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# Effects of Design Thinking Integration on Organization Dynamics and Innovation Outcomes in Thai Organizations

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## Abstract

Purpose: The purpose of the study is to analyze the advantages of integrating design thinking in an organization in Thailand, and its effect on organization dynamics and influencing innovation outcomes. Design/Methodology/Approach: The research methodology involves qualitative interviews with organizational leaders and literature review. Thematic analysis is applied to interview data. Findings: The findings highlight the benefits of design thinking in influencing organization dynamics and fostering innovation outcomes within the context of Thai organizations.

Originality/Value: This study contributes to the understanding of the practical benefits of design thinking in shaping organization dynamics and influencing innovation outcomes within the unique business landscape of Thailand, offering insights that can be applied to enhance organizational creativity and problem-solving.

**Keywords**: Design Thinking Integration, Organization Dynamics, Innovation Outcome

**JEL Classification Code**: M11, M13, O31, O36,

## 1. Introduction

Larger companies and long-established companies face competitions from younger and more innovative companies. Meanwhile, small-and medium-sized enterprises (SMEs) also face the challenges of the competitive business landscape and must innovate more frequently in order to maintain a competitive advantage. They need to use dynamic capabilities and strategy to create and refine a defensible business model that will guide organizational transformation (Teece, 2008).

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Thailand's 20-Year National Strategy (2017-2026) called Thailand 4.0 focuses on transforming the economic and social sector towards sustainability. As Thailand works to become a developed country by implementing the Sufficiency Economy Philosophy principles, this national strategy will help Thailand to thrive in the 21st century through security, prosperity, and sustainability (The Ministry of Industry, 2017). Thailand 4.0 helped create an innovation-driven economy, where companies are looking to align themselves with Thailand's national strategy. The purpose of this paper is to analyze the impact of design thinking integration on organization dynamics and innovation outcome.

### 1.1. Research Objectives

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Here are the research objectives that will help guide the study:

R1. Examine the effects of design thinking integration on organization dynamics

The purpose of this research objective is to understand managers' attitudes toward implementing design thinking in their respective organizations, learn about the effects on organizational culture, communication, and collaboration from the adoption of design thinking methodologies. Finally, analyze the effects design thinking integration has on the roles of leadership, teamwork, and communication strategies that led to changes in organizational dynamics.

R2. Analyze the impact of design thinking integration on Innovation Outcomes

The purpose of this research objective is to learn how design thinking influences the organization's culture and business strategies. Furthermore, learn how integrating design thinking methodologies influences organizational innovation outcomes. Finally, identify elements of design thinking that contribute to fostering innovation within the organization.

## 1.2 Research Questions

Here are the research questions that will help guide the study:

RQ1. How does the adoption of design thinking correlate with changes in organization structure, communication flow, and collaboration dynamics within the organization?

RQ2. What innovation outcome results from integrating design thinking in the organization's process?

## 1.3 Significant of the study

This study is significant as it contributes to the understanding of the practical benefits of design thinking in shaping organization dynamics and influencing innovation outcomes within the unique business landscape of Thailand. Furthermore, the study offers insights that can be applied to enhance organizational creativity and problem-solving.

## 1.4. Definition of Terms

### 1.4.1. Design Thinking

According to the Interaction Design Foundation, teams use design thinking, which is a non-linear, iterative process to understand users, challenge their assumptions, redefine problems and create innovative solutions to prototype and test. This process involves five phases—Empathize, Define, Ideate, Prototype and Test that is most beneficial to address undefined or unknown problems (Interaction Design Foundation). Design thinking not only means many things to many people in its definition, but also in its practical applications. Today a wide variety of design thinking frameworks and visualizations exist in the world today that are variations of the design thinking process (Interaction Design Foundation).

### 1.4.2. Design Thinking Integration

According to Li & Zhan (2022), Design Thinking Integration (DTI) refers to fostering interdisciplinary and innovative talent development that fosters learning and connecting multidisciplinary knowledge and skills by applying design process/skills in a co-creative environment. (Li & Zhan, 2022). Furthermore, Design Thinking Integration (DTI) also refers to promoting transdisciplinary learning and helping with cultural understanding and inheritance (Li & Zhan, 2022).

### 1.4.3. Organization Dynamics

Organizational Dynamics (OD) refers to encouraging the employees to experience how designers frame problems, think outside the box and ideate innovative solutions by improving employees' design thinking skills by integrating design thinking process and methods. (Razzouk & Shute, 2012). According to

Akintayo & Faniran (2012), Organizational Dynamics (OD) refers to the communication skills and interpersonal relationship between workers and organizational goal achievement.

#### 1.4.4. Innovation Outcome

There are many definitions about Innovation Outcomes. Some pointed to the degree of newness of project, and some pointed to the effect of the Innovation project to the organization. Janger et al. (2017) concluded that Innovation Outcomes (IO) refers to the result of the introduction of innovations, including the economic effects of innovation outputs on the firms introducing new innovations. While Driver et al (1988) at that time presented the Innovation Outcomes (IO) that referred to the degree newness of innovations, where scholars describe "radical" innovations as totally new goods and services or production processes, and "incremental" innovations as performance enhancements of existing goods and services or production processes which do not profoundly change their characteristics. For another dimension of Innovation Outcome concluded that Innovation Outcomes (IO) refers to the effect of structural changes from the introduction of radical innovations (Quatraro, 2009). Moreover, Gatignon et al., (2002) summarized that the Innovation Outcomes (IO) refers to the effects from incremental innovations that result in a minor structural upgrading that refines and improves existing entities.

## 2. Literature Review

The purpose of this chapter is to form a conceptual framework based on literature reviews on Design Thinking Integration and Organization Dynamics and Design Thinking Integration and Innovation Outcome.

### 2.1 Design Thinking Integration and Organization Dynamics

A study by Miller (2023) examines what design thinking is both as a process and a mindset. Miller (2023) suggests the benefits of design thinking on organization dynamics and tools that can help drive design thinking in the organization. In order to help individuals new to the Design Thinking process in the organization adopt the mindset, it is advantageous to have a facilitator to help walk through the Design process (Wrigley et al., 2018). Furthermore, experts suggest when first integrating design thinking into the organization existing processes as an agile method instead of strict process where diverse design thinking tools can be used and applied in various ways (Chen & Venkatesh, 2013). Design Thinking Integration affects Organization Dynamics as the increased project ownership that is a by-product of the iterative nature of design thinking projects helps increase self motivation and empowerment (Roth et al., 2020).

### 2.2 Design Thinking Integration and Innovation Outcome

#### 2.2.1. Innovation Outcomes at the firm level

The iterative nature of the Design Thinking process helps reduce ambiguity of situations and provide a dynamic and flexible approach that results in a leaner and faster innovation process (Roth et al., 2020). Design Thinking can also help develop products that are user-centered and will meet the user's needs (Chen et al., 2018). The positive qualities of the Design Thinking process can help innovation outcomes at the firm level. Innovation Outcome is the result of the introduction of innovation that results in economic effects or value added from innovation output from the firms (Janger et al., 2017). There are different types of innovation Outcome that can occur at the firm level, where product innovations are sold to users and process innovation helps reduce cost or add value to firms inputs that will generate economic gains (Janger et al., 2017).

### 2.2.2. Innovation Outcome at the Industry level

Based on the study by Janger (2017), Innovation Outcome at the firm level can affect Innovation Outcomes at the Industry Level two ways; structural change towards more knowledge-intensive industries and structural upgrading within industries as seen in Figure 1. According to Zhang (2018) Design Thinking Integration can help develop the capability of a company's brand ambidexterity in their business strategy. With the Design Thinking process, companies can pursue both incremental innovation and radical innovation at the same time. Using Design Thinking business opportunities could be discovered by using existing resources that can lead to incremental innovation (Rösch et al., 2023). On the other hand, Design Thinking integration can also lead to identifying new opportunities through knowledge and experimentation, which can result in radical innovations (Zhang, 2018). Depending on what industry the organization is in, Structural change occurs when there is a move from industries with lower levels of knowledge intensity to higher knowledge intensity (Janger et al., 2017). Thus, Design Thinking Integration can provide organizations with a process that has the dynamic capability to adapt to the needs of organization and current market.

## 2.3 Conceptual Framework

The literature review provided the foundation for the conceptual framework design to examine how design thinking integration affects organization dynamics and innovation outcomes. The conceptual framework in Figure 1 is inspired by the conceptual framework in Figure 2 from a study by Gao & Yu (2023). The research framework from Figure 2, depicts the process of knowledge exchange with design thinking that leads to SMEs service innovation. The first part of the knowledge exchange examines the relationship between CEOs, staff and the design thinking implementation led by researchers. The CEO is vital to encourage participants and help implement design thinking. The second part of knowledge exchange in Figure 2 focuses on the service side, where staff are encouraged to empathize with learning the customers' needs, where this knowledge exchange is vital in the growth of the service innovation that is made possible by the implementation of design thinking. The conceptual framework in Figure 1 is also inspired by the conceptual framework in Figure 3. The research framework from Figure 3, defines the innovation outcome at the firm level and the two types of innovation outcome at the industry level: structural change towards more knowledge-intensive industries and structural upgrading within industries.

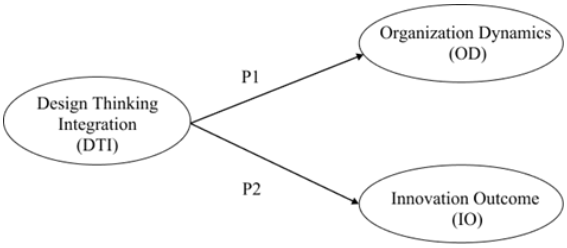
Here are the following two qualitative propositions for the conceptual framework for this study:

P1. Design thinking can have a positive influence on organizational dynamics.

P2. Design Thinking can have a positive influence on innovative outcomes.

**Figure 1**

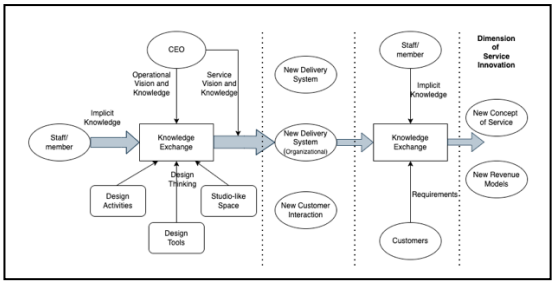
*Conceptual Framework*




Source: Adapted from previous studies by authors

**Figure 2**

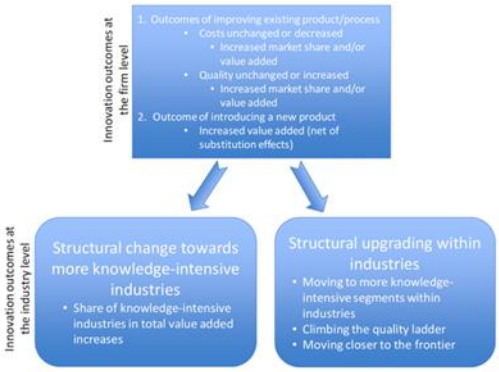
*Design thinking, knowledge exchange and service innovation: a conceptual framework*




Source: Gao, B., & Yu, K. (2023). Knowledge exchange in smes service innovation with Design thinking.

**Figure 3**

*Innovation outcomes at the firm and the industry level: a conceptual model*




Source: Janger, J., Schubert, T., Andries, P., Rammer, C., & Hoskens, M. (2017) The EU 2020 innovation indicator: A step forward in measuring innovation outputs and outcomes?

## 3. Research Methods

The objective of this study is to examine the effects of design thinking integration on organization dynamics and to analyze the impact of design thinking integration on Innovation Outcome. The research method selected for this study is semi-structured qualitative interviews. For this study, a total of nine semi-structured interviews from eight companies across six different industries. Eight out of nine interviews were conducted and recorded over video conference calls. One interview was conducted in person and detailed notes were taken.

### 3.1. Population and Sample

In this research study, managers and team leads of organizations based in Thailand are interviewed. Participants are selected based on how they apply design thinking techniques within their organizations. Overall, nine participants were interviewed across several industries such as Banking, Community Outreach, Design, Electric Vehicle, Marketing, and Retail.

### 3.2 Interview Questions

The interview questions are divided by each of the following variables: Design Thinking Integration, Organization Dynamics, and Innovation Outcomes. The interview questions for Design Thinking Integration, and Organization Dynamics are based on Dunne (2018), while the interview questions for Innovation Outcomes are based on the study by Janger et al., (2016) (see Table 1).

### 3.3 Reliability Test

The Index of Item Objective Congruence (IOC) test was sent to three experts to review the interview questions. A total of two out of three responses were received from the experts. Each expert was asked to give a score for each question, where +1 for congruent, 0 for questionable, and -1 for incongruent. The total score out of 2 from the IOC test (Table 1).

**Table 1**: Interview Questions with IOD Score

| Variable | Questions | | Source | IOC |
|---|---|---|---|---|
| Design Thi | Q1 | What challenges or opportunities led to the introduction of design thinking methodologies in your organization? | | 2/2 |

| | | | | |
|---|---|---|---|---|
| | Q2 | Could you share how design thinking has been integrated into your team or company's workflow? | Dunne (2018) | 2/2 |
| | Q3 | Could you highlight specific phases of Design Thinking that contributed to fostering innovation within your team or organization? | | 2/2 |
| Organization Dynamics | Q4 | How does your organization define or perceive design thinking, and what significance does it hold within your company's culture? | | 2/2 |
| | Q5 | How has the adoption of Design Thinking influenced the organization's structure and communication flow? | | 2/2 |
| | Q6 | Do you think that the Design Thinking framework encourages better cooperation between individuals on the team? | | 2/2 |
| Innovation Outcome | Q7 | For the project that you worked on, did your team improve an existing product/process or introduce a new product? | Jagger et al., (2016) | 1/2 |
| | Q8 | Can you explain if the cost was unchanged or improved from improving the existing product/process? Did you notice an increase in market share and/or value-added? | | 1/2 |
| | Q9 | Can you explain the increased value added by introducing a new product/process? | | 2/2 |
| | Q10 | Would you say the project you worked on affected the innovation outcome on the industry level with the share of knowledge or Structural change towards more knowledge-intensive industries? | | 1/2 |
| | Q11 | Can you explain if the share from total value added increased from the structural change towards more knowledge-intensive industries? | | 1/2 |
| | Q12 | Can you explain if the firm was able to move more knowledge-intensive segments, improve its quality and become the frontier within the industry from the structural upgrading within industries? | | 1/2 |

## 4. Results and Discussion

The purpose of this chapter is to present the result from the data collection from the qualitative interviews and the data analysis.

### 4.1 Demographic Profile Summary

The total number participants that were interviewed was nine persons that are team leads and managers of organizations in Thailand. Information about the participant's basic demographic information, education background, current position, field of work and number of years of work experience can be found in the table (see Table 3). For field of education, research divided into two main fields: STEM (Science Technology Engineer and Math) and non-STEM.

**Table 3**: Profile of each participant

| No. | Name | Gender | Age | Degree | Field of Study | Position | Industry | Years of Work |
|---|---|---|---|---|---|---|---|---|
| 1 | CO-1 | M | 26-30 | Bachelor's | STEM | Business Developer and Test Automation | Engineering | 5 |
| 2 | CO-2 | F | 26-30 | Bachelor's | STEM | Packaging Global Supply Manager -New Product | Engineering | 5 |
| 3 | M-1 | F | 26-30 | Bachelor's | Non-STEM | Marketing Executive | Marketing | 5 |
| 4 | M-2 | F | 41-45 | Master's | Non-STEM | Chief Marketing Officer | Marketing | 20 |
| 5 | M-3 | F | 26-30 | Bachelor's | Non-STEM | Managing Director | Marketing Agency & Food Wholesale | 4 |
| 6 | B-1 | M | 26-30 | Bachelor's | STEM | UX Designer | Banking | 8 |
| 7 | D-1 | M | 31-35 | Master's | STEM | CEO | UX Design | 10 |
| 8 | EV-1 | F | 56-60 | Bachelor's | Non-STEM | CEO | Electric Vehicle | 37 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 9 | R-1 | F | 41-45 | Master's | STEM | Product Manager | Retail | 20 |

**Note**: Group-B: Banking Industry, Group-CO: Community Outreach, Group-D: Design Agency, Group-EV: Electric Vehicle, Group-M: Marketing, Group-R: Retail

## 4.2. Theme 1: Design Thinking Integration

When companies first introduce their respective design tools to their company's innovation process, running workshops is the most common way to introduce the Design Thinking and design tools to the employees.

1) Design Thinking Workshops

All of the eight companies ran workshops to integrate in the form of workshops that focused on experiential learning and hand-on on projects. Frequent check-in and presentation and conducted to ensure each individual understanding of the new thinking framework being introduced.

For example, Interviewee CO-1 and CO-2 said "We ran workshops and divided the mixed students from different universities where each team had a few experts on design thinking and helped teach each other. In addition, they were mini hands-on projects to help enforce how to apply design thinking principles to a tangible project."

### 4.2.1 Design Tools Implementation

By interview and discussed about design thinking approaches of each company found that all eight companies used different design thinking tools and combinations of different design thinking tools depending on each industry's requirements and team needs. Organizations in similar industries used similar design thinking tools.

Some organization applied additional tools/techniques like Interviewee R-1: "Need to re-enforce the agile mindset (design thinking tool) to make people think Some employees who are not used to collaborating may struggle with agile adoption. Extra techniques like visual boards or structured communication frameworks may be needed to help introverted employees collaborate, which using a variety of design thinking tool becomes beneficial."

### 4.2.2 Design Thinking Process

The Design Thinking process is a non-linear, iterative methodology is a solution-based approach to solving problems that helps deal with complex problems that are ill-defined or unknown (Alarcon, D. et al.,2011). There are five stages of the Design Thinking process as shown in Figure 4:

1. Empathize—Research Your Users' Needs
2. Define—State Your Users' Needs and Problems
3. Ideate—Challenge Assumptions and Create Ideas
4. Prototype—Start to Create Solutions
5. Test—Try Your Solutions Out

The Design Thinking Process from in Figure 1 is used by interviewees from four out of eight companies from the Banking, Electric Vehicle and Retail industry. The process supports all design thinker members to develop the innovation result align with industry and objectives of each.

Key points form six participants as follows; Interviewee B-1: "The Design Thinking process helps facilitate involvement of all the stakeholders needed at each stage where Product owners now understand the need to include the design team in discovery research before briefing projects. In addition, there is more iteration between design and development and more usability testing than before the integration."

Interviewee D-1: "When teaching Design Thinking to big companies, Design Thinking can help the companies make better decision that is not based on their own bias and the process help them create one target that they can focus on. Empathy part is the most important especially in more important than the prototyping and validation part that is later in the

Design thinking process because software production could take a long time"

Interviewee EV-1: "Design Thinking helped the team deal with multi-dimensional and difficult problems to solve as the early electric vehicle distributor trying to create an ecosystem for a brand new industry. Also, using Design Thinking to help facilitate collaboration with involved stakeholders. "

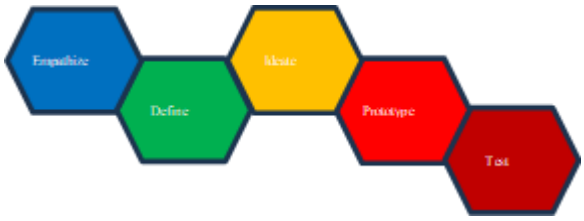
Interviewee M-2: "Defining the problem was viewed as the most impactful design thinking phase, helping to scope goals and guide innovation."

Interviewee M-3: "The vision is communicated to the team, then have them study stakeholders like suppliers and customers to uncover needs, volume, and pain points"

Interviewee R-1: "Design Thinking is used in engineering and project management to help define the scope of the project. Compared to waterfall, problem discovery is slow, with design thinking tools risk is minimized because problem discovery is quicker with design thinking tools."

**Figure 4**

Design Thinking Process from d.school




**Note**: The Design thinking process, graphic by d.school, Hasso Plattner Institute of Design at Stanford

### 4.2.3 Double Diamond

The structure is to understand customers and their problems and come up with creative and innovative solutions. There are four phases to this structure:

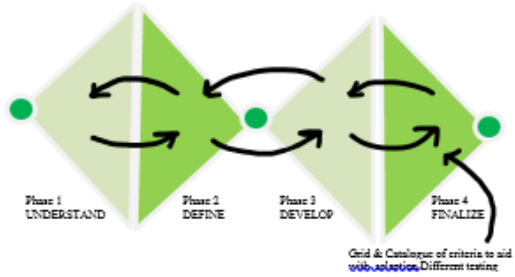
1. Discover customer problems
2. Define specific customer problems
3. Develop potential solutions to these customer problems
4. Deliver feasible and viable solutions to these customer problems

The Double Diamond process in Figure 5 is used by interviewees from one out of eight companies from the Design Agency industry. The process apply divergent thinking and convergent thinking but not the same time (Gallico, D, 2021).

Interviewee D-1: "Participating in user testing helped developers gain empathy and understand the need to make changes, overcoming their own assumptions. Being able to empathize and discover users' problems is more important than fully building the prototype. For example, a government agency could take months to years to develop it and by that point they implement something that people don't use."

**Figure 5**

*The Double Diamond Process*




Note: This figure is from the article "How the double diamond process can help you work in a more user-centred way" by Eissa and Testing Time. https://www.testingtime.com/en/blog/double-diamond-process/

### 4.2.4 Socially Engaged Design

The method combines knowledge about the social, cultural, economic, environmental contexts where there is a design solution and encourages designers to reflect how their own cultural background and identities form their approach and impact. There is a focus on social and technical aspects throughout the design process. There are five stages:

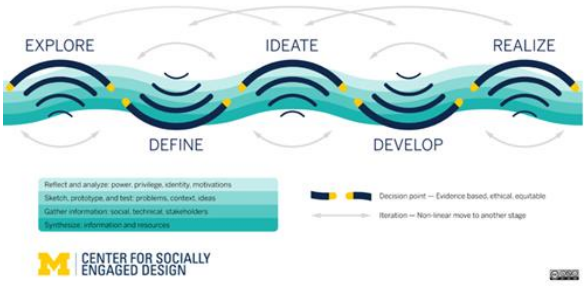
1. Explore- designers ask questions and gather information

2. Define- convergence of information and context to define complex problems into bitesize challenges
3. Ideate- present creative solutions and investigate possibilities to create options that can be developed further
4. Develop- engineers focus on a particular solution and refine the solution based on user input and feedback from stakeholders
5. Realize.- board stage that could include validation, implementation or revisitation of previous stages in the process

The Socially Engaged Design process developed by Center for Socially Engaged Design (2020) as shown in Figure 6. This process is used by interviewees from one out of eight companies from the Community Outreach industry.

The application to apply this process into student project were mentioned from two participants. Interviewee CO-1 and CO-2 "Before the team's trip to the north of Thailand, the team, which consisted mostly of engineering students as well other students from other faculties organized workshops in various stages of the Socially Engaged Design process. We applied it to different scenarios and studied how different behaviors and cultural norms can be interpreted differently across various cultures. The step-by-step co-design is very important to the project as it helps design a solution that best meets the unmet needs. With each iteration the products were more efficient and effective at addressing a particular problem."

**Figure 6**
*Socially Engaged Design Process Model*




Note: Center for Socially Engaged Design (2020). Socially Engaged Design Process Model. Available at: https://csed.engin.umich.edu/socially-engaged-design-process-model

### 4.2.5 Customer Journey Map

The maps help teams uncover customer needs and the customer's journey to reach a product or service. Using this information, you can identify pain points and opportunities to enhance customer experience and boost customer retention. Here are the following components included in the customer journey map:

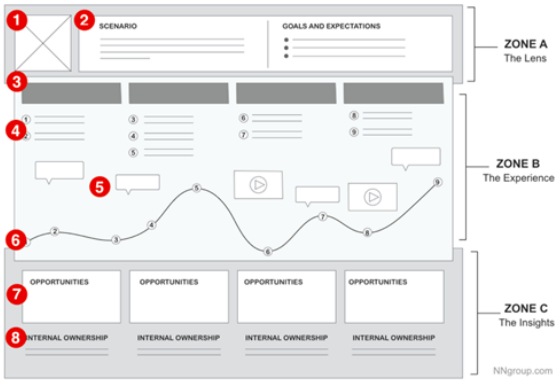
[1] Point of View: An actor or persona is chosen for a clear narrative.
[2] Scenario: Define the experience to map, whether existing or "to-be." The user's goal during the journey, emphasizing sequential events.
[3] Actions, Mindsets, and Emotions: Explore user behavior, thoughts, and feelings.
[4] Touchpoints and Channels: Align interactions (touchpoints) and communication methods (channels) with user goals and actions. Analyze potential brand inconsistencies and disconnected experiences.
[5] Insights and Ownership: Uncover gaps in the user experience through insights. Assign ownership for different parts of the journey map to empower action.

The Customer Journey Map tool in Figure 7 is used by interviewees from one out of eight companies from the Marketing industry.

Interviewee M-2: "The Customer Journey Map exercise during the company workshop we did

provided ideas to improve marketing materials and the customer experience."

**Figure 7**
*Customer Journey Map Template*




Note: The figure is from the article "Customer journey maps: When and how to create them" by Kaplan from Nielsen Norman Group. https://www.nngroup.com/articles/customer-journey-mapping/

### 4.2.6 Persona Design

Tool used to understand and define target customers and their needs. There are four steps toward creating a persona for design thinking:

[1] Research and Analysis

[2] Persona descriptions

[3] Problem analysis

[4] Collaboration and Revision

The Persona Design tool in Figure 8 is used by interviewees from one out of eight companies from the Marketing industry.

Interviewee M-2: "In the full day workshop participants were split into cross-functional teams and given specific customer profiles to role play and engage with.91% of participants said the workshop was insightful, Common improvement ideas focused on better addressing customer needs and pain points based on the persona"

**Figure 8**
*An example of a customer persona*


Note: An example of a customer persona, courtesy of InnovationTraining.org from the article "How to create Personas for Design Thinking: Innovation training" by Casey. https://www.innovationtraining.org/create-personas-design-thinking/

### 4.2.7 Five Whys

Simple and effective tool for discovering the root cause of the problem are the steps to Five Whys Technique (Serrat, O., 2017):

[1] Define the problem and record the first question.

[2] Note possible follow-up questions. The questions should build up logically and incrementally based on previous answers.

[3] Repeat the second step five times.

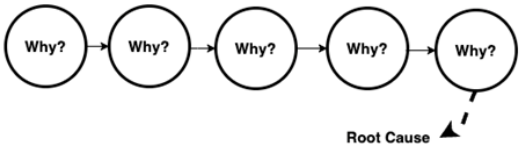
The Five Whys tool in Figure 9 is used by interviewees from two out of eight companies from the Marketing industry.

Interviewee M-1: "The 5 Whys method helps facilitate communication flow and gets everyone involved by allowing people to voice ideas they might not otherwise share. When metrics showed declining performance of Instagram reels, the team used the 5 Whys method to have a creative discussion about potential reasons and decide whether to eliminate reels."

Interviewee M-3: "It was challenging getting the analytics-focused team to think more creatively and

ask "why" questions, but over time they generated ideas, tested them, and iterated based on feedback."

**Figure 9**
*The 5 Whys Method*




Note: The figure is from the article "What are 5 Whys?" by Daniel Skrok and Interaction Design Foundation. https://www.interaction-design.org/literature/topics/5-whys

**Agile**

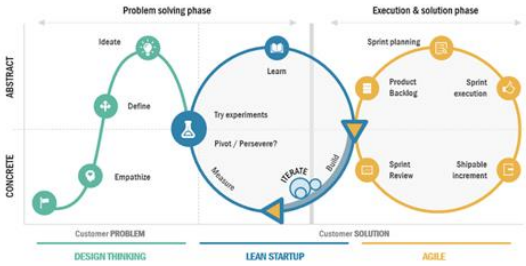
A method that uses a highly collaborative way to design and develop new products by dividing tasks into small parts performed in sprints. The Agile software development cycles can be divided into six stages:

1. Concept: Define project scope and needs
2. Inception: Assemble Agile team according to project specifications
3. Iteration: Create code that allows customer feedback
4. Release: Test the code and fix and issues
5. Maintenance: Provide continuous tech support to ensure product dependability
6. Retirement: The end of the product life cycle that is the start of a new one.

The method in Figure 10 is used in one organization from the retail industry. The interviewee emphasize the importance and benefits of the Agile method on the organization's innovation outcome:

Interviewee R-1: "Agile can be run in parallel and allows for increased efficiency resulting in a shorter development time. Being able to be the first to market or adjusting to changing market conditions is crucial to the profitability of the well established organization"

**Figure 10**: Agile Framework




Source: Gartner. https://www.gartner.com

### 4.3 Theme 2 Analysis: Organization Dynamics

1) Attitude for Innovation

Implementing Design Thinking tools helps promote curiosity, inquisitiveness, and self-drivenness. Design Thinking tools provided different opportunities for employees to share their ideas and propose potential solutions.

Interviewee EV-1: " To be able to contribute to the team with the design thinking approach that promotes collaboration in the team"

2) Improved Communication Flow

There is an increase in communication due to the introduction of the new thinking framework being introduced. Having multiple stakeholders involved in the design thinking process motivated employees to communicate more often thereby enhancing their communication skills.

Interviewee M-2: "The design thinking workshop forced people from different departments to communicate with each other and provided good networking opportunities that translated into enhancing the company culture. Even after the workshop, I notice improved relationship and ease of communication between employees"

3) Increased collaboration

The interviewees all mentioned that implementing Design Thinking has made the teams become less top-down and collaboration increased within the team and other stakeholders. According to Pourdehnad, J., Wilson, D., & Wexler, E. (2011), the best way to ensure that the design will serve the purpose of the organization is to include the stakeholders in the formulation of the design. Hence, the success of a design is directly related to the level of stakeholder participation in the development of the design.

Interviewee EV-1: "Using this design thinking process helped our company realize the importance in co-creating with our customers and our suppliers."

### 4.4 Theme 3 Analysis: Innovative Outcome

#### 4.4.1 Business opportunity discovery

The design thinking process helps lead to business generation ideas that could be prototyped and tested.

Interviewee EV-1: "The beginning stages of the design thinking process allowed us to understand our clients needs better and identify the root cause of low Electric Vehicle sales, which was due to a lack of electric vehicle comprehensive ecosystem and after sale services"

#### 4.4.2 Decrease risk

The design thinking process encourages idea generation and testing of ideas which help decrease risks. The Design thinking process allows for the ability to test solutions before deployment. In addition the tool helps identify users needs and test whether the solution meets users needs. As a result, by identifying these issues and evaluating each potential solution's performance, companies are able to decrease their risk and their losses.

Interviewee R-1: " In testing, there needs to be frameworks and has to be a criteria, which agile thinking helps provide that framework and criterias. If solutions do not meet their KPIs we are able to pivot or abandon the project early on"

#### 4.4.3 Increase efficiency

Design Thinking helps discover problems, which help create solutions to help increase efficiency in the solution and the organization.

Interviewee M-1: "From the 5 whys, we were able to determine the root cause of our low views due to poor short performance, thus we are able reallocate resources to profitable products and used knowledge we gain from our poor performing product to support our profitable product"

## 5. Conclusion and Recommendations

Implementation of the design thinking process required increased communication across the organization due to the level of collaboration required, which resulted in a more dynamic workplace that is able to adapt to the competitive business environment in Thailand. The integration of the design thinking process led to the discovery of business opportunities that can help guide businesses with innovation in their products and offerings in their industry. Furthermore, design thinking has helped organizations decrease risk and increase efficiency with their innovative goals in their company.

### 5.1 Findings and conclusion

From the qualitative data collected and analyzed, Design thinking can have a positive effect on organizational dynamics and innovative outcomes.

P1. Design thinking can have a positive influence on organizational dynamics.

The qualitative data from the experts have proven this qualitative proposition to be correct. Experts mentioned that design thinking integration has

improved the employee's attitude for innovation. The improvement in attitude for innovation includes increased curiosity, inquisitiveness, and self-drivenness in employees. The second positive influence mentioned by experts from integrating design thinking in the company was improved communication flow between teams and stakeholders. Lastly, experts noticed increased collaboration and ease of collaboration between workers and team with the implementation of design thinking in the company.

P2. Design Thinking can have a positive influence on innovative outcomes.

Based on the interviews from experts have proven this qualitative proposition to be correct. During the interviews with experts they mentioned design thinking helped the team not only refine their current business and product strategy but helped discover business opportunities for the company. Another positive influence, experts mentioned, is that using design thinking tools help decrease risk on projects that would not be profitable for the company or meet the needs of the customers. Lastly, experts say that design thinking helps increase efficiency and help streamline the innovation process by identifying customer pain points and help facilitate effective solutions.

## 5.2 Recommendations

Based on the findings of this study with 9 participants from six industries: Banking, Community Outreach, Design Agency, Electric Vehicle and Marketing. The key recommendations for management and design thinking team may pinpoint into five dimensions.

### 5.2.1 Priority and Key Stakeholder involvement

Management able to the Design Thinking process to help prioritize the needs of the users, promoted cross-functional collaboration. Key success of design thinking is the involvement of all key stakeholders in the development process from beginning to end. Another recommendation is to use the Design Thinking process and other Design Thinking tools to increase efficiency in the project development time and mitigate risks by promoting a culture of rapid prototyping to test ideas quickly in order to risk investing in unsuccessful products and features.

### 5.2.2 Empathy with community

The recommendation for manager and team leads is to use Design Thinking to help develop the team's empathy with the community and understand the needs and challenges of the community they are serving. Also team must be consider the community resource and sustainability of the innovation. When teams integrating the Design Thinking process in a cross-disciplinary team, required to Design Thinking expert guide each team.

Especially, for the project with a long timeline and high cost of software production development it is important recognize the importance of developing solutions that will be utilized by users by prioritizing empathy early in the process.

### 5.2.3 Right for multi-dimensional problems

This approach assists in defining multi-dimensional problems, identifying business opportunities within the new market, and co-creating with stakeholders to help establish a leading infrastructure such as the electric vehicle market.

### 5.2.4 Cross-disciplinary teams

Management should select Design Thinking Team members with cross-disciplinary with other departments in the organization such as sales, customer service and relevant technical teams to improve communication flow collaboration and increase collaboration and support innovation outcome. Furthermore, other Design Thinking tools should be explored in addition to the Five Whys Technique, Customer Journey Maps and Persona tools that some organizations in the industry currently use in their company process. Managers can evaluate which Design Thinking tools and combination of Design Thinking tools are best for understanding the

customer needs, the scope of the project and the organization's goals.

#### 5.2.5 Agile Framework Support

A recommendation for project managers and team leads is to use the Design Thinking process to help that will funnel project specification into the Agile Framework ensuring that the development teams are solving the right problems. Using the Design Thinking process can help project managers define multidisciplinary problems and scope for efficiently that could lead to faster sprints and project timeline. Another recommendation for project managers and team leads are to conduct further research to explore other design thinking tools in addition to the design thinking process that can support the main Agile Framework that is the primary process for development teams in the Retail Industry.

### 5.3 Limitation of the Study

Some of the limitations in this study include constrained time frame for data collection and analysis, coverage of limited industries which includes Banking, Community Outreach, Design, Electric Vehicle, Marketing and Retail that were studied. The findings from this study may only be applicable to the industry that was studied and may not be applicable in other companies from other industries in Thailand. Furthermore, sensitivity of company information and ongoing project details concerns prevented participants from disclosing certain information that could limit the comprehensiveness of the findings. Due to time constraints a total of nine participants from eight companies across six industries in Thailand were interviewed.

### 5.4 Future Study

For future studies, more research can be conducted on companies in other industries in Thailand as not all industries in Thailand were covered in the study. By covering more industries in the scope of the research, a more comprehensive pattern can be established across the different industries. The effectiveness and timeliness in using Design Thinking tools to drive the company's innovation could be further explored as companies are in the race to gain greater market share or be the first to market.

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