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A Study on the Case of Design Thinking with Fusion System

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Abstract

Unlike in the past, profit-making companies use design thinking to solve their customers' essential needs rather than just solving problems in a conventional way. Design syncing is a creative strategy to solve problems by using designers' senses and methods in the process of design. Design thinking is a new way of thinking for designers to design their own ways and solve problems. In other words, design thinking can solve complex problems in a new and creative way. In order to realize the necessary functions, an aggregation of relevant elements in accordance with the new law can create an innovative design. Additionally, if a convergence system is applied that is organized and regularly functional to accomplish the functions of different kinds, design-thinking outcomes can make the necessary functions more specific. Through our research, we would like to explore the differential features of design and discuss the direction of design for consumer needs through a case analysis of design thinking with creative convergence system. We would like to propose competitive design product development and creative design thinking through case analysis such as products and systems with design thinking applied. We hope that this research will help businesses and individuals who make design thinking a problem.

Keywords: *Design Thinking, Convergence System, Fusion System, Creative Thinking*

1. Introduction

If the existing business solutions were logical, the current and upcoming future "design thinking" methodology is important. Design is the core capability of a company, and design thinking is a way of thinking about users first. In the era of global competition, it is a time when "design for human beings" is desperately needed to emphasize "creative innovation" and consider "emotion" rather than "reason." Design thinking of creative strategies that utilize designers' senses and methods in the process of design is a future-oriented integrated approach. As interest in design thinking has already increased mainly in the U.S., research on design thinking has begun to be actively conducted [1]. Design Thinking is a creative problem-solving method that balances intuitive thinking and analytical thinking, and it is also being used in various fields other than design [2]. In this study, we analyze the theoretical background of design thinking and the case in which design thinking is applied. Based on the research, we found that there are various design thinking cases from integrated

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thinking and that creative design thinking cases are highly evaluated. The purpose of the study is to find various design thinking products that will be developed in the future and to expand design thinking.

2. Main text

2.1 Definition of Design Thinking

Design Thinking is drawing attention as a process that can foster the 'creative problem solving' needed in the era of the Fourth Industrial Revolution [3]. Design thinking using creative designer's senses and methods is a practical and creative solution to a problem, and problem-driven thinking. Design thinking is aimed at solving complex problems and proposing innovative solutions based on a user-centered perspective (Buchanan, 1992; Rittel, 1972) [4]. Design thinking based on design learning and methods was designed in the 1990s by design consulting firm IDEO (Kelley & Littman, 2001) [5], and presented a process for solving problems with an innovative human-centered approach.

The design thinking process for <Figure 1> was proposed by Tim Brown, founder of the design company IDEO in 2008 and took place from a user-centered perspective, from brainstorming to observation to prototyping. Three areas for solving problems are divided into inspiration, ideation, and implementation, which are organically linked and connected to each other. Design thinking, claimed by Tim Brown of IDEO, is a training method that uses designer sensitivity and methods to meet people's needs for technically feasible and transform viable business strategies into customer value and market opportunities [6]. Human-centered design thinking is about putting people at the center of all processes and implementing them from the source was Brown in 2008. Creative designers present optimal solutions based on human-centered experiences is shown in Figure 1.

Figure 1. IDEO design thinking process

2.2 Integrated Design Thinking

Design thinking comes from integrated thinking, where designers design something. Integrative thinking is to include both conflicting ideas and create new ideas than each. In other words, it is a way to use both conflicting ideas and conflicting conditions to find new solutions. As shown in Figure 2, Roger Martin, who presented design thinking and integrated thinking theory, suggested that design thinking is not one of intuitive thinking or analytical thinking, but rather an integrated approach to these two [7]. The source was Roger Martin in 2018.

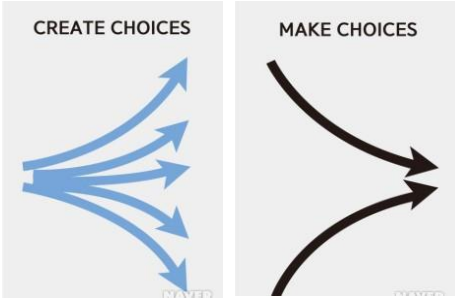


Figure 2. Diverge and converge

3. Design Thinking Cases

3.1 Clean Team Project in Ghana

Design thinking understands and observes users and discovers problems. It is a creative strategy that draws innovative ideas through the process of spreading and converging ideas, and utilizes designers' senses and methods in the process of implementing them and supplementing problems. In addition, the practical purpose could be emphasized more if a convergence system, in which different kinds of things merge into one and are organized and regularly functional to fulfill their functions, is applied. It is important to incorporate relevant elements in accordance with certain laws to realize the necessary functions.

To address the poor hygiene system of the Ghanaians, Unilever and Water and Sanitation for the Urban Poor (WSUP) and the Clean Team project were carried out. It introduced a cyclical system that collects excrement in one place through a toilet that can be easily installed inside the house and converts it into electricity and fertilizer in the village, making life clean for the people of Ghana. It also created jobs for locals. Consumer-centered design presentation has resulted in better results, and from this perspective, the design thinking process can be used in various fields, including business models is shown in Figure 3. The source was Roger Martin in 2018.

Figure 3. Diverge and converge

3.2 Aquaduct from IDEO

Developed in 2008 by IDEO Design Team, the mobile water purifier bicycle Aquaduct is a pedal-driven concept vehicle that carries, filters, and stores water for developing countries. Two things can be solved: drinking water pollution and transportation problems. Aquaduct roads are designed to disinfect and transport water, which can save many lives. Shows that when the rider presses the pedal, the pump attached to the pedal crank draws water from a large holding tank through a carbon filter to a smaller, cleaner tank. The clutch engages or disengages the drive belt from the pedal crank, allowing the rider to filter water while driving or when stationary. Clean tanks are closed for removable, pollution-free household storage and use. Aquaducts with proper purification technology and innovative means of transportation are examples of design thinking made with convergence systems that can improve life in developing countries is shown in Figure 4.

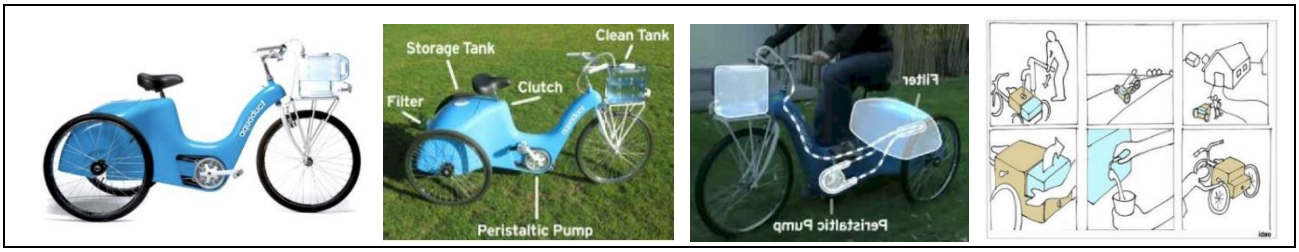


Figure 4. Function of Aquaduct

3.3 IBM Design Thinking

IBM is a representative company that puts final consumers at the center of the design process and applies convergence systems. IBM is using design thinking for a variety of products and services to help consumers reduce costs and offer better solutions. The framework in Figure 5 reflects design thinking and is to go to the site where the users are present and observe it, reflect it as a next step, and synthesize specific solutions from abstract ideas. Here we are using a continuous and constant loop of activity (loop) model for better experience. Observe, Reflect, and Make links are constantly repeated, giving users and consumers confidence. As shown in Figure 5 is a result, the speed of product development has more than doubled and reduced management costs.

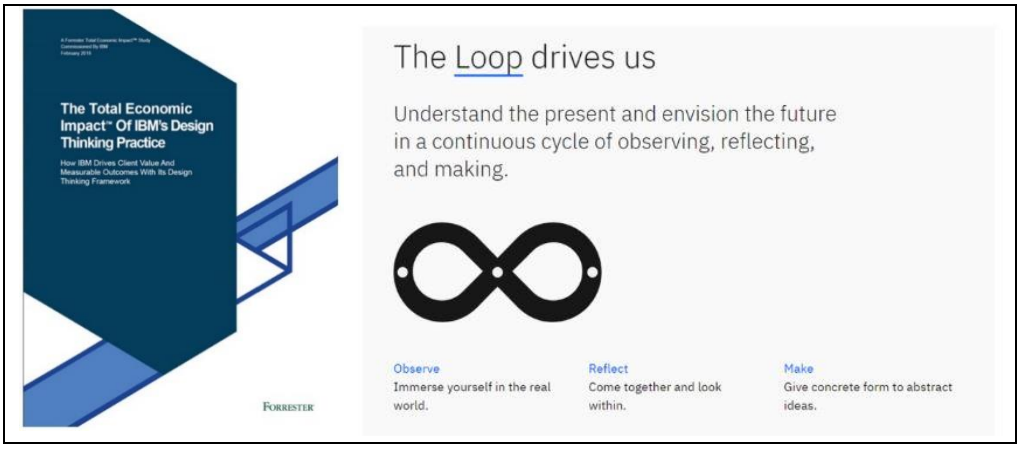


Figure 5. IBM's loop model

3.4 Amazon Dotcom's Internet Bookstore

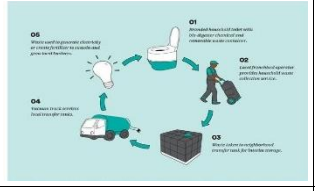
This is an example of Amazon Dotcom's convergence system, which was founded by Jeff Bezos in 1995. In an article saying that the population of the Internet is growing exponentially, he discovered new opportunities and sold books as an Internet bookstore business item. Books that run the world's largest bookstore and are difficult to get at regular bookstores were also available on Amazon Dotcom. Amazon Dotcom grew rapidly to the point of receiving orders from 160 countries around the world and grew by more than 200 percent every year from 1995 to 2000. Since 2000, when the Internet boom began to collapse, the convergence system has been applied as a comprehensive Internet shopping mall that sells not only books but also cosmetics, computers and home appliances as an idea of diversifying businesses. It was a complete success with a successful revenue model for Internet shopping malls is shown in Figure 6.

Figure 6. An internet bookstore run by Amazon DotcoM

4. Formatting Your Paper

Among the design thinking cases, a consumer survey was conducted on Aquaduct, fusion toilet system, hybrid car instrument panel interface, Amazon Dotcom's Internet bookstore, and fingerprint recognition espresso machine. The design evaluation elements are four basic evaluation lists of designs, and the originality, functionality, economic sentiment, and aesthetics were assessed out of seven. The average score was calculated by collecting the scores of 80 office workers and college students living in Seoul. The product with the highest average score was a 6.78 fusion toilet system, a design that consumers want to design and store as a database, and has the characteristics of being stored as energy and used as fertilizer in addition to the existing toilet functions. Design and convergence and examples are highly regarded by consumers for the development of underdeveloped areas. According to the results, Aquaduct maintained high scores with 6.78, Hybrid Car Instrument Panel Interface 6.70, Amazon Dotcom's Internet bookstore 6.78, and Fingerprint Recognition Espresso Machine 6.77. The reason is the freshness of the design applied with the fusion system. Rather than one function, various functions are combined to give synergy effects is shown in Table 1.

Table 1. Evaluation of Design Thinking Cases

NO	Product	O	F	E	B	7p	Design Concept
1		6.6	6.9	6.9	6.7	6.78	Pedal-driven concept bike aqua ducts that carry, filter, and store water for developing countries.
2		6.95	6.92	6.9	6.4	6.79	Converged toilet system created to address the poor sanitation system of the Ghanaians.
3		6.83	6,76	6.62	6.6	6.70	Ford 'Fusion' Hybrid Instrument Panel Interface
4		6.8	6.78	6.82	6.7	6.78	Amazon Dotcom's Internet bookstore founded by Jeff Bezos
5		6.9	6.74	6.7	6.72	6.77	Fingerprint recognition espresso machine that stores users' fingerprints and stores favorite coffee information in the database.

5. Conclusions

Design thinking begins with empathy with future users. Design thinking is an innovation that reflects the direction users want, finds what they need in their lives, and carefully listens, feels, and understands what consumers like and dislike. In addition, better results can be achieved if a converged system that is organized and regularly functioning to bring different kinds together and perform functions is designed with practical purposes. Consumer research on design thinking cases proves this. Design Thinking, a creative strategy that utilizes designers' senses and methods in the process of design, makes human life happier. Designers apply creative and innovative integrated thinking to designs that take into account functionality, aesthetics, economics, and rationality. In a global era where design competitiveness is important, differentiation of design is very important in order to gain an upper hand in design competition in other cultures [8]. Design thinking is technically available, meets people's needs and leads to social problems. Human-centered design thinking, which shows the possibility of improving the quality of our lives, should continue to be developed and stand at the center of our lives. Convergence in various fields such as society, culture, economy, science, and art creates new design thinking. The 21st century needs to be constantly researched and developed for consumers who want a more convenient, more valuable design fusion. So far, this study has identified the importance of design thinking felt by consumers through investigation and evaluation of design thinking and suggests that additional research is needed on the applied products.

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