Design Thinking in Large Companies and Design Consulting Firms in Japan

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Abstract
This paper focuses on large companies in Japan and derives insights into how large Japanese enterprises have adopted Design Thinking (DT). By comparing patterns for large companies that has adopted it by themselves and with support from design consulting firms, the author reveals each relevant feature and develops approaches to adopt DT into company operations. Towards these research questions, the author conducts a literature review on definitions of DT, tools, methods and frameworks related to DT, as a basis for deriving interview questions for design thinkers in large companies and design consulting firms. The author conducted semi-constructed interviews with interviewees from large operating companies as well as design consulting firms. Having analyzed interview data using M-GTA as a textual analysis method, the author discovered five key concepts: 1. Adoption of user observation and user study, 2. Development and usage of original tools and methods, 3. Emphasis on the sharing of feelings about participation, 4. Non-Affinity with existing development processes, and 5. Necessity of a mindset and organizational structure. The contributes of this paper reveals individual and common characteristic of large operating companies and design consulting firms.

Introduction

Design Thinking (DT) is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology and the requirements for business success (IDEO, 2020); it is applied not only to product or service development but also to organizational design. As examples of product and service development, Carroll and Richardson (2016) used DT to develop an innovation framework for connected health in the field of health care management. Bech-Petersen et al. (2016) adopt DT to design a library while Ostrowski et al. (2015) used it to develop a user-centered e-learning platform. In addition, ICT4D (Adler, 2010; Fawcett et al., 2013; Mutuku & Colaco, 2012) and education (Goldman et al., 2009; Lugmayr, 2011; Valentim et al., 2017; Maculey et al., 2016) also adopted DT. As an example of organizational design, Pasman and Wieringa (2011) summarized the issues that had been faced while applying DT to a software development company. Although these cases are reported by researchers in academics, practitioners in companies also tried to adopt DT into their enterprises, particularly after the 1999 appearance of IDEO on *Nightline* —a news program broadcast on the American television network ABC. Many books related to DT have been published, and many workshops or seminars on the subject had been held; however, many companies have no specific ideas about how they should adopt DT into their companies or what kind of improvements they could thereby expect.

A prior study investigating how large companies adopted DT by themselves was conducted by Rauth et al. (2014). They targeted six large companies in Germany and the United States. They focused on the fact that there is less prior research on management with DT in large companies. They conducted interviews with 36 managers in these six companies who had over five years of DT experience. A survey regarding the use of DT in large companies showed that they adopted five approaches:
1. Demonstrating the usefulness of DT
2. Meshing DT with organizational culture
3. Convincing thorough experience
4. Creating ambassador networks
5. Creating physical spaces and artifacts.

Although the prior study is about the cases that large companies in Germany and the United States adopted using DT, two patterns emerge about adoption of DT. The first is the pattern a large company adopts; the other is one supported by design consulting firms such as IDEO. As large companies have no practical knowledge of adopting DT, it is expected to be rational and effective for them to offer design consulting firms to support them. There are no insights regarding what kinds of features each pattern has or which pattern should be adopted by large companies depending on the case they are situated in.

Based on this context, the author sets forth the following research questions:
RQ1: What kind of features does each mentioned pattern have?
1. A pattern that large companies adopt DT by themselves
2. A pattern that large companies adopt DT supported by design consulting firms.

RQ2: In what kind of situation would DT be appropriate, and which pattern in such instances should large companies adopt?

Toward these research questions, two patterns mentioned in RQ1, are to be compared with qualitative analysis that reveals the differences between them. The restriction of this paper is the target of data because the author conducted analysis on large companies and design consulting firms in Japan. Due to this restriction, it is difficult to apply insights in this paper directly to large companies in other countries; still, it is useful for developing initial hypotheses. This paper compares and analyses the two patterns with a method of qualitative analysis. The second section conducts a literature review in order to design interview questions presented to design thinkers in large companies and design consulting firms. The third section describes an analytic method. The fourth section shares the results of the qualitative analysis. The fifth section discusses the two research questions, applying insights based on the results.

Literature Review

The author conducted literature reviews regarding definitions of DT, tools, methods and frameworks related to this approach. This enabled the questions to be designed for semi-structured interviews with design thinkers in large companies and design consulting firms. By reviewing definitions of DT, evaluating the degree of comprehension of DT is achievable. Reviewing tools, methods and conceptual frameworks related to DT, leads to the identification of how they use DT and the kind of approaches they adopt.

Definition

Although *Design Thinking* with lower case in English means cognitive process of designers, Capitalized Design Thinking means a method for innovations. As the Japanese language has no distinction between these two words, the difference between them depends on its context of usage as long as the meaning isn't explicitly expressed. In this section, the author reviews literature based on each definition.

Dorst (2011) regards the core of design thinking as abduction. The abduction in this paper is applied to open and complicated problem-solving processes; value is only given in the equation that both things and working principles lead to value. Owen (2006) defines design thinking as a way of approaching issues, problems and opportunities almost uniquely suited to innovation; the author also lists 15 features. In addition, Owen (2007) defines the difference between design thinking and scientific thinking using the axes of symbolic-real and analytic-synthetic, arguing that both can be used complementarily because both have opposite positions.

As comparison of characteristics among practitioners, Goldschmidt and Rodgers (2013) found differences among undergraduate students who major in industrial design and architecture and PhD candidates who major in design by creating three groups of four students, analyzing their design process. Norman (2013) discusses human-centered design and the Double Diamond model as the two most powerful views for DT. The Design Council (2019) indicates that the double diamond model is a tool for solving issues appropriately. It is composed of two phases: one to determine the appropriate issues solved and the other dedicated to deriving the best solutions. Each phase has a divergence and convergence about quantities of ideas on issues and solutions; it is therefore called double diamond. Martin (2009) calls the DT process a knowledge funnel. The knowledge funnel has three phases. The first selects a particular problem to be solved, the second offers an initial heuristic to the problem and the third converts the heuristic to an algorithm. The practice of a knowledge funnel requires a balance between analytical and intuitive thinking.

Thoring and Müller (2011) discuss the human-centered design process as an element that supports the creative process of DT; they also address issues of diversity on the team and working environments (e.g., physical space, culture and atmosphere). Moreover, Tonkinwise (2011) points out that design-as-styling is neglected or concealed in DT. Thornton (2010) compares two approaches to DT—those of Brown (2008) and Martin (2009). Thornton supports Brown's DT, which covers more practical elements; conversely, Martin's DT focuses on a model to explain activities by using DT, although Thornton concludes that the latter has several contradictions.

Although Thornton compares two specific viewpoints on DT, there are several cases that can help us compare DT with other design methods. For example, Denning (2013) discusses how we can improve software design by combining computational thinking with DT. Knemeyer (2015) compares DT and UX. He explains that both began in academia; UX has gradually gone from the level of designers and engineers while DT has influenced C-level management. Behrendorff et al. (2013) review participatory design and DT, proposing that participatory design should not only be used complementarily but also to create relationships between corporations and end users.

In addition to comparisons among design methods, some research compares characteristics among practitioners. Razzouk and Shute (2012) reveal differences between novices and experts of DT through a literature review using ERIC, JSTOR, Science Direct, IEEE Explore and Google Scholar.

Tools, Methods and Frameworks

The DT process outlined by Brown (2008) has three stages, but users do not need to implement them in order. The three stages are implemented as an iterative process. The first is inspiration: to learn from people via interaction. The second is ideation: to generate, develop and test a variety of ideas. The third is implementation: to develop concepts and promulgate them in society.

The DT process adopted by d.school at Stanford University and funded by Hasso Plattoner, the founder of SAP, has five steps (Stanford d.school, 2017):
1. Empathize, to understand users and their lives
2. Define, to identify an appropriate issue to lead to the best solution
3. Ideate, to discover a variety of possible ideas
4. Prototype, to learn through actual experience
5. Test, to understand solutions and users.

The DT process by the HPI School of Design Thinking, in contrast, has six iterative steps; they differ from those used at the Stanford d.school (Plattner et al., 2009):
1. Understand (i.e., collect existing information)
2. Observe, based on qualitative research
3. Define point of view (POV), to define both the issues to be solved and the users
4. Ideate, to brainstorm based on POV
5. Prototype, to visualize ideas
6. Test, to obtain feedback about the prototypes.

There are some tools for learning DT itself and making the process more efficient. Teen design days offer a framework for workshops to learn DT processes. This framework focuses on young people and proposes values using DT from the viewpoint of Information and Communication Technologies and Development (Fisher et al., 2013).

Schelle et al. (2015) revealed a variety of issues faced in workshops for DT, developed and evaluated several tools to solve the issues. For example, they designed a tool for 'breaking the ice' to help workshop participants understand issues, a tool for managing participants' expectations and energizing them to deal with fatigue and boredom also another related to value and attitude to encourage participants to behave appropriately. They incorporated these into the design process and showed their superiority to paper-based tools such as Post-it notes.

There are some case studies of frameworks developed by combining DT and existing tools or methods. For example, Müller and Thoring (2012) propose the lean DT framework, which combines Lean tartup, a method that originated from business management with DT. Seo et al. (2016) developed a framework that merges VRIO, a resource analysis tool composed of value, rareness, imitability and organization, with DT.

In the realm of software design, Banfield et al. (2015) propose a method for workshops called design sprint that mixes an agile development method with the DT process and includes observation and prototyping for a week. Newman et al. (2015) have developed Diving Board, a DT framework that adopts the approach of participatory design in order to resolve knowledge asymmetry and the physical distance between partners and designers, in addition to the agile method corresponding to uncertainty.

There are two cases in the field of product and service design. Chen et al. (2016) developed a structured DT strategy framework that adopts speculative design. Within this framework, a designer creates some scenarios at the ideation phase, considering probable, potential, possible and preferable futures. Chang et al. (2013) developed an approach integrating Martin's model of analytical thinking and intuitive thinking with Verganti's (2009) innovation matrix and verified it using Apple and Samsung as case studies.

Methodology

1. *Survey Process*

Semi-constructed interviews were conducted focusing on practitioners of DT in order to obtain data for qualitative analysis and thus reveal answers to the research questions. After administering questionnaires in order to select candidates for interviews, interviewees were selected based on the research objectives.

2. *Questionnaires*

As a result of a survey of search engines, books published in Japan, interviews on design consulting firms and books published in Japan before June 2018, 14 large operating companies and nine design consulting firms, which are well known for DT, were extracted. A company in Japan with more than 300 million JPY in capital and employing a minimum of 300 employees is defined as a large company in Japanese corporate law. The author sent the questionnaires in Table 1 to the top design thinker in each company. If a recipient thought that the company had a more appropriate person to consult, the author asked to be introduced to that person instead. Results were returned from 12 out of 14 large companies and seven of the nine design consulting firms. A large company sent answers from three practitioners. In total, the author received 22 responses.

3. *Interviewee Selection*

The author selected the interviewees from 22 candidates using the following two parameters: first, the author chose the same number of interviewees in order to discover differences between large companies and design consulting firms. Second, the author selected interviewees in order to reveal characteristics among experts based on their extent of experience with DT. In this paper, we define experts as practitioners with more than 10 years' experience of DT, intermediate practitioners with more than five but less than 10 years' experience of DT, and beginner with less than 5 years' experience with DT.

Table 1: *Questions on the questionnaire.*

Question	Options
Q1. What is your expertise? If you have multiple areas of expertise, please provide the main one.	**A.** Design **B.** Engineering **C.** Accounting **D.** Marketing **E.** Consulting **F.** Other
Q2. How many years have you been engaged in the area of expertise (in Q1)?	_____ years
Q3. Do you use Design Thinking in your work or have you used it?	**A.** I've used it (go to Q4) **B.** I had used it (go to Q4) **C.** I've never used it (go to Q6)
Q4. (For those who answered A or B in Q3) For how many years have you used or did you use Design Thinking?	_____ years
Q5. (For those who answered A or B in Q3) Could you please select the concrete applications for which you used Design Thinking? You can choose multiple options.	**A.** Client work: product and business development **B.** Client work: human resources and organizational development **C.** In-house work: product and business development **D.** In-house work: human resources and organizational development **E.** Other
Q6. (For those who answered C in Q3) Could you please explain the reason?	
Q7. Is it possible for you to participate in a one-hour interview with payment?	**A.** Yes **B.** It depends on the date and time **C.** No

Table 2: *Attribute information for interviewees who work for design consulting firms.*

ID	Organization	Expertise	Experience
A	*Design firm*	Design (Product)	12 years
B	*Innovation consulting firm*	Consulting	6 years
C	*Design innovation firm*	Design (Information)	10 years
D	*Innovation consulting firm*	Design	10 years
E	*Design consulting firm*	Design	6 years

Table 3: *Attribute information for interviewees who work for large companies.*

ID	Organization	Capital (billion JPY)	Number of employees	Expertise	Experience
F	*C-to-C service provider*	40.1	600	Planning	7 years
G	*Web service provider*	8.7	7,000	Design (Information)	9 years
H	*Home appliance company*	258.7	270,000	Design (Product)	9 years
I	*Electronics company*	114.4	40,000	Consulting	10 years
J	*Imaging and electronics company*	135.3	100,000	Design (Product)	More than 10 years

Tables 2 and 3 show information about the 10 interviewees who granted the author permission for an interview. Some respondents have experience with both types of organizations: Interviewee D has experience related to large companies because he/she has worked for a global consumer products company and a global home electronics company. Interviewee H is in charge of in-house consulting in the large company, and Interviewee I is in charge of consulting both outside (70%) and inside (30%) the electronics company for which he/she works. These three interviewees, therefore, have opinions formed by working in both types of organizations.

4. *Interview Design*

The questions for the semi-structured interviews described in Table 4 were developed based on the literature review. First, this paper focuses on intelligibility on DT in order to find out how practitioners understand the definition of DT described in the literature review and who has the strongest influence on them. Second, this paper focuses on evolvability of DT in order to reveal whether each organization merely imported the specific design tools, methods and frameworks mentioned in the literature review or whether they developed original tools, methods and frameworks based on DT. Third, this paper focuses on case studies on DT in order to discover what kind of approaches large companies or design consulting firms adopted and in what kind of cases they succeeded or failed.

5. *Interviewee Process*

Face-to-face interviews were held with all interviewees except for H and J. They were at remote locations, so their interviews were conducted via Skype. The average interview duration was approximately 40–70 minutes; the interviews were transcribed using recorded audio data.

Table 4: *Excerpt from questions for semi-structured interview.*

Category	Questions
Definition	**1.** How do you define Design Thinking? **2.** What books or research papers influenced you? **3.** If your definition of Design Thinking is original, what kinds of theories influence you?
Tools, methods, frameworks	**4.** What kind of tools or methods do you use? **5.** If you have original tools or methods, please explain them.
Case study	**6.** For what kind of project do you use or did you use Design Thinking, such as for a client or in-house project, or for a product, business or organization? **7.** What kind of difficulties or issues do you or did you have when you use or used design thinking in the projects? **8.** Do you have any successful case studies using Design Thinking? **9.** What elements do you think made them successful? **10.** Do you have any unsuccessful case studies using Design Thinking? **11.** Why do you think that the cases failed?

Results

The author analyzed text data obtained from 10 interviews in order to clarify RQ1; This paper applied M-GTA (Nagayama & Hasegawa, 2014) to generate hypotheses as an analysis method. M-GTA is a method that extracts similar comments as variations and then weaves concepts based on common meanings. After transcribing the text data, variations were extracted in case that more than two similar comments were found, and were conceptualized. As a result of this analysis, five concepts were derived as key findings, as presented below.

Adoption of User Observation and User Study

Four interviewees from large companies commented on 'adoption of user observation and user study' out of the DT process (Table 5). They typically do not use or develop original tools for improving the existing business or developing new businesses. This is because of the difficulty of adopting a new approach. In the later phases of the development process, the impact can be more visible and significant. On the other hand, the influence is less visible in earlier phases. This difference caused the respondents to increase their motivation to use these tools and methods. The operational companies have a purpose in developing new products or refining existing products. As there is no motivation to develop new methods, tools and frameworks, they use only existing tools and methods.

Table 5: *Variations involving adoption of user observation and user study.*

Interviewee	Variation
F	Recently, it has become common to conduct qualitative research on users, to identify issues based on the research and solve them.
G	After our company adopted the slogan *User first*, the mindset to ask users was widely penetrated; now, 80% of sections answer that almost every service is doing something related to user study.
J	I write up questions for interviews and get user feedback on each question. For example, we have support centers. Customers usually call this center when they have an issue. I sometimes go there and ask the staff what kind of problems the customers have.
H	We try to develop many products not for consumers, so we have to do fieldwork. In my case, I usually visit stores or airports' back room a few times per month.

Development and Usage of Original Tools and Methods

Six interviewees, one from in-house consultants at a large company and five from design consulting firms, commented about *development and usage of original tools and methods* in their business, rather than tools and methods originating in DT (Table 6). The reason for this is that design consulting firms are expected to offer original tools, methods and frameworks from their clients, and each firm can deliver their own business values for such needs. Once they receive a huge fee from their clients, they try to take on a variety of considerations to convince their client: project management from team building, smooth communication and involvement of staff and executive levels, rather than logical background data and attractive proposals.

Table 6: *Variations involving development and usage of original tools and methods.*

Interviewee	Variation
A	We have several original workshop programs. For example, we have a workshop about shapes. It begins by deconstructing or disassembling objects, and extracting any codes on an object, such as a button. The participants list any meaning of each code, and rethink its shape as an assembly of meanings. Next, they reveal wider objectives for why the object has these meanings and the relationship with what kind of involvement designed this shape.
B	We use methodology to predict the future. We think about future societies as abstract concepts by scanning or combining qualitative news in the societies.

C	Although we usually imagine a User Journey Map, a Customer Journey Map or another framework as a tool, I call for a softer and detailed fragment of communication like magic *Micro Tool*. I love creating these kinds of tools. For example, Onion Peel is a micro tool to share embarrassing stories with clients.
D	I definitely share a vision with my client at the beginning of a project. First, we start to write what kind of situation we want to create within one to three years, and make a story in chronological order.
E	We designed an original framework called *Service Design Sprint*, which offers several workshops that conduct surveys together with clients for four or six weeks and involve clients and end users thinking together.
I	Once a project is contracted, our service designer develops a project determining what kinds of steps this project should have or how we proceed on this project, according to the client's requirements. In this case, they select several methods and combine them and finally offer the final plan.

Emphasis on the Sharing of Feelings About Participation

Three interviewees from consulting firms commented on *emphasis on the sharing of feelings about participation* (Table 7). This means that it is possible not only to increase the units as a team but also to steer the projects successfully by adopting a variety of tools and methods to create a feeling of participation. This is strongly connected to sociocultural decision-making processes in Japan. Japanese society has emphasized council systems throughout its history. Based on this background, council systems are implicitly at work in organizations' decision-making processes, including product development processes that include DT. It is quite difficult to modify this kind of culture within a short time; it is therefore preferable to design tools and design processes that allow users to share feelings about participation.

Table 7: *Variations involving emphasis on the sharing of feelings about participation.*

Interviewee	Variation
B	In the case of the projects where we conducted interviews or field observation with the clients, I felt the projects went well. On the other hand, in the case of the projects that we did completely by ourselves, the results were vice versa.
C	At first, when we start a project with multiple members, we talk about stories inside the business. We feel somewhat biased that a person with a loud voice is easily accepted. I think that it's not so bad, but in many cases people with a quiet voice are the majority. I welcome which direction the project is to go, but I strongly believe that we should avoid situations where the facts are not visualized.
E	When we are doing Service Design Sprint, it's really hard to involve every participant in every session. If the people who couldn't participate in a session where important ideas came out and they couldn't share the passions or atmosphere at that situation, they feel a little isolated.

Non-Affinity with Existing Development Processes

Four interviewees from large companies and design consulting firms commented about 'non-affinity with existing development processes (Table 8). This does not mean a full package of DT, and engineers in the existing product sections are resistant to only user observation and user study. This is linked to organizational structures in Japan. Operational companies in Japan have the mindset of working based on deadlines or time restrictions rather than creating more satisfying products, and they are apt to avoid adopting new approaches to established processes. One reason for this avoidance is that most Japanese companies have a vertical organizational system that matches the Waterfall development process; indeed, when they were accidentally successful in the 1980s and 1990s, they adopted the waterfall development process for effectuating innovative change. Given that it is very difficult to embed DT into existing development processes, the first thing to do is to adopt it for new product development processes which have no complex organizational and human issues. After some success, it is preferable to embed DT into existing fields.

Table 8: *Variations involving non-affinity with existing development processes.*

Interviewee	Variation
D	When a project has a waterfall product development cycle and suddenly tries to adopt an agile approach, it can be explained easily and logically that the project doesn't work well. They have to hand over their outputs to the next phase by a specific date. Even if we met those who are under pressure and told them to work freely, we have faced several situations that they said, *What are you saying? Do you want to try instead of us!?* in the actual business.
H	In the case of product development, the schedule is fixed, so it's difficult to spend much time in the first part of the design process. The difficult point in the actual project is that it's impossible to do leisurely tasks. In fact, DT has many methods to find customers' issues, but I feel it is painstaking to do them.
F	We feel that social trends are changing every three months, and it's really hard to catch up. Our board members really understand this, so they rarely develop a long-term plan, and they think this mindset fits our business. Based on this approach, it's impossible to prepare user research for a month.
G	Sometimes we are told that it takes too much time, but I have always told them that we need to change the mindset that we will do as much as we can with a limited schedule, such two weeks or one month. For example, we have many patterns to do a user study.

Necessity of a Mindset and Organizational Structure

Four interviewees from large companies and design consulting firms commented on *necessity of a mindset and organizational structure* (Table 9). Without constructing a mindset that requires DT, or even an organizational structure to realize it, it means that it is impossible even to incorporate new methods rather than realization of innovation.

Table 9: *Variations involving the necessity of a mindset and organizational structure.*

Interviewee	Variation
C	When you create a new business, it's important to listen to users' voices, but the more indispensable point is passion and a strong passion to tackle projects. If you don't consider this mindset, half of the effectiveness on DT will be lost.
F	So, I think it is more important to design organizational structure. If it isn't designed yet, we usually say that DT or UX has no meaning.
I	In cases where projects didn't go well, they proceeded with a generous number of members. Also, when the participants' mindset didn't change or they felt that this was just job training, the projects definitely didn't succeed. On the other hand, in case where the project was successful, they had a strong passion, including at executive levels.
J	It was because we couldn't arrange the actors to drive the project and no one tried to lead it.

Discussion

This section discusses approaches to adapt DT in large companies based on the five concepts extracted in Section four in order to reveal RQ2. As these five concepts are connected to variations from experts and intermediates who work for the large companies and design consulting firms in Japan, these approaches can be effective – especially in large manufacturing and IT companies.

First, it should be necessary to prepare a mindset that favors adopting DT, at a management level as well as among employees and throughout the organizational structure. This approach is based on the fact that practitioners in both large companies and design consulting firms have indicated that they need to prepare a mindset and organizational structure where they can conduct DT processes. The five approaches proposed by Rauth et al. (2014) can work as a solution to achieve this approach.

Next, large companies should apply DT to new businesses when they adopt it in their companies. This approach is based on the concept that interviewees from both the large companies and the design consulting firms pointed out the non-affinity of DT with existing development processes.

When large companies adapt DT to new business with help from design consulting firms, the possibilities of adopting DT can be improved – not by modifying the DT process directly, but by customizing it for each company. This approach is based on the idea that design consulting firms primarily develop and utilize original tools and methods. When delivering original tools and methods, the possibilities that a DT project in large companies works well can increase by adopting tools and methods to emphasize sharing feelings about participation. This approach is based on the concept that it is mainly design consulting firms that emphasize sharing of feelings about participation.

On the other hand, when large companies adapt DT to their existing business, it is preferable to start with user observation and user study which can be adapted a bit more easily than other tools and methods and the outcome of which can be easily recognized; then expand the areas of application. This approach is based on the concept that it is mainly large companies that have adopted user observation and user study.

It is not only DT, but also other design processes that include a variety of tools and methods in each step. It is difficult for practitioners to understand them while working on other projects. Furthermore, it will create chaos in the companies if the whole design process rapidly and radically changes. Considering these issues, it is more practical to only adopt specific tools and methods when large companies newly apply DT to existing businesses.

Superiority which large companies have —but which design consulting firms don't have— exists in touchpoints with their customers and users. The firms can invite customers/users to conduct interviews directly and then develop a hypothesis by analyzing the comments thereby sent —e.g., via contact forms on their website or at support centers. First, they should adopt user observation and user study at their points of contact with customers; then, based on the outcomes, they should expand the areas of application or adopt other tools and methods.

Conclusion

This paper investigated the approaches used by large Japanese companies to adopt DT by comparing patterns by themselves or with support by design consulting firms. The author administered questionnaires, selected 10 DT experts who work for large operating companies and design consulting firms and then conducted interviews. As a result of M-GTA-based textual analysis of the answers, as obtained through the interviews, five concepts as key findings toward RQ1 were extracted. About RQ1, *development and usage of original tools and method* and *emphasis on the sharing of feelings about participation* were extracted from design consulting firms. Also, *adoption of user observation and user study* were extracted from large companies. Furthermore, *necessity of a mindset and organizational structure* and *non-affinity with existing development processes* were common in both.

About RQ2, first, it should be necessary to prepare a mindset that favors adopting DT, at a management level as well as among employees and throughout the organizational structure; next, large companies should apply DT to new businesses when they adopt it in their companies and the possibilities of adopting DT can be improved – not by modifying the DT process directly, but by customizing it for each company. When delivering original tools and methods, the possibilities that a DT project in large companies works well can increase by adopting tools and methods to emphasize sharing feelings about participation. On the other hand, when large companies adapt DT to their existing business, it is preferable to start with user observation and user study, and then expand the areas of application. In future studies, the author will reveal how large companies in other Asian countries, e.g., Taiwan, South Korea, Singapore, Thailand and etc. use DT. With these data, the author can reveal the manner in which such firms have adopted DT while simultaneously revealing each feature distinguishing large companies and design consulting firms in Asia.

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