A Prototype Toolkit for Developing Design Thinking Skills for Non-Designer Managerial Level

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Abstract

This research is based on theoretical and practical concerns about the concept of Design Thinking (DT), its background, characteristics, process models, and process toolkit. Besides the literature review, a qualitative analysis of Stanford d.school is a well-known model of the DT process, and applied DT tools were made. The research provides a critical approach to DT to help the management better understand the benefits. The idea can be put into practice in business and help the managerial level become more creative thinking. Ten CEOs, both design and non-design backgrounds, were interviewed to identify the outlook of their business problem-solving and business innovation management process. DT workshop was provided with seven cross-disciplinary middle managers as participants to answer the two research questions: (1) What method is used for business problem-solving? (2) How does a manager integrate DT into their innovation processes? (3) How can a manager's creative skills and mindsets be optimized base on DT methodology? Evaluate the DT workshop format's impact and outcome in a non-designer context; all participants were asked to evaluate their understanding of DT before and after the workshop. After attending the workshop, all participants grow skills and mindsets in the field of DT. They applied the DT method in their projects, including ideation and development prototyping. All workshop participants planned to apply DT methods in their future projects. The impressive results in such a limited time frame by diverse Design Thinking teams promise to integrate DT in their problem-solving and Innovation process.

Keywords: Design Thinking, Innovation, Creative Thinking, Research Sprint, Prototyping

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Introduction

New business models, technological advancement, and social changes have been a concern and are focused on studies of both scholars and practitioners. However, management's practice has not changed since the first functions of management were defined by Fayol (2016), such as POCCC (planning, organizing, commanding, coordinating, and controlling). According to Hamel and Breen (2007), management's function still entails setting objectives and talent, accumulating and applying knowledge, allocating resources, building and nurturing relationships, and meeting stakeholder demands. Moreover, the United Nations prioritized creativity and Innovation as the competencies required in this era and the future (Creativitywakeup, 2021).

Several research suggestions have emerged about the missing right brain competencies that need to be nurtured for the new age managers and leaders. While most of these competencies relate to the left brain hemisphere, which deals with logical, rational, and analytical thinking, increasingly, DT becomes important for the new-age individuals to stimulate the right brain hemisphere responsible for Holistic Thinking, Intuitive Thinking, and Creative Thinking (Herrmann and Herrmann-Nehdi, 2015). Like a designer in terms of Holistic Thinking, Dunne and Martin (2006) highlighted the importance of thinking that focuses on Design Thinking would be a good business strategy.

One method that supports increasing creative thinking through the Design Thinking process has also been adopted by some of the world's top universities, such as Stanford University, Oxford University, and Massachusetts Institute of Technology (Meinel and Leifer, 2012). Nonetheless, there were hardly any attempts to link Design Thinking with top managerial levels, although those managers consider developing new products and services as central issues. For many years, Stanford University has been teaching non-designers to think like a designer which was called Design Thinking in one day. Brown (2009) states that DT is not just for non-designers to get closer to Design but also provides for designers to get closer to business thinking. DT was a bridge for non-designers and designers. Non-designers were taking Design Thinking classes and participating in Design Thinking workshops. These workshops have never been found crossing the bridge from business land into design land without cooperation between non-designers and designers and real problem-solving experience.

Research Question

This research aims to address the lack of a research framework for examining the integration of Design Thinking with innovation processes. No appropriate existing adoption models and research frameworks are insufficient in developing a prototype Design Thinking toolkit for a manager. This research aims to build a prototype Design Thinking toolkit to develop creative thinking skills based on Design

Thinking methodology. In particular, this research will probe and deduce answers to the following three research questions.

1) What method is used for business problem-solving?

2) How does a manager integrate Design Thinking into their innovation processes?

3) How can a manager's creative skills and mindsets be optimized base on Design Thinking methodology?

Research Objective

This study focuses on understanding the integration of Design Thinking with innovation processes. Based on these research questions, concise sub-purposes are clearly stated as follows.

1. To describe the method used for business problem-solving by CEOs and Ownership.

2. To identify the integration of Design Thinking with innovation processes from CEOs' and Ownerships' perspectives.

3. To develop a prototype of a Design Thinking toolkit to drive creative thinking skills and mindsets for a non-design manager.

As shown in Figure 1, the research problems, three research questions, and three research objectives are established to explore possibilities for the Prototype toolkit of developing Design Thinking skills for the Non-Designer Managerial Level to provide insights into solutions to the research problem.

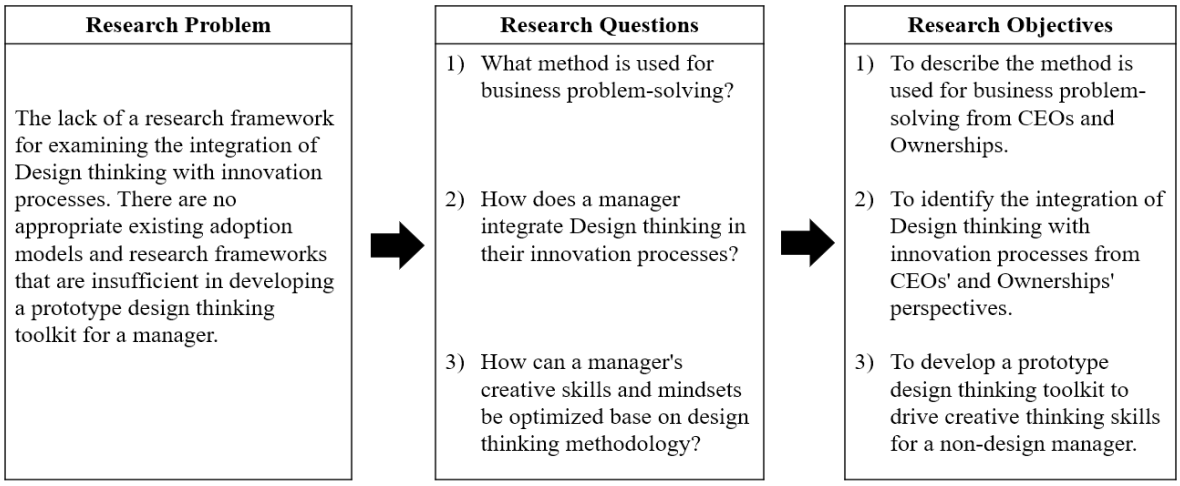

Figure 1 Summary of the research problem, research questions, and Research Objectives

Literature Review

The Concept of Design Thinking (DT)

Today, Design Thinking (DT) is understood to be a complicated way of thinking that creates new realities and reflects the introduction of design culture and its method into such an innovative business (Elsbach and Stigliani, 2018). Coe Leta Stafford, Managing Director of DEO, one of the world's influential design consultants, said, " Design Thinking is a process for creative problem-solving. " Martin (2009) also mentioned that DT affected the organization's transformation and inspired Innovation. DT is the next competitive advantage. Stevens (2022) specify that " Design Thinking is both an ideology and a process, concerned with solving complex problems in a highly user-centric way."

DT is an approach used for practical and creative problem-solving. It is based on the methods and processes that designers use, but it has evolved from various fields, including architecture, engineering, and business. DT can also apply to any area; it does not necessarily have to design specifications. DT is a driver for Innovation promoted by a designer and offers new models of processes and toolkits that help improve every creative process carried out by a designer and multidisciplinary teams in any firm (Martin, 2009)

DT is a driver for Innovation promoted by a designer and offers new models of processes and toolkits that help improve every creative process carried out by a designer and multidisciplinary teams in any firm (Martin, 2009). DT combines "design" and "thinking" in many fields, such as Innovation, management, and marketing. It creates opportunities to apply design tools to other problem-solving contexts, but it is not only related to the appearance and functionality of artifacts but in the form of businesses, services, and processes (Thoring and Mueller, 2011). Nowadays, Design Thinking is not only a cognitive process or a mindset but has become an effective toolkit for any innovation process, connecting the creative design approach to traditional business thinking based on planning and rational problem-solving.

Models of the Design Thinking Process

Several process models have been published and defended in the Design Thinking domain applied in business and Innovation as the most appropriate. Some of the best-known models are the 3's I model (Brown and Wyatt, 2010) and the HCD model (IDEO, 2015), both developed by the design agency IDEO, the Double Diamond model from the British Design Council (Design_Council, 2019), and the Design Thinking model of the Hasso-Plattner-Institute.

Regarding DT's domain, applied in business and Innovation, the most popular process model is the Hasso-Plattner model published and defined by Stanford d. school that is most appropriate to the innovative process (Meinel and Leifer, 2012). This model first defines the problem and then implements the solutions, continually with the user demographic's needs at the core of concept

development. This model focuses on need finding, understanding, creating, thinking, and doing. This process's core is action and creation: creating and testing prototypes. DT can continue to learn and improve upon initial ideas. The Design Thinking model consists of these five steps of the process Stanford (2010) is present in more detail as follows.

1. Empathize: Empathy is the centerpiece of a human-centered design process. The Empathize mode is the work done to understand people within the context of the design challenge. It's an effort to learn about how and why they do things, their physical and emotional needs, their worldview, and what matters to them.

2. Define: The Define mode of the design process brings clarity and focus to the design space. This stage is about making sense of the general information you have gathered. As a design thinker, it is a chance and responsibility to define the challenge you are taking on based on what we have learned about the user and the context after becoming an instant expert on the subject and gaining invaluable empathy for the person designing.

3. Ideate: Ideate is the mode of the design process in which you concentrate on idea generation. Mentally it represents a process of "going wide" in terms of concepts and outcomes. Ideation provides both the fuel and the source material for building prototypes and getting innovative solutions into your users' hands.

4. Prototype: Transform ideas into a physical form to experience and interact with people and, in the process, learn and develop more empathy.

5. Test: Try out high-resolution products, use observations and feedback to refine prototypes, learn more about the user, and purify the original point of view. Simplify understanding Design Thinking process is illustrated in Figure 2

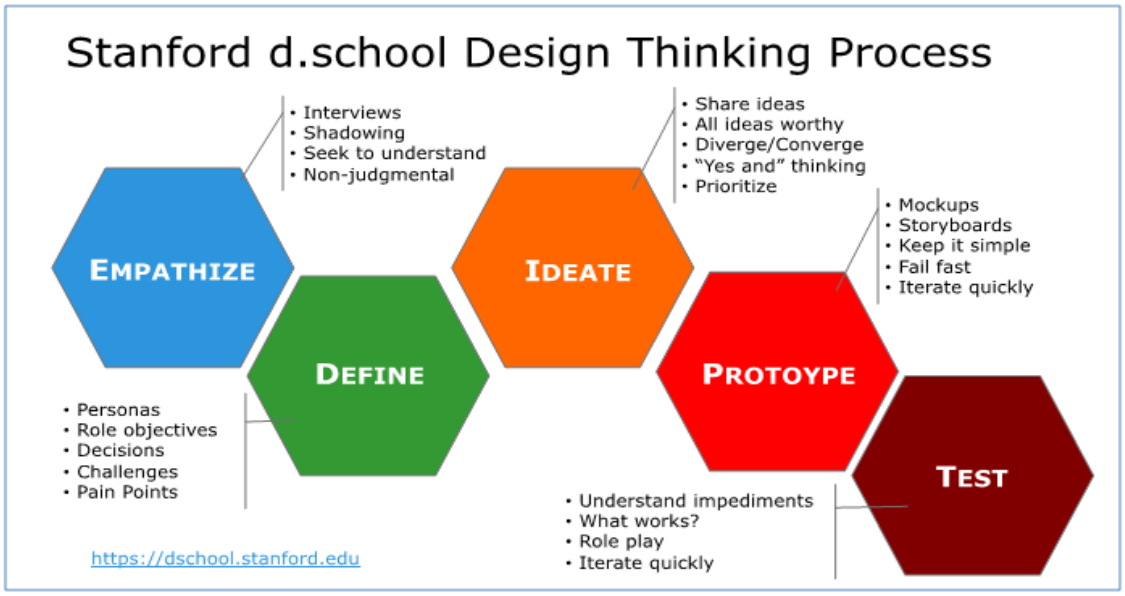

Figure 2 Stamford d. school Design Thinking process

Source: Stanford (2010)

Using Design Thinking to Develop Creativity Skills

DT was recently identified as one of the most alternative methodologies for developing management creative skills and mindsets and the research phenomenon. DT is based on methods developed in practice. In this context, "Design" is understood very broadly as a process of developing new products and services, including business models (Meinel and Leifer, 2012). Some of the world's leading universities, such as MIT, Cambridge University, and Standford University, identified DT as a promising method for teaching innovativeness, creativity, new product development, and problem-solving (Brown, 2009). Kummitha (2018) defined DT as the willingness and capability to build better solutions than traditional management programs.

Research Methodology

Research Design

Given the lack of conceptual frameworks in Design Thinking for Thailand's business contexts, this study was essentially exploratory in nature. Therefore, the qualitative method was selected as the most appropriate method for gathering the data with sufficient depth and richness, answering the research question, and fulfilling the research purpose (Neuman, 2009). Based on such a qualitative approach, the researcher was directly involved in activities intended to foster changes at the group and organizational levels (Dickens and Watkins, 1999). For this study, a cross-sectional study was more appropriate and more common than a longitudinal study to assess the Design Thinking in Thailand's business contexts to describe only the contemporary situation of the digital era. In addition, a qualitative research method, in-depth interviews, and workshop format allow flexibility, allowing emerging data to be incorporated into the analysis iteratively.

This research methodology aims to explore new research methods using the lean and sprint processes. To improve research goals and objectives, a researcher must employ the 'lean' research process, build, test, and learn their explored research prototype. This method adopted a sprint process in the agile methodology to sharpen the overall research direction. The entire process of data gathering and research methodology was presented in Figure 3.

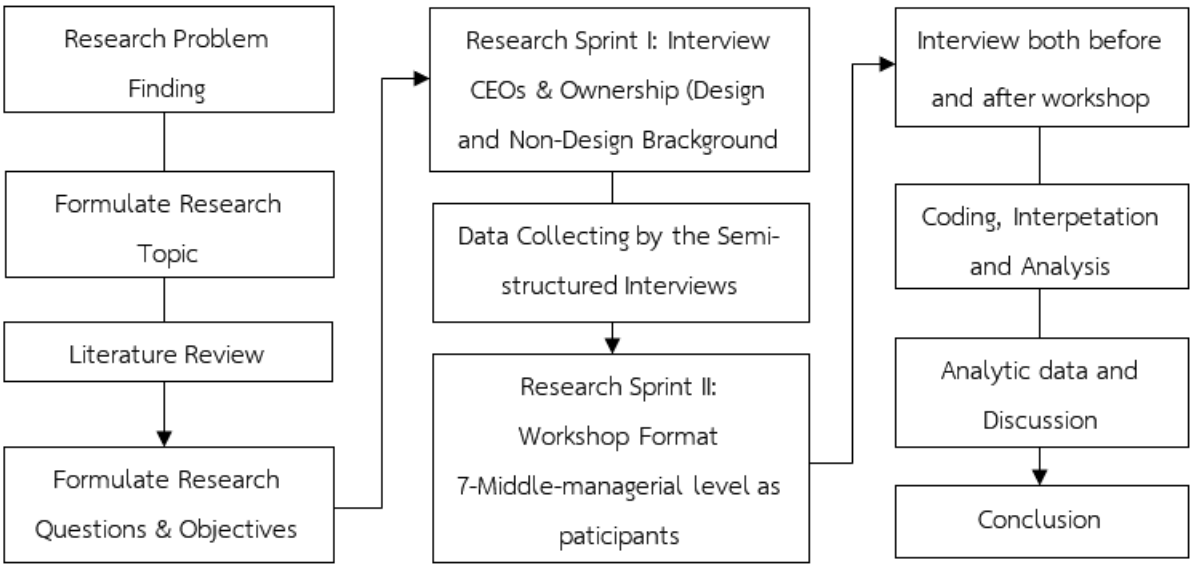

Figure 3 Structure of the research components and methodology in this study

Sampling Procedure and Data Collection

Research Sprint I:

The convenience and snowball techniques was selected for gathering data. The primary data to develop a conceptual framework was collected from ten persons who voluntarily participated in the interview. Interviewees were persons in businesses located and launched in Thailand. These interviewees were chosen from CEOs and ownerships, both Design and non-design backgrounds, and the knowledge of their experiences in developing innovative processes for driving businesses. Interviewees were asked the same questions about their ideas and perspective based on three questions; 1) What is Design Thinking? 2) What method was used for your business problem-solving? and 3) How do you develop service or product innovation? Each interview lasted between 20-30 minutes and was carried out face to face at the interviewee's workplace and online format; Line calls, Facebook messenger, and Zoom. All interviews were recorded and transcribed for late analysis. All data were coded according to themes derived from literature and emergent data. These codes formed the basis of a theoretically informed analysis (Miles, Huberman, and Saldaña, 2019).

Research Sprint II:

Based on this research, the Design Thinking workshop covered theoretical and practical sessions, cases, group discussions, and compact design exercises. A one-day Design Thinking challenge was provided to solve a team problem and judge the effect of the workshop framework communicating the Design Thinking ethos.

The sample was selected from seven cross-disciplinary job titles and backgrounds voluntarily participating in the workshop format. The sample was examined and evaluated Design Thinking's

impact in a non-designer context; all participants were asked to assess their understanding of Design Thinking before and after the workshop. This cross-disciplinary composition of the workshop group is a key factor in mutual learning and understanding of the different disciplines. Design Thinking acts as an enabler (Best, 2012) and catalyst in this process. The Job position of participants is compiled in Table 1.

Table 1 Interdiscipling Job Position of the workshop participants

No.	Gender	Job Position
1	Male	Engineering Manager
2	Male	Legal Manager
3	Female	Human Resource Manager
4	Female	Customer Service Manager
5	Female	Sale Manager
6	Female	Public Relation Manager
7	Female	Quality Assurance Manager

The participants were given a task and a physical location in KX Knowledge Exchange Innovation Center to initiate their exploration phase. They applied the methodology, tools, and skills in introductory theoretical, practical, and group feedback workshop sessions. The interdisciplinary team then runs the innovation process through Design Thinking through empathic exploration; 1) problem framing 2) concept ideation and testing 3) phase of the Design Thinking process. Finally, the present results were presented and evaluated. Figure 4 shows the participants' tasks and self-description of the developed solution through the Design Thinking Workshop.

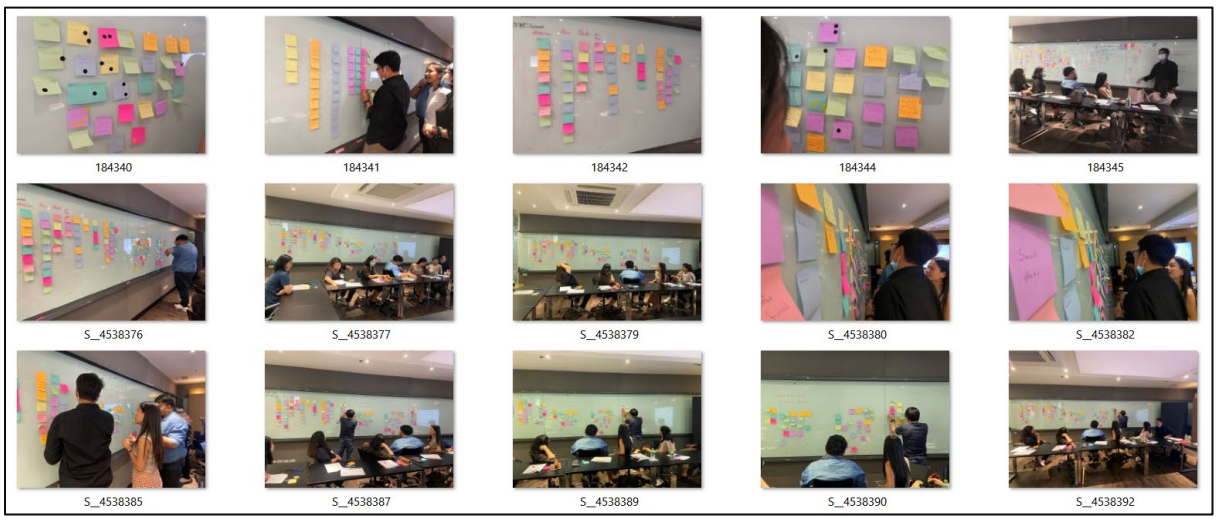

Figure 4 The participants' tasks and self-description of the developed solution through the Design Thinking Workshop.

Data analysis

In a qualitative approach, the data collection will be carried out through multiple sources of evidence, including thematic interviews and workshop format, to study the Design Thinking process's opinions about Design Thinking and innovation process experiences. A pattern-matching analytical strategy will be employed based on Veal and Ticehurst (2005).

Findings

1. The Result from Research Sprint I

Based on the literature's systematic review, it is clear that the existing Design Thinking models are inadequate for antecedent conditions for a Thai firm. The idea of applying research sprint No.1 uses qualitative data to formulate their point of view to develop an innovation process. The analysis was the sentences that were transcripts from ten interviews: CEOs and Ownership of ten mid-size firms. Initially selected the mid-size firms as small, but they were efficient and continuously experienced, growing to become mid-size firms. Interviewees were asked the same questions in 15-20 minutes, and there are three major questions to ask interviewees the same questions; (1) What is Design Thinking? (2) What is the method used for your business problem-solving? (3) How do you develop service or product innovation?

What is Design Thinking?

The point of view of interviewees, both two groups in the definition and short-meaning of Design Thinking is a very similar perspective that was presented in Table 2.

Table 2 The definition and meaning of Design Thinking from ten interviews

No.	Design Background	No.	Non-Design Background
1	The process is to design the new product and services.	6	The process of Design is to use for new products.
2	The methodology of business problem-solving.	7	The process of creative thinking.
3	The management strategy is to develop innovative products.	8	The new strategy is used to develop a new product.
4	The methodology to create new ideas.	9	A strategy is used to solve a business problem.
5	The process of developing a new product is to meet customer needs.	10	Creative thinking is as a designer.

What is the method used for your business problem-solving?

The extraction of codes from the interview was grouped into four steps by content analysis. To understand, it presents the assigned principles of the related contents, derived from interviewees, to a particular division code of the method used for business problem-solving, as shown in Table 3.

Table 3 The method used for business problem-solving

Step	Activities
1. Define the problem	- Differentiate fact from opinion - Specify underlying causes - State the problem specifically - Solve the problem with data
2. Generate alternative solutions	- Specify alternatives consistent with firm goals - Specify short- and long-term alternatives - Brainstorm on new ideas - Seek alternatives that may solve the problem
3. Evaluate and select an alternative	- Evaluate alternatives relative to a target standard - Evaluate both proven and possible outcomes - State the selected alternative explicitly
4. Implement and follow up on the solution	- Plan and implement a test of the chosen alternative - Gather feedback from all affected parties - Establish ongoing measures and monitoring

How do you develop service or product innovation?

One of the interviewees' perspectives on the development innovation process is that one of the concepts from interview coding is provided. In order to better manage the development of innovative ideas, they were defined as follows components.

- Market - to create ideas around new markets to target
- Marketing - to create ideas around new ways of marketing the product
- Partner - to make ideas around new partners for distributing the product
- Product - to make ideas around new product
- Technology - to make ideas around new technologies for supporting various insurance value chain processes

2. The Result from Research Sprint II

By analyzing the perception, understanding, and experience before the workshop, this paper aims to clarify how Design Thinking is currently interpreted by non-design background. Firstly, I will introduce the composition of the workshop group (7 participants) regarding their previous awareness of Design Thinking. More than half of the workshop participants, or equal to 71%, had no prior touch with Design Thinking but had ever seen various sources from general media, especially Facebook. All of those had not actively applied Design Thinking methods in their projects. Thus, the definition of Design Thinking exhibited extreme differences in understanding the actual nature of Design Thinking, as shown in Table 4.

Table 4 Definitions of Design Thinking before the workshop participation

No.	Definition
1	"A process for finding solutions to complex problems with the help of a multidisciplinary team."
2	"Brainstorming in a team and discussion."
3	"A discipline which aims to solve people's need, using creative thinking."
4	"Define, research, idea, prototype, choose, implement, and learn."
5	"A comprehensive methodology to crate applicable and innovative products and services for businesses."
6	"Brainstorming to solving business problems."
7	"A multidisciplinary team to develop new innovation."

After the workshop session, all participants demonstrated and understood the Design Thinking mindsets, methods, and tools, identified useful and diverse insights, formatted relevant framed design tasks, and solved them with a design-minded approach. All workshop participants planned to apply Design Thinking methods in their future projects. The impressive results in such a limited time frame by diverse Design Thinking teams promise to integrate Design Thinking in their problem-solving and Innovation process.

Discussion

As an introduction to the process dynamic of Design Thinking, This study conceived a one-day workshop for middle managers, in which they are conducted through a whole creative process and can try out DT tools in several exercises. The workshop activities should help them decide which DT tools are helpful and add value to their daily work life. This study is related to the Design Thinking workshop as action research by Tschimmel (2012) that provides a critical approach to Design Thinking

to help the innovation management community better understand the potential the concept has for implementing and developing creative thinking in business in society in general.

Concretely, the workshops aim to familiarize the participants with all the creative process stages and the techniques that support collective creation. If a manager understands that the designer's visual output is rarely the result of a wish to produce a sketch or model but rather to understand and discuss a problem, perhaps they wouldn't be so afraid to include the visual tool in their daily routines of Thinking and speaking about problems. Thus, one of the workshop's objectives is a better understanding of DT's skills and an increased motivation to innovate. These results are related to the experimental research by Agarwal and Salunkhe (2012) that enchange creative thinking and innovation thinking competencies in the students, making them students as a holistic managers.

Every business owner and manager can benefit from using Design Thinking when developing innovative solutions to problems or looking for new challenges and opportunities. Facilitating Design Thinking (DT) sessions, which are incorporated into actual creative sessions in businesses, is another method for raising awareness of the significance of Design Thinking in innovation processes. With more in-depth insights into the DT process's dynamic and powerful tools, managers can improve their participation and facilitate innovation processes. From the question; How does a manager integrate Design Thinking in his innovation processes? This study wants to give some practical advice as follows:

1. Design Thinking is not just the designer's ability; it can also be developed and taught by anyone who wants to solve problems using creative thinking, conceive new realities, and communicate new ideas. This means teaching design to engineers and marketers and designers business skills.

2. Managers should encourage teams to be more visual. Invite them to express their ideas on whiteboards, free walls, and notebooks. Make quick and rough prototypes by sketching on wallpapers without worrying that the drawings won't look good enough to be seen.

3. Interdisciplinary teams can benefit from DT tools' strong visual character by understanding and creating together. In addition, they help the creative process, which involves the end users.

4. This workshop model acts as a guide for each development interaction. Without being tied to a specific DT process model, managers could gradually incorporate DT tools into the various stages of their innovation processes to get a sense of their potential.

Conclusion

While both types of competencies. Left-brain Thinking and right-brain. Thinking are required for Management functions in Today's organizations. It is apparent from this research that there is an opportunity to strengthen conventional management programs to generate right-brain thinking

competencies along with left-brain competencies. In this research, present the middle manager's prototype of a problem and action base workshop by integrating the Design Thinking methodology, which has its foundation in business reality. It is a practical application in different environments that ranges to the knowledge transferring of non-design background. And it is on track to become one of the most methods prevalent in driving creativity, problem-solving, and managerial thinking.

The study presents the working research sprint to solve the research question. The study contributed to the growth of knowledge in the field of Design Thinking by proposing the application of Design Thinking to develop skills and mindsets in non-design managers. This research can serve as a model of knowledge transfer of entrepreneurship or related disciplines at all levels; it is sufficiently flexible in applying to various environments. This research also calls for a border inclusion of managerial mindsets. This research will encourage innovativeness and creativity as two building blocks of success and a development-oriented society.

Suggestion

This study suggests developing an evaluation toolkit that will transfer the Design Thinking knowledge to CEOs, Ownerships, and Managers, both design and non-design backgrounds. For further studies, monitoring such workshops requires extensive knowledge and experience, should be more widely explored, and more examples of use in different education settings should be presented.

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