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Citation: Yaldız, Naz and Bailey, Mark (2019) The effect of critical thinking on making the right decisions in the new venture process. *Procedia Computer Science*, 158. pp. 281-286. ISSN 1877-0509

Published by: Elsevier

URL: <https://doi.org/10.1016/j.procs.2019.09.053>
<<https://doi.org/10.1016/j.procs.2019.09.053>>

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The Effect of Critical Thinking on Making the Right Decisions in the New Venture Process

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Abstract

The design of a new venture is similar to the engineering design process. With systematic approaches, it is possible to increase foresight and reduce the complexity of the engineering design process. On the other hand, in new venture design, self-efficacy must be maintained to increase resistance to challenging situations by an entrepreneur. Decision making is compelling and risky in both engineering and new venture design processes. During the logical inferences, psychology, unconscious and environmental impacts will affect the decisions made. However, critical thinking has a significant effect on making the right decisions. Self-efficacy and creative confidence are beneficial in making the right decisions and maintaining new venture design processes. In this paper, a critical thinking approach to engineering product development and design processes, applied by Anlam Tasarım Atölyesi, will be explained. The paper will also seek to answer the question, ‘How can the right decisions be made by protecting self-efficacy in the face of criticism?’ Additionally, the paper will emphasise the relationship between critical thinking, self-efficacy and creative confidence.

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Peer-review under responsibility of the scientific committee of the 3rd World Conference on Technology, Innovation and Entrepreneurship

Keywords: self-efficacy, new venture design, critical thinking, creative confidence

1. Introduction

Entrepreneurship, which is a practical discipline, is generally considered to be a process involving many different stages, but it is neither linear nor predictable (Lynch, Steinart, & Gunnar, 2016). The creation of a new venture is

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made by making the right decisions based on many options. According to Gunes (2012), designers are defined as natural entrepreneurs. This definition is based on the creative skill and competence of designers in identifying user needs and generating ideas, conceptualisation, and product development (Møller Nielsen, Wikström, & Tollestrup, Year). Experience is essential for a design to be good or successful. However, in his description, Gunes (2012) emphasises the designer's ability without making any distinction between an experienced or recent graduate. This is because designer thinking approaches will be effective in enhancing the designer's creativity and desire to discover new ideas. 'Design thinking relies on the natural—and coachable—human ability to be intuitive, to recognize patterns, and to construct ideas that are emotionally meaningful as well as functional' (Kelly & Kelly, 2013).

Although the prescriptive and descriptive models proposed for the engineering design process differ in terms of structure and method, they are based on logical inferences. The Double Diamond Model proposed by the British Design Council (2015), shown in Figure 1, enables abductive, deductive, and inductive logical inferences through divergent and convergent thinking in the design process. In addition, Double Diamond is a useful model for developing design thinking capabilities. It is not possible to switch from one stage to the next in a model without completing the current stage. These four stages are discover, define, develop, and deliver. As a result of the discovery and definition stages carried out with divergent and convergent thinking approaches, preparing a design summary provides clarification of the situation to make the right decisions.

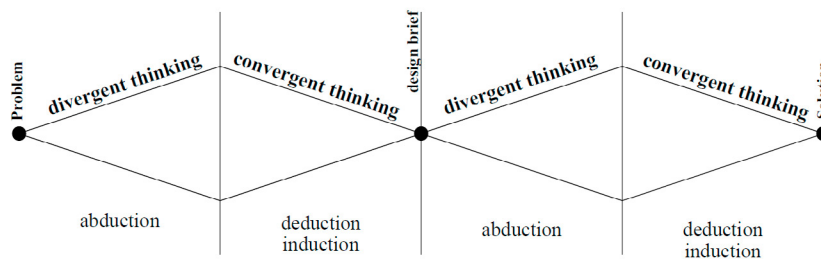


Figure 1: Double Diamond

In the engineering design process, analysis and synthesis processes are carried out by inductive and deductive logical inference. Abduction is the only logical process to reveal any new idea. 'Abductive reasoning changes the mind-set of decision makers to become intrinsically forward thinking and explorative towards innovation opportunity' (Guenther, Eisenbart, & Dong, 2017). Dorst (2015) emphasises the effect of logical inference in outsourcing, saying that, if we want to create something new for others, such as in design and other professions, the basic reasoning required is abduction. In the new venture design, an entrepreneur can make innovative and creative decisions by highlighting abductive logical inferences with convergent thinking approaches.

Designing a new venture requires the ability to produce solutions to many problems at the same time. An entrepreneur's self-efficacy will be an important determinant in achieving this. The concept of self-efficacy refers to the belief that we can act (Bandura, 1997). 'People with self-efficacy set their sights higher, try harder, persevere longer, and show more resilience in the face of failure' (Kelly & Kelly, 2013). As Seelig (2009) points out, 'Imagination leads to creativity. Creativity leads to innovation. Innovation leads to entrepreneurship'. In a venture design based on imagination, creative confidence can be increased by critical thinking, while preserving self-efficacy.

1.1. Objectives

Critical thinking is a purposeful, reasoned and goal-oriented style of thinking used in decision making. However, applying critical thinking requires self-confidence (D'Alessioa, Avolioa, & Charlesa, 2019). Also, criticisms made by others should be evaluated according to the criteria determined by the entrepreneur.

In this article, the critical thinking method will be proposed to enable the entrepreneur to realise their self-efficacy in the design process and to increase creative confidence.

2. Protecting Creative Confidence in the New Venture Design Process

Designing a new venture requires research, as does the engineering design process. The scope by which the new venture research will be deepened constitutes the source of information for abduction inferences. In the design process of engineering, it is suggested that design research should be conducted with culture and human behaviour (Atölyesi, 2019). Thus, products that can more than meet the user's expectations can be designed. In venture design, the focus on culture and human behaviour will enable entrepreneurs and design engineers to explore various opportunities.

In the new venture design, there is a concern relating to identifying the target customer base and struggling with possible competitors; as with engineering products, doing what is best will be effective until someone else does it better. The intention to become competitive for short-term business success will reduce entrepreneur productivity.

The entrepreneur's self-efficacy is increased as a result of successful practice, and this also enhances motivation. Unsuccessful results should not undermine the entrepreneur's self-efficacy. People with creative self-confidence see new possibilities for improving their environment and collaborate with others for this purpose (Kelley & Kelley, 2013). The entrepreneur's determination of their cause by the Golden Circle proposed by Sinek (2009) will enable them to realise and protect their self-efficacy. Thus, they will have the courage to think critically, develop their innovation skills and increase their self-confidence.

2.1. The Golden Circle

This is based upon the ability to collaborate across disciplines, and the importance of deep, core knowledge by the Golden Circle proposed by Sinek (2009) (whY) shaped individuals (Bailey, Duncan & Aftab, 2014). In the Golden Circle model proposed by Sinek (2009), with an inside out approach, an entrepreneur forms their beliefs during the new venture design process. As shown in Figure 2, the Golden Circle includes three questions: why, how, and what. The first stage in the Golden Circle is to determine the reason why the entrepreneur is designing a new venture. The discovery of the why is an inner journey to understand self-efficacy.

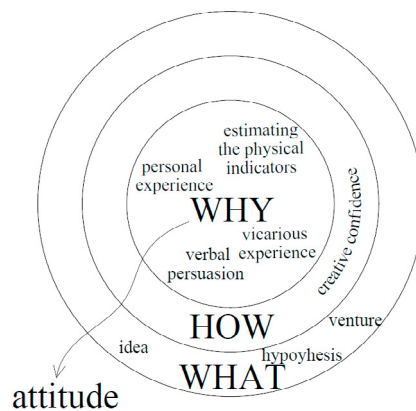


Figure 2: Golden Circle

To achieve this, individual stories are told by the entrepreneur to a partner. Individual stories will provide an understanding of the potential sources of self-efficacy, which are explained by Bandura (1977). These are 'personal experience', 'vicarious experience', 'verbal persuasion', and 'estimating physical indicators'. These stories may include conclusions based on other people's behaviour. For example, during this sharing, the entrepreneur can identify and explore appropriate role models. Thus, the entrepreneur will gain confidence in their qualifications. According to the stories, the themes determined by the partner will act as positive social support for the entrepreneur. This support is intended to increase the entrepreneur's self-efficacy. Therefore, the behaviours of the partner and the themes should be realistic and not exaggerated. It is possible to estimate 'physical indicators' in the stories. The entrepreneur who is aware of their self-efficacy will create and apply their beliefs according to their ability. Being aware of what the

entrepreneur can do will be effective in pushing their limits and increasing their resistance. The answer to the question of how, is determined by the method of realisation of purpose (i.e. the answer to why). The effective way to accomplish this is through creative confidence as a new tool to improve problem-solving practices (Kelly & Kelly, 2013). With creative confidence, an entrepreneur can pass from the question of ‘why’ to ‘what’. The answer to the what question can be a venture, idea and hypothesis. And also the answer will be proof of the determined purpose. The transformation into a Y-shaped individual in the new venture design, will ensure that the right decisions are made in the face of criticism.

2.2. Critical Thinking

Critical thinking is the systematic evaluation of thought for development (Paul & Elder, 2006). Logical implications are the result of critical thinking. Abduction systematically supports the way a new hypothesis will be produced in the engineering design process (Lu & Liu, 2012). A hypothesis is created and evaluated as a result of abductive reasoning. In the engineering design process, there is a testing phase to evaluate the accuracy of the decisions made and to make changes. The testing phase for the entrepreneur is to implement the decisions. ‘Entrepreneurs act as a force for creative destruction, sweeping away established technologies, products, and ways of doing things and replacing them with others that the marketplace as a whole sees as representing greater value’ (Harvard Business Review, 2018). As can be seen from this definition, in the design of the abductive interference, the determination of the next move is carried out by abductive inference. The evaluation of these logical implications, according to the universal standards of thought, will neutralise the subconscious and the psychological traps in decision making. Hammond, Keeney, and Raiffa (2013) proposed eight psychological trap definitions that can influence the business decision-making process. These traps are: (1) the anchoring trap, which leads us to give disproportionate weight to the first information we receive; (2) the status quo trap, which, though there are better alternatives, causes us to maintain our current situation; (3) the sunk-cost trap, which inclines us to perpetuate the mistakes of the past; (4) the confirming-evidence trap, which leads us to seek out information supporting an existing predilection and to discount opposing information; (5) the framing trap, which occurs when we mis-state a problem, undermining the entire decision-making process; (6) the overconfidence trap, which makes us overestimate the accuracy of our forecasts; (7) the prudence trap, which leads us to be overcautious when predicting uncertain events; and (8) the recallability trap, which prompts us to give undue weight to recent, dramatic events (Hammond, Keeney, & Raiffa, 2013). In the new venture design, the wrong decisions can be made under the influence of at least one trap. Clarity, accuracy, precision, relevance, depth, breadth, logic, significance, and fairness should be used as evaluation criteria for a hypothesis created by abduction. Questioning the hypothesis according to these criteria will prevent it from falling into the psychological traps.

The evaluation of hypotheses according to critical thinking standards is applied in the workshops carried out by Anlam Tasarım Atölyesi. The Anlam Tasarım Atölyesi applies the Leaf Model (Yaldız & Bailey, 2019), a meaning-oriented engineering conceptual design method, in the workshops it organizes. In the engineering design process; prioritizing the design of the meaning, the Leaf Model proposes a team-based approach (Yaldız & Bailey, 2019). In the workshops carried out by Anlam Tasarım Atölyesi, solutions are designed for social and environmental problems. In these executions’ hypotheses proposed by the participants as a solution to a problem form the drafts of meaning. Then, these drafts are questioned to create meaning. The fact that the interrogation is impartial and non-supportive is important in discovering new and different things. In the questioning of hypotheses, as in Figure 3, Anlam Tasarım Atölyesi recommends that participants play ‘Catch the Keywords’. The entrepreneur must evaluate their hypothesis while playing the game.

Playing the game before the making the decision by the Y-shaped entrepreneur will allow the hypothesis to be evaluated according to the entrepreneur's own values and behaviours. In the face of criticism, the ability of the entrepreneur to maintain his or her attitude will increase his or her confidence and hence self-efficacy. Developing self-efficacy will enable objective logical inferences against challenging situations such as criticism. Entrepreneurs need to play the game with a partner who can be reliable and impartial. Questions are asked by the partner according to the standards of thought shown in Figure 3. The entrepreneur must answer the questions within 30 seconds. If the answers are considered insufficient by the partner, the entrepreneur must answer again, but the answer should be explained differently, this time in 60 seconds. The partner’s task in this game is to highlight the keywords in the entrepreneur’s answers. After answering all of the questions, the hypothesis is evaluated and improved according to the determined keywords. Thus, the entrepreneur determines his next move in accordance with his purpose without the influence of the psychological traps. Time limitations in the game, and repetitive questioning ensure that the

entrepreneur has full understanding and comprehension of his hypothesis. Throughout the game, the entrepreneur reinforces his knowledge.

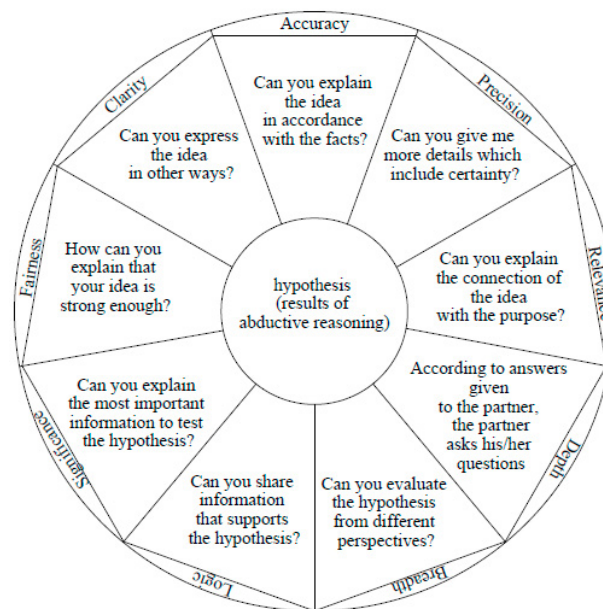


Figure 3: Catch the Keywords

Catch the Keywords is a game that reveals new ideas that are not realised by the entrepreneur in the hypothesis. This process is uncomfortable for the entrepreneur. However, entrepreneurs must be able to challenge themselves, be comfortable in communication, and show confident optimism (Lu & Liu, 2012). Therefore, this game will be useful in enabling the entrepreneur to develop these features. It is compelling, requires patience and is a fun game. It is also a discovery process. In this game, the entrepreneur must be aware of what they are trying to achieve. As suggested in the Golden Circle model, an entrepreneur who has determined their purpose and fully comprehends their hypothesis will be able to develop a creative and new hypothesis as a result of this game. Exploring the new thing as a result of a compelling process will create courage to overcome other challenges. Thus, creative self-confidence, which is defined as the courage to produce and test new ideas (Kelly & Kelly, 2013), can be increased.

3. Conclusion

Design thinking is ‘a discipline that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity’ (Brown, 2008). At the heart of design thinking is abductive logic (Martin, 2009). Deduction and induction are the logic of what must be. The goal of abduction is to posit what could possibly be true (Martin, 2009). New venture design is a process in which many logical inferences are required, as in the engineering design process. When making decisions according to the results of logical inferences, critical thinking methods should be applied, so as not to be influenced by the subconscious. Thus, the right decisions can be made without falling into the psychological traps. In this study, self-efficacy is defined as the potential of the individual, and creative self-confidence is defined as the ability to increase and use this potential. The development of this skill can be achieved by specified methods. The Golden Circle will prevent the entrepreneur from feeling that they have competitors. Because the purpose of the entrepreneur is completely individual as an answer to why. Playing the Cath the Keywords game is effective in making the right decisions without the impact of the subconscious. In future studies, a method will be developed to measure the increase in creative self-confidence by applying the workshop executions of the methods described, run by Anlam Tasarım Atölyesi.

References

- Yaldız, N., Bailey, M. (2019). Giving meaning to products via a Conceptual design approach, International Conference on Engineering Design ICED 19. Delft, Netherlands.
- Yaldız N., Bailey M. (2019). Establishing different interpretations of engineering design in the conceptual design process, International Conference on Engineering and Product Design Education (E&PDE19). Strathclyde, United Kingdom.
- Sinek, S. (2009). *Start with why? How great leaders inspire everyone to take action*. New York: Portfolio Penguin Group.
- Sinek, S., Mead, D., & Docker, P. (2017). *Find your why?* New York: Portfolio Penguin Group.
- Seelig, T. (2009). *What I wish I knew when I was 20*. New York: HarperCollins, USA.
- Paul, R. & Elder, L. (2006). *Critical Thinking*. USA: Pearson.
- Møller Nielsen, L., Wikström, A., & Tollestrup, C. (2013). Design based entrepreneurship, International Conference on Engineering Design ICED13. Seoul, Korea.
- Martin, R. (2009). *The Design of Business*. Harvard Business Press.
- Lynch, M., Steinert, M., & Andersson, G. (2016). Educating entrepreneurs in practical methods with design practices as a guide. NordDesign.
- Lu, S. C. Y. & Liu, A. (2012). Abductive reasoning for design synthesis. *CIRP Annals - Manufacturing Technology*, 61, 143-146.
- Kelley, T. & Kelley, D. (2013). *Creative confidence: Unleashing the creative potential within us all*. New York: Crown Business.
- Harvard Business Review (2018). *Entrepreneur's handbook everything you need to launch and grow your new business*. Boston, Massachusetts: Harvard Business Review Press.
- Hammond, J. S., Keeney, R. L., & Raiffa, H. (2013). *The hidden traps in decision making*. Boston, Massachusetts: Harvard Business Review Press.
- Gunes, S. (2012). Design entrepreneurship in product design education. *Procedia- Social and Behavioral Sciences* 51, 64-68.
- Guenther, A., Eisenbart, B., & Dong, A. (2017). Creativity as a way to innovate successfully, 21st International Conference on Engineering Design ICED17. Vancouver, Canada.
- Dorst, K. (2015). *Frame innovation: Create new thinking by design*. USA: MIT Press.
- Design Council [Internet]. Place of Publication: Publisher; [updated month day; cited 2018 November 21]. Available from: <https://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond>.
- D'Alessio, F. A., Avolio, B. E., & Charles, V. (2019). Studying the impact of critical thinking on the academic performance of executive MBA students. *Thinking Skills and Creativity*, 31, 275-283.
- Brown, T. (2008). *Design Thinking*. Harvard Business Review.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman and Company.
- Bailey, M., Duncan, T. & Aftab, M. (2014). New Design is Bigger and Harder-Design Mastery in a Changing World, 16th International conference on Engineering and Product Design Education (E&PDE14), Strathclyde, UK.
- Anlam Tasarım Atölyesi [Internet]. Turkey: Anlam Tasarım Atölyesi; [2019 April 09, cited 2019 February 19] Available from: <https://www.anlamtasarimatolyesi.com/blogs/stratejik-uygulama-olarak-yaprak-modeli>.