

## Service Design for Creating Attractive Services, and Trends in Design Thinking

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### Abstract

Terms such as service design and design thinking are receiving a lot of attention as methodologies for producing attractive services, and the NTT Group is tackling this issue from various perspectives. This article introduces these initiatives, first discussing what design is, then describing how service design and design thinking fit within current design trends. Finally, it introduces three key concepts on which NTT Service Evolution Laboratories places particular focus: human-centered design, user experience design, and participatory design

*Keywords: service design, design thinking, user experience design*

### 1. Introduction

The concept of design is attracting attention in various fields. Upon hearing the word *design*, one tends to think of something stylish or cool, but that is only part of it. *Design* derives from the Latin word *designare*, meaning to express (de-) a sign or symbol (sign), or to encode a person's acts. In other words, design is the process of producing a concrete form creatively expressing people's productive activities. There are many ways to define design, but we have adopted the following definition (**Fig. 1**).

*Design is a process of adapting products and systems so that resources meet human needs and wants and solving problems by working creatively and iteratively within various societal, economic, and other constraints.*

In other words, in most of our productive activities, we are actually carrying out design. However, there are various constraints in implementing excellent products and services, and the solution for them is not unique. It is also extremely difficult to achieve an excellent solution in just one try. For these reasons, it is very important to iterate design, creating something and repeating the process, in order to gradually reach a concrete solution. The object of design usu-

ally begins with some necessities in daily life, develops into a product or service, and then expands through society, involving cities, the environment, and energy. Of course, information and communication technology (ICT) is also a product of design. Terminals, applications, and also networks, clouds, security, and other aspects have points of contact with people, so design can be said to apply to them too (**Fig. 2**). The NTT Group is addressing this broad domain. These Feature Articles introduce design initiatives to produce excellent ICT services within the NTT Group. This article discusses design trends as an introduction to this topic.

### 2. From modern design to service design

Formerly, design was closely tied to complex social systems such as those related to class or occupation. Where one lived, what one wore, what one used every day, and other factors were determined by the class to which one belonged. These ties were broken by modern revolutions such as the French Revolution, the Industrial Revolution, and the Meiji Restoration. Then, starting in the latter half of the 19th century, new designs signifying new social systems, life styles, and living environments began to appear.

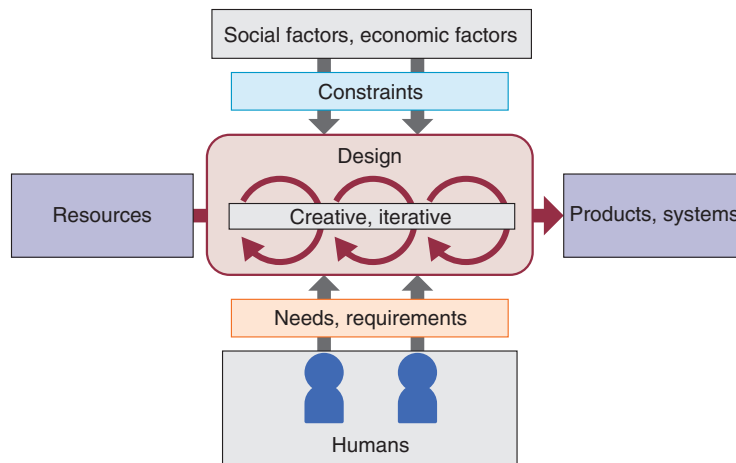


Fig. 1. What is design?

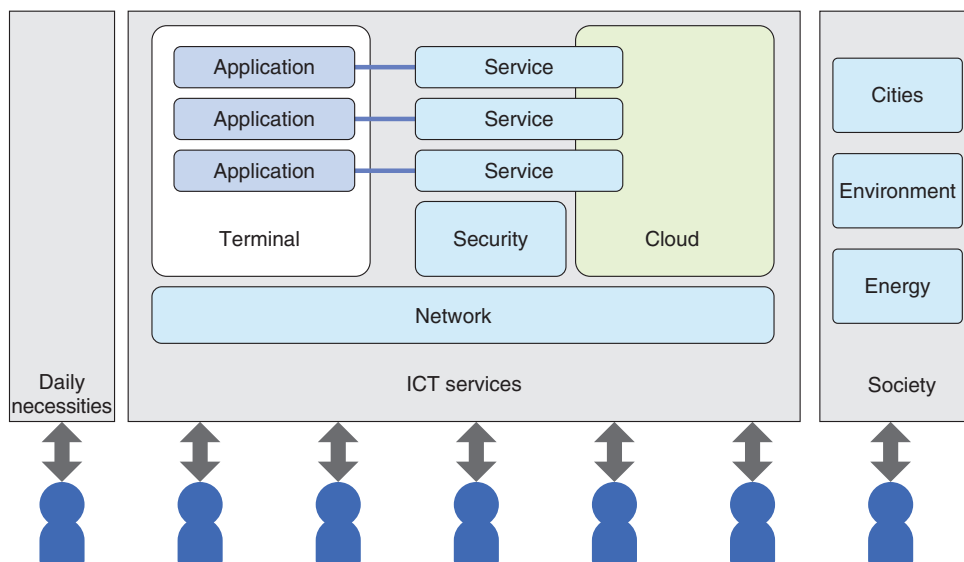


Fig. 2. Major design domains.

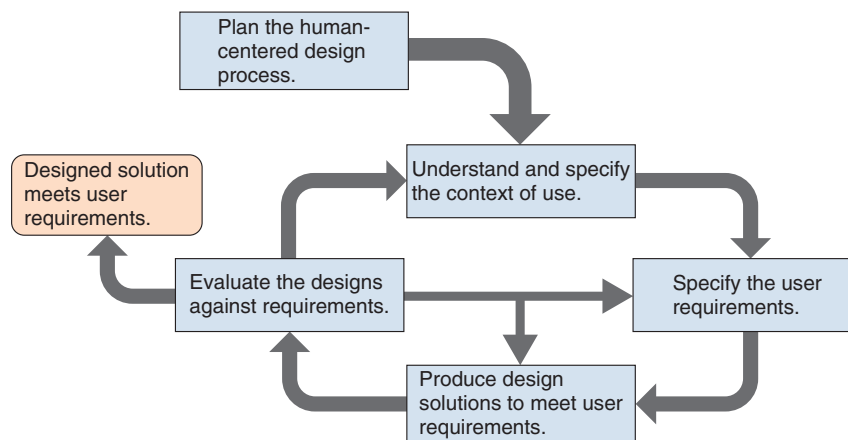
These are in the category referred to as modern design [1].

The new social systems are closely connected to market economies. Initially, manufacturing was basically handcrafted, but soon, the age of mass production began, bringing homogeneous, low-cost products. This enabled enterprises to use design to generate large profits. For example, design took a significant role in the field of automobiles. Henry Ford produced the Model T—a low-priced, highly reliable automobile—in 1908, generating explosive sales, and

General Motors attempted to segment the market with different models in the 1920s. In the 1980s, design began to have a close connection with ICT. Apple\* is a typical example. As everyone knows, the Apple II, Macintosh, and later the iPhone and iPad have all had a significant impact on people’s lives.

In the 21st century, enterprises generated quite a lot of profit through the design of products, but there was

\* Apple, Apple II, Macintosh, iPhone, and iPad are trademarks or registered trademarks of Apple Inc.



ISO: International Organization for Standardization

Fig. 3. Human-centered design process (from ISO 9241-210:2010).

also much discussion in relation to design through problem solving, innovation, and even management strategy. In addition to products, services also came to be considered as something to be designed. *Design thinking* and *service design* are methodologies that arose in this context. Design thinking is a methodology that uses the basic approach of a designer to develop services, in other words, thinking deeply about the people using the product or service, clarifying the various constraints, and then using an iterative, trial-and-error process to arrive at the best solution. It is a human-centered, iterative method used to create services. As such, it emphasizes prototyping, and services take form while repeatedly being verified. The U.S. design firm IDEO has recently been attracting a lot of attention with its proposal of design as a methodology for innovation. Service design is almost the same approach [2], but this is more common in Europe and is used more broadly than just in private enterprise, for example, in public services as well.

These methodologies focus not only on products and services produced through design, but also on design processes and methodologies. Attention is paid to any new strengths arising from design, which are then incorporated into innovative products and services as part of the process within the enterprise.

Design has also greatly exceeded the economic activity of private enterprises and has become an essential means of finding solutions to urgent issues in society and the environment around the world [3]. As such, efforts are producing excellent, breakthrough solutions that demonstrate a deep under-

standing of the needs and desires of the relevant people and that satisfy the various constraints involved. In Japan, design has not necessarily been applied in finding solutions to such problems, but initiatives are gradually beginning to spread. The importance of design and the range of applications should continue to expand in Japan in the future.

### 3. Different design concepts

Here, we introduce three concepts we emphasize when designing ICT services: human-centered design, user experience design, and participatory design.

#### 3.1 Human-centered design

Human-centered design is a methodology for designing convenient, usable systems, which focuses on the people that will use the service and their needs, and uses knowledge of human engineering and usability [4]. Here, system users are not limited to those directly operating the system but include other stakeholders surrounding it such as managers and owners deciding whether to purchase the system. Designers first gain an understanding of the users of the service and clarify the user characteristics, the conditions under which the service will be used, and the desires of users in those scenarios. Then, ideas on how to satisfy those desires are generated and evaluated as to whether the user desires are really satisfied. It is difficult to achieve an excellent service that truly satisfies the desires of users in one try, so this process is repeated (Fig. 3). Often, thinking about services

begins with a technology or a function, but a major strength of human-centered design is that it always maintains a focus on the people that will use the service. Both design thinking and service design are based on the concept of human-centered design.

### 3.2 User experience design

User experience (UX) design is a methodology for designing attractive services that appeal to users, and it has attracted a great deal of attention in recent years. UX encompasses the behaviors taken by users when using the service, the feelings produced in doing so, and the experiences and memories left afterward. These experiences and memories are formed during the entire process: before, during, and after use. There are various opportunities at points of contact between the user and the service for adding advertising, support, or other features to the service itself. Various usage scenarios can also be considered. They must be considered in an integrated rather than fragmented way when designing the service so that all contact between the user and the service leaves a positive impression on the user.

Deep knowledge of the users is needed to accomplish this. To understand the users, they are interviewed and observed in order to clarify their everyday activities, interests, and values and the environments in which they use the service so that a service integrating all of them can be created. It is important to create a service that has a user interface with a consistent appearance that is carefully and discretely configured, and it is also vital to determine how the users feel when operating the service to ensure that they feel comfortable and content. This requires extra work, but many leading enterprises have adopted it as a way to create attractive services.

### 3.3 Participatory design

Participatory design is the idea of involving the various end users and other stakeholders directly in the design from the initial stages. It has spread around the world from its beginning in Northern Europe. It has recently attracted much attention as a new approach to designing ICT systems, and in particular, applications, infrastructure, and the environments for those using the systems and the environments for people engaged in work using ICT systems. For example, when developing a service, it is helpful to hold workshops with users in the initial stages of service development in order to draw out any latent issues and ideas from users themselves. There are two main points that led to the idea of doing this.

The first is an ethical factor, the idea that users who will be using the product or service have a right to participate in the design. For example, it is considered important for workers who will be working in a particular environment to be able to participate in its design. This idea was introduced into information systems workplaces in the 1970s in Northern Europe and arose from concerns that efficiency was the only thing that mattered, and the value of work and humanitarian concerns were being ignored.

The second point is related to efficiency. The service is used by users, and ultimately, they are the ones that best know themselves. The objective is to more effectively understand users' needs, evaluate usability, and design services by having them participate from the initial stages of the design process. This idea is also emphasized in human-centered design.

These concepts and methodologies are effective for creating attractive and competitive services and also in handling societal issues for which solutions are difficult to find.

## 4. Service design initiatives within the NTT Group

These Feature Articles introduce various initiatives in service design within the NTT Group. In "Concept Tailor: A Tool for Iteratively Designing Service Concepts Using Storyboards" [5], we introduce the Concept Tailor tool developed by NTT Service Evolution Laboratories. This tool supports the process of obtaining user evaluations of and refining a service concept iteratively. Concept Tailor makes iterative design easier, which is important for human-centered design. Note that this laboratory is also engaged in various other research and design initiatives related to service design [6].

In "Evaluation Methods for Service Design" [7], we introduce user evaluation methods for service design in use at NTT Advanced Technologies, including both concepts and practical methods. User evaluation is essential in deciding what is good or bad about a service and for drawing out issues that need to be addressed. The article explains what evaluation methods must be used in line with the objectives at various stages of design.

"Methodology for Creating Attractive Services" [8] introduces various service-design methodologies that NTT IT Corporation is working on and discusses points that must be considered throughout the process of creating and evaluating ideas based on user understanding.

“Training Initiatives for UX Designers” [9] introduces the results of work done by NTT Communications in organizing the skill set, mind set, and design processes for training UX designers. Excellent UX designers are needed to produce excellent services. This initiative is a first step.

Finally, “Initiatives Related to the Creation of New NTT DATA Services” [10] introduces initiatives at NTT DATA to create new services together with corporate customers, centered on and related to service prototyping, which is based on design thinking. Here, design is based on realizing ideas through prototyping and verifying whether they really are good from the customer’s perspective. It is a very important initiative.

## 5. Future prospects

All of the methodologies discussed—design thinking and service design—and the concepts over-viewed—human-centered design, UX design, and participatory design—appeared in the context of modern design efforts in Europe and the United States. However, they do not include views, methodologies, or values from Japan. They are closely related to Western culture and so may not necessarily work well in Japan as-is. Japan boasts a wonderful culture and values, including a hospitality culture as exemplified by the tea ceremony and folk crafts that find the beauty in simple everyday things, as well as an acceptance of diversity as shown by the syncretization of Shinto with Buddhism, and an emphasis on quality as represented in the manufacturing industry. We believe that to compete globally in service design, it will be important to think of new design methodologies and concepts based on such Japanese values. NTT Service Evolution Laboratories will continue to

research and develop service design, establish new design methodologies and values in collaboration with others within and outside the NTT Group, and work to create excellent ICT services.

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