

User Experience Design in Fujitsu

● Yoshihiro Ueda ● Keita Matsumoto ● Hideo Zempo

A digital revolution is progressing rapidly with advances in big data, IoT, robotics, and artificial intelligence (AI). The key challenge is creating new ideas for leveraging ICT in the best way for a given situation, moving us toward a human-centric society. The next step in ICT design must focus on total development: to understand people, society, and technology, to envision an ideal on the basis of the principles of human behavior and emotion, to consider future experience and a system to achieve it, and to design optimum services and indispensable products as the best total system. To achieve this, we need a methodology for designing visions and experiences for the future. This paper outlines Fujitsu's user experience (UX) design method for designing visions and experiences, with reference to design thinking and human-centered design (HCD), from a historical viewpoint. It then presents Fujitsu's latest UX design framework and methods.

1. Introduction

The domain of ICT design is expanding in step with ongoing advances in technology. While the main design domains up to now have been product design and user interface (UI) design, ICT design is currently expanding into more upstream processes for creating user experiences that include these domains. This field is called "user experience (UX) design."

The term "UX design" can be used in the context of extending usability to include elements such as feelings of empathy and satisfaction. In business, there is an increasing emphasis on the idea that value provided in the future will lie in user experiences above and beyond products and services.¹⁾ Moreover, once a practical set of functions has been implemented and a sufficient level of performance has been achieved, the need may arise for elements that are emotionally engaging beyond the need for utility—the appeal and emotional quality of such elements are sometimes referred to as "UX."

In this way, the concept of UX differs in accordance with the user of the product or service and the context of its use, so the definition of UX can take on various forms. "Design thinking," which has been attracting attention in recent years, provides a methodology and

mindset for UX design. It is characterized by fieldwork that emphasizes direct contact with users, problem discovery based on empathy with users, inspiration driven by a vision of the future, and evaluation and verification through early-stage construction of mockups.

Design thinking is based on the concept of human-centered design (HCD) and the idea of co-creation in which products and services are developed together with customers. It was popularized with the issue of international standard ISO 13407:1999 targeting HCD processes for interactive systems (revised by ISO 9241-210:2010).²⁾ It is a design methodology that places importance on understanding usage conditions in the initial stages of development, on user participation in the design process, and on feedback obtained through an iterative process of design and evaluation.

In today's world of rapid change reflected by globalization and the digital transformation, of more fundamental importance than "What should we make?" and "How should we make it?" are the questions "For what purpose are we making it?" and "What does it mean to people and society?" These questions are driven not only by profit, efficiency, and convenience factors but also by social and ethical considerations that are beginning to take on increasing importance.

By using such questioning as a starting point, they can be used as a starting point for contributing to a better future by creating UX with value and providing it to society.

2. Establishment of UX design platform at Fujitsu

At Fujitsu, we have established a platform for creating new types of value-added experiences for users by applying HCD along with a deep understanding of human characteristics and behavioral principles. This section outlines the historical development of HCD as a UX design platform.

1) Establishment of ergonomic design and GUI design

The spread of information systems and the expansion of usage scenarios since the 1980s has promoted ergonomic design that emphasizes human factors. This period saw the establishment of “ergonomic design,” which takes into account physical characteristics related to the human body, vision, hearing, etc. In hardware design, for example, ergonomic design has resulted in display screens that are easy to view, keyboards that have good tactile response, and mouse devices that are easy to hold and operate. In software design, this period saw the practical application of “graphical user interface (GUI) design” for enhancing understandability in line with human cognitive characteristics, as in the ordering and arranging of information in an easy-to-understand manner, the design of mistake-proof input forms, and the design of easy-to-search menu systems. Together with GUI design, this period also saw the establishment of UI development techniques and evaluation methods.

2) Pursuit of universal design and establishment of inclusive HCD

The further spread of information systems starting in the second half of the 1990s led to a “digital divide,” a social issue yet to be resolved. It became necessary to pursue universal design that aims to enable anyone to use information systems including physically challenged users, the elderly, and beginners. This need led to the establishment of “inclusive HCD” processes and methods that treat users with diverse characteristics in a unified manner in development projects. Inclusive HCD includes such work as researching the characteristics of physically challenged users and the preparation

of in-house guidelines on universal design.

Two key examples of implementing inclusive HCD are improved accessibility to public information devices such as ATMs and to websites and improved usability of mobile phones and smartphones for the elderly. As a result, a variety of products and services applying universal design developed, and design activities that contribute to business while promoting social diversity.

3) Advancement of ubiquitous computing and establishment of vision-oriented HCD

By the early 2000s, the Internet, personal computers, and mobile phones had spread throughout society, and the concept of ubiquitous computing had come into focus. In contrast to the time when ICT was centered about mainframe computers, it became dispersed throughout society. A world in which information can be exchanged “anytime, anywhere, and by anyone” had become a reality, and the ICT paradigm had undergone a major shift.

For this reason, instead of a focus on products and services from an ICT perspective, design activities were designed with a focus on proposal-type design development that envisions future human activities and considers products and services that would be useful to people in everyday life. This shift in thought led to the practice of “vision-oriented HCD,” which promotes the development of ICT systems and products with an eye toward providing user value starting from a macro perspective, and to the expansion of processes and methods for vision design.³⁾

3. Toward new UX design methodology

The 2010s were marked by the construction of advanced networks and data centers and the dawn of the era of cloud computing providing computing power as a service. These developments were accompanied by the use of big data stored at data centers and the expanded development of ICT services and products that provide new value for work and living. Today, the world of ICT is progressing rapidly, and the wave of digital innovation in such fields as IoT, artificial intelligence (AI), and robotics shows no signs of stopping.

Fujitsu publishes the Technology and Service Vision⁴⁾ every year. Using the visions outlined in the publications as a starting point, we make an effort to understand the customer’s vision and issues through an interactive process and to find the direction to take

together with the customer before developing ICT services and systems. In this regard, where and in what way should ICT be used to create an enriched society that can produce value in a creative and human-centered manner? To envision such a society, the need has arisen for a new methodology.

In considering a new methodology, we felt that the established HCD needed to be enhanced and expanded through processes and methods that could perform the following tasks.⁵⁾

- 1) Processes and methods that can evaluate with actual feeling whether products and services are essential
- 2) Processes and methods that can customize a greater diversity of ideas with the growth in the number of stakeholders in products and services
- 3) Processes and methods that can assess the effect of the products and services on society and communities
- 4) Processes and methods that create a vision as well as serve as a basis for launching a new business

Additionally, we set out to construct processes and methods that could provide answers to the questions “For what purpose are we making it?” and “What does it mean to people and society?” to enable us to create a feeling of empathy with the customer and thereby

help us guide the customer to the vision-to-business stage. We also performed a comparison study on the HCD processes that Fujitsu has so far put into practice while referring to knowledge and know-how of UX design practices compiled by related organizations (Japan Ergonomics Society, IPA, HCD-Net, etc.), standards (ISO, JIS), and a variety of publications. As a result of this study, we established the “Human Centric Experience Design (HXD) Framework” consisting of three basic processes (**Figure 1**).

4. HXD Framework and its features

In this section, we introduce the HXD Framework and methods to apply it to Fujitsu’s business areas as well as tools, sites, and other features needed to put it into practice.

1) HXD Framework

The HXD Framework consists of three basic processes and six activities as part of those processes (**Table 1**). Based on the Framework and approach in the software development system,⁶⁾ the HXD Framework is positioned and systematized as a basic frame for putting UX design into practice in a variety of Fujitsu business areas. These processes are not limited to a narrowly defined design domain—they differ from conventional HCD processes and methods by including a wide range of technologies and business verification

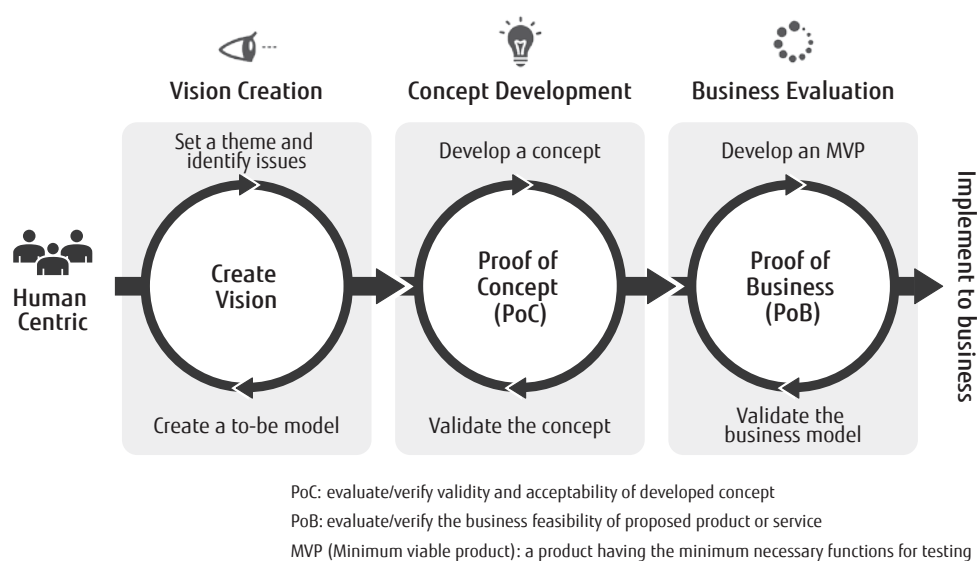


Figure 1
Human Centric Experience Design (HXD) Framework.

Table 1
Human Centric Experience Design (HXD) Framework (activities and main methods).

Process	Activity	Description	Main Methods	
			Conventional	Co-creation
Vision creation	1. Set a theme and identify issues	Build relationships with customer and outside partners and discover issues after clarifying study themes and conducting surveys	• On-site observations • Alm interviews • Various surveys	• Workshops • Open dialogue
	2. Create a to-be model	Clarify focus points such as issues and values as starting points for finding solutions and create a vision	• Persona • Journey maps	• Future sessions • Vision workshops
Concept development	3. Develop a concept	Develop concept for achieving the vision and integrate it in specific ideas and prototypes	• Scenarios • Brainstorming • Paper prototyping	• Ideathon • Hackathon
	4. Validate the concept (PoC)	Share UX based on this concept with concerned parties and verify validity and acceptability of concept	• Usability evaluation • Various surveys	• Storytelling • Service role playing
Business evaluation	5. Develop an MVP	Develop MVP (and all associated services) to test the applicability of proposed concept and ideas to business in targeted fields	• Prototype development • Agile development	
	6. Validate the business model (PoB)	Evaluate and verify business model based on MVP (and all associated services) after clarifying conditions for a successful business	• Service blueprint • Business model canvas • Test marketing	

Alm (Appreciative & Imaginative) interview: An interview method developed by Fujitsu Laboratories for visualizing customer viewpoints

methods for achieving human-centric experiences. In addition, the HXD Framework assumes that processes and activities can be modified as needed in accordance with the purpose, target, and scale of the project.

For example, when promoting a project for the purpose of creating a new business for a customer or undertaking the development of a new service, all three processes will need to be executed. Designer skills will be useful in the vision formulation and concept development process of business verification, on the other hand, will require a management viewpoint and business decision-making skills to develop a minimum viable product (MVP) that reflects the proposed concept and ideas and for analyzing the various factors involved in making the business a reality. Needless to say, executing all of these processes solely within the design department is difficult—it is necessary to proceed in unison with the development department and consulting department as an integrated project team.

At the same time, it is important to sufficiently incorporate user viewpoints in the system development domain as in the case of packaged software and system integration (SI). The focus here is on executing the vision formulation and concept development processes from a new UX viewpoint that includes conventional usability and on extracting and defining requirements on

the basis of an upstream user viewpoint. The business verification process, on the other hand, may be executed as needed in the form of an added-value step.

There are also cases in more upstream domains such as work style revolution that assume no specific products or services. These cases are reflected by such desires as “We would like to think about a new way of working,” “We would like to create a vision for in-house activity 20 years from now,” and “We would like to promote community activities for solving common social problems.” In these cases, vision formulation to establish direction and themes and visualize a vision must be given priority.

2) Co-creation tools

In addition to conventional methods based on HCD, the practice of UX design frequently uses a co-creation approach consisting of workshops that include concerned players, ideathons and hackathons for prototyping, and other activities. The purpose of such methods is to encourage participants to give opinions beyond their usual business roles and to induce a change in mindset as a path toward innovation.

To put this sort of co-creation approach into practice, Fujitsu has developed, tested, and applied a variety of tools to promote communication among participants, to make workshops more efficient, raise

the overall quality of workshops, etc. It has developed, in particular, a self-introduction tool to get workshops off to a smooth start and proprietary card-type tools for brainstorming such as “inspiration cards,” “idea/know-how cards,” and “technology cards” that summarize Fujitsu technologies. These card-type tools have been shown to be effective at sites where participants come together to exchange opinions. New cards can be created at any time depending on the theme covered. Techniques and tools themselves are now being represented in card form, and trials are being conducted on applying them to the UX design process.

Fujitsu is also creating environments that can raise the efficiency and quality of workshops even further by digitizing such tools. Digital tools make it easier to store the know-how accumulated and results obtained at workshops. The use of tools in digitized spaces should also have a variety of beneficial effects such as making it easier for participants to come up with ideas oriented to the future.

3) Co-creation sites

At Fujitsu, sites for putting co-creation into practice are being continuously developed and put into operation. Beginning with the Minato-Mirai Innovation & Future Center managed by Fujitsu FSAS Inc. to foster innovation, a succession of new facilities have opened up such as CO☆PIT at Fujitsu Learning Media Ltd., HAB-YU Platform, FUJITSU Knowledge Integration Base PLY, and FUJITSU Digital Transformation Center (DTC) at Fujitsu, and Mirai DOORS at Fujitsu Social Science Laboratory Ltd. Each of these sites incorporates measures for stimulating conversation and encouraging free expression of ideas such as furniture and fixtures that can be rearranged depending on current objectives and the provision of tools for visualizing and sharing ideas quickly as they come to mind. Digital tools touched upon in 2) Co-creation tools above have been installed and operated at the DTC, where they have been well received by users. Fujitsu also operates “TechShop Japan” as a prototyping site to quickly give form to ideas in the field of Monozukuri (manufacturing). This is one example of how Fujitsu is expanding its efforts in open innovation.

4) Personnel development

In addition to the efforts described in 1) to 3) above, the need for personnel development has grown to put this new approach into practice. To enable

employees to practice co-creation on their own, the Fujitsu Group on the whole has initiated a variety of activities including a co-creation personnel development program and a digital-business personnel development program highlighted by the key term Human Centric Experience Design (HXD).

5. Conclusion

This paper described the UX design methodology at Fujitsu. The application of UX design enables the early discovery of customer value as a source of competitive power and promotes the ongoing development of easy-to-use products and ICT services.

In the years to come, it will become increasingly necessary to envision the form of future UX. At Fujitsu, we aim to further develop the UX design methodology as a means of envisioning an enriched future society that can produce value in a creative, human-centered manner and as an aid to imagining and developing innovative ICT services and systems.

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Yoshihiro Ueda
Fujitsu Design Ltd.
President



Keita Matsumoto
Fujitsu Design Ltd.
Mr. Matsumoto is in charge of improving product usability and quality through ergonomics and promoting the standardization of related technologies.



Hideo Zempo
Fujitsu Design Ltd.
Mr. Zempo is engaged in the development and in-house promotion of a common design platform centered about HCD and UX.