greater quantity (Liem, and Sander, 2011). This is where the product also becomes more valuable to the consumer.

Collaboration and co-creativity are important from a managerial perspective predominately because it values each team members unique input and perspective on the problem. Collaboration allows for a problem to be targeted from all angles of perspective rather than from a single perspective. Problems can be solved in more ways than one and when I ideas are shared and refined then problems can be solved more efficiently and effectively to produce the best outcome. This includes collaboration internally and external stake holders (Brown and Wyatt, 2010). Collaboration is essential in reaching goals as it creates a group mentality of achieving a single goal.

Design being a transformative process is beneficial as a result of identifying a problem in a current system and striving to correct it. The constant evolution of making a finding-problems in a current system to create something positive. By critically analysing a system or process can open up the door for new positions, platforms and processes put in place (Maier and Fadel, 2009).

Other benefits in relation to design thinking principles is design emergent. Working where ideas and development are more fluid than they are rigid can result in various beneficial outcomes. Goals that are rigid with no room for change can result in an outcome of lower quality than expected. However, if a manager is able to trust the process, they may come to realise the initial goal set isn't necessarily the end point, but a guideline to the 'real' goal. Where problems are encountered throughout a process can result in newer ideas, potentially a more improved process and ultimately a more defined goal then your product will be a higher quality than originally perceived (Zhang and Dong, 2009).

Using visual representations is essential to problem solving in a variety of industries. Using a variety of platforms to convey an idea to others is paramount in having people understand your perspective. Various platforms such as prototypes, graphs, charts, blue prints used in conjunction with words to explain your ideas how others conceptualize the proposed idea (Guimaraes and Saraph, 1991). When others have a greater understanding of an idea this allows them to critically analyse and build on top of that idea to create something positive.

Part 3: Criticisms of Design Thinking

Though design thinking can be used to benefit an industry process or product, there are some identifiable limitations with a multi-level framework of design thinking. Design thinking has some notable flaws within the principles that is based on.

Issues associated with human centred principle is that it assumes that a product or service is constructed or built for a single person. Because it is almost impossible to have a product that appeals to everyone 100% of the time it is not feasible to assume that the research will state that product will suit everyone. This design also examines consumers in their current state of mind. This is to say one the product is seen that the consumers' needs will not change (Maguire, 2001).

Radical collaboration and inclusive design also have down falls as a principle in relation to design thinking. There are benefits to in receiving multiple perspectives on a problem. However, issues can also arise from having too much input. If there is a substantial amount of input from various bodies a lot of those ideas and perspectives will be lost. Not

every idea can be put adopted into solving a problem. A result of too much input can be counter intuitive and can become costly and time consuming if a final agreement is not met amongst all bodies which could result in a product that less desirable (Tan and Hsiao, 2013).

Transforming existing conditions in a process or a product can be beneficial, but it also has the potential to be costly. Li, 2002 found that attempting to transform a process can become costly. To determine whether a change to a process or product is beneficial it requires a significant amount of research. There is also the trial and error phase which can become time and cost consuming depending on the extent and complexity of the transformation. The result of the process can also vary. This means a certain degree of risk is taken in implementing such a transformation.

Design is susceptible to change over time as design is emergent. Where one problem is encountered a new solution is created. This process can be continuous and on-going however. If there are numerous problems faced in solving one problem, a vicious cycle may arise where every problem that is fixed a new problem may arise. This cycle can become costly and time consuming also (Christie, Montrosse and Klein, 2005). Where some problems cannot be fixed and should be abandoned before to many resources are drained to find a solution. As a result of an incident such as this, a new goal must be set.

Lastly, using a holistic approach in design thinking can create some issues to the process of design. Using a holistic approach to design incorporates various aspects of an ecosystem including the environment, the economy, the consumer the stakeholders and the business. There are so many elements to consider in solving the problem that is becomes difficult to solve the problem that is the consumers' needs rather than wants (Buchana, 1992). A holistic approach makes it difficult identify the problem and ways to solve the problem accounting for elements within the ecosystem. This can make the process very complex as they are all inter linked.

Part 4: Application contexts of Design Thinking

Design thinking is versatile in the sense that can be applied to various industries. Manufacturing, service, technology, finance construction, goods and so on. Design thinking

is only effective If applied and utilised appropriately. In relation to the recent developments of the automotive industry a significant amount of advancements in technology have been made based on the current consumer climate and environmental issues of climate change (Kotler and Rath, 1984). The design thinking model can be applied the development of Tesla's automotive design and application.

In relation to a human centred approach to design thinking, Tesla automobiles are aimed at benefiting a population that drives cars. This design problem with current automotive cars is there have been numerous accidents issues related with safety due to human error on the roads. Tesla responded to these problems based on the users experience of driving to create a car that is incredibly safe, fast and automated. This means users experience a relaxed drive where the stress is taken out of driving eliminating human error, creating a luxury vehicle that is comfortable and affordable. Based on the community's feedback Tesla has developed a product that is at the forefront of automated technology.

Tesla would have employed the principle of co-creativity and collaboration throughout the development of their Tesla models. In order to create an automobile that Tesla has would have required radical collaboration from a variety of stakeholders involved with the project. The design aspects of a car require inputs from various teams internally such as prototyping, design, technology, finance, and manufacturing in order to meet all the requirements of the projected goal. The contribution from the team would results in the product formulated today. Collaboration externally to Tesla also would have played a significant role in the development from the most important stakeholders; the community and other manufacturers.

Tesla would have seen the current state of the automotive industry and would have identified the industry as problematic in relation to the user and the environment. This is the basis for Tesla to apply Design transformation. The current existing state of the automobile industry is fossil fuel based. The effects of fossil fuels have resulted in increased temperatures around the world and also has an impact on the user's costs of petrol. Tesla acknowledged where the current industry is at and managed to visualise the automobile industry as a positive industry that benefits the user as well as the climate.

Tesla's current models of car would have changed significantly over time. This is evident across various automotive companies. Every year, cars are redesigned to meet

currents goals and expectations. The design process is emergent in relation to cars. Community perceptions change as well as needs and requirements of the product. With new laws on CO2 emissions, automotive companies like that of Tesla needs to adapt and develop their models. Tesla would have encountered issues in relation to their product design moving from fossil fuels to electric cars. As a result of this new designs and research are emerging because of these changes.

Conveying ideas in the automotive industry is essential in the development and final stages of manufacturing. Starting with the conceptualisation of a Tesla as a product would have started with an idea. The idea is limited by the words used to explain the idea. Until other visual aids such prototypes, blue prints manufacturing schematics were established, the concept wouldn't be anything more than an idea. The use of visual aids and 3D models would help further conceptualise the idea. This is allowing for further understanding and development of the idea from other teams. This would result in what the Tesla car models look like today.

Lastly, Tesla has managed to have a designed a product that is holistic. Tesla conceptualised key goals early in the developmental stages of their cars. Tesla focused on the consumer's needs in relation to the product being safe, comfortable and aesthetically appealing. However, they Tesla also took into account the larger picture of that their product will be helping the environment by reducing the release of CO2 emissions creating an electric car. The car is a solution to problems related to the environment and consumer safety.

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