

BASIC RESEARCH ON TRANSITION OF DESIGN DOMAIN AND DESIGN ROLE IN JAPANESE ELECTRIC INDUSTRY -BY THE USE OF "DESIGN DOMAIN MAP"-

Yoji Kitani 1, Keiichiro Kawarabayashi 2, Mikio Yamashita 3, Noboru Koyama 4, Katsuhiko Kushi 1 and Mikio Fujito 1

1 Kyoto Institute of Technology, 2 Shizuoka University of Art & Culture, 3 Villa Tosca DMC Japan Inc, 4 Toyota Motor Cooperation

ABSTRACT:

In the Japanese electrical industry, the first design department was established in a company in 1952. Since then, the function of design in the industry has gradually changed in unique Japanese ways.

However, the design department does not show the changes of design domains with an objective index. Therefore the main subject of this paper is to create an objective index to identify the changing of design domains and roles. In this research, the organizational positioning of "design" in companies is investigated.

First, the changing design domains and roles were studied through interviews and questionnaire surveys on 2 major Japanese electrical companies (Toshiba and Mitsubishi). Secondly, a "Design Domain Map" was created to be used as an objective index of these changes. The transition of design domains was marked on the map. By the use of this map, it was confirmed whether the changes in practice of "design" in companies

could be extracted or not, and then, the chronological changes of the design domains were confirmed and the characteristic pattern was extracted.

As for these results, the “design domain map” as a tool made up on two axes can be used not only for grasping of the changing design domains and roles, but also as an index for positioning of design in future.

1. HISTORICAL BACKGROUND

After the war the Japanese electrical products industry accomplished remarkable development. It has made products such as the so-called three sacred treasures of Japan (refrigerators, washing machines, monochrome television sets) and color television sets, air conditioners as well as IT products, which serve everyday needs. Design has evolved evolution with this development. It was in the first half of the 1950s that “design” came to be regarded as important in earnest among Japanese companies. It was at this time that a specialized “design” section began to be established in many electrical companies. Because products were short after the war for a while, design activities at this early stage mainly served the safety and functional requirements of products. With material abundance growing in the Japanese society, differentiation by appearance through the design of products has become a big theme, and the main duties of “design” have come to concentrate on the styling of products. As digitization advanced from the 80s to the 90s, not only hardware design but also software and interface design have come to be included in design activities, and the abilities needed from a designer keep changing. Furthermore, in present day when “design” is recognized as a brand value, “design” comes to participate in a wide area extending from strategic product development to sales strategies. “Design” now plays an important role in brand strategy development in companies. In this way, “design” practice has been changing continuously.

2. THE PRESENT CONDITIONS

As stated above, the domains related to design have changed greatly over time. Such a changes are confirmed by the changes in the categories of design prizes (Good Design Award) on behalf of Japan beginning in 1957 (cf. tables 1 and 2). Table 1 provides a category classification of design prizes, and table 2 shows the changes of special prizes. Domains such like interaction design, ecology design, communication design and design management that were not seen started to appear.

Year	category													
1984-1993	Recreation hobby / DIY	Audio visual	Daily use products	kitchen / dining table / housework	Furniture / Interior design	Equipment of houses / exterior	office / store	products for education	Medical care / health / welfare machinery	Information equipment	Industrial machine	transport machinery	Public space	
1994-1995	Recreation hobby / DIY	Audio visual	Daily use products	kitchen / dining table / housework	Furniture / Interior design	Equipment of houses / exterior	office / store	products for education	Medical care / health / welfare machinery	Information equipment	Industrial machine	transport machinery	Public space	Facilities
1996	Sports recreation products	Media machinery for families	Daily use products	Housework / kitchen products	Interior design products	prefabricated house / equipment of a house	office / store products	products for education	Medical care / welfare machinery	Information / communication equipment	Industrial facilities / machinery	transport machinery	Facilities / machinery for public space	Facilities
1997	Sports recreation products	Media machinery for families	Daily use products / clothing	Housework / kitchen products	Interior design article	prefabricated houses / equipment of houses	office / store products	products for education	Medical care / welfare machinery	Information / communication equipment	Industrial facilities / machinery	transport machinery	Facilities / machinery for public space	Facilities
1998	Sports leisure	The media for families	Medical care / products	Housework / kitchen	Interior design	house	office / store	Education	Medical care / welfare	Information	Industry	transportation	Public space	Facilities
1999	personal use products			family use products			working use products			social use products			Facilities	theme
	body / sports / hobby	The personal media	Daily use products / furniture / interior design	kitchen / Electrical products for household / The media for families	House equipment / Interior design / furniture / prefabricated house	car	office / store	industrial machine	Computer hardware & software	Education / medical care / public facilities				
2000	personal use products			family use products			working use products			social use products			Architecture and environmental design	New Territory Design
	body / sports / hobby	The personal media	Interior design / furniture	Electrical products for household / The media for families	A house / House equipment	Accessories for car / cars	office / store	Industrial machine / facilities	Medical machinery / computer hardware & software					
2001	A personal use products			A family use products			working use products			Architecture and environmental design			communication design	New Territory Design
	appearance article, daily use products	Sports recreation products	Personal media communication tools	Furniture / kitchen / Daily use products	Household appliance products	Furniture / Lighting / Interior design products	Interior design for house/ exterior facilities	car / car concerned products	Office furniture / machinery / daily use products	Computer for business use / related products	Industrial machine / facilities			
2002	product design										Architecture and environmental design	communication design	New Territory Design	
	24 items										Two items			
2003	product design										Architecture and environmental design	communication design	New Territory Design	
	24 items										Two items			
2004	product design										Architecture and environmental design	communication design	New Territory Design	
	28 items										Four items			

Table 1: Transition of category

A change of a special prize												
year	special prize											
1980-1983	Good design grand prize	Grand prix according to good design section	Long-selling special prize									
1984	Good design grand prize	Grand prix according to good design section	Long-selling special prize	Good design prize for foreign products	Good design product prize for Small and Medium Enterprises							
1985-1989	Good design grand prize	Grand prix according to good design section	Long-selling special prize	Good design prize for foreign products	Good design product prize for Small and Medium Enterprises	Good design welfare article prize						
1990	Good design grand prize	Good design category prize	Long-selling Good design prize	Good design foreign country products prize	Small and Medium Enterprises Prize	Good design welfare article prize	Good design interface prize	Good design scenery prize				
1991-1993	Good design grand prize	Good design category prize	Long-selling Good design prize	Good design foreign country products prize	Small and Medium Enterprises Prize	Good design welfare article prize	Good design interface prize	Good design scenery prize	Chairperson of JIDPO special prize (a design to be kind to the earth)			
1994-1995	Good design grand prize	Good design category prize	Long-selling Good design prize	Good design foreign country products prize	Small and Medium Enterprises Prize	Good design welfare prize	Good design interface prize	Good design scenery prize	Chairperson of JIDPO special prize (a design to be kind to the earth)			
1996	Good design grand prize	Good design Gold prize	Long-selling Good design prize	Good design foreign country products prize	Small and Medium Enterprises Prize	Good design welfare prize	Good design interface prize	Good design scenery prize	Chairperson of JIDPO special prize (a design to be kind to the earth)	Media machinery for families / user instruction		
1997	Good design grand prize	Good design Gold prize	Long-selling Good design prize	Good design foreign country products prize	Small and Medium Enterprises Prize	Universal design Prize	Interaction Design Prize		Ecology design prize			
1998	Good design grand prize	Good design Gold prize	Long-selling Good design prize		Small and Medium Enterprises Prize	Universal design Prize	Interaction Design Prize		Ecology design prize			
1999	Good design grand prize	Good design Gold prize	Long-selling Good design prize		Small and Medium Enterprises Prize	Universal design Prize	Interaction Design Prize	Urban design prize	Ecology design prize			
2000	Good design grand prize	Good design Gold prize	Long-selling Good design prize		Small and Medium Enterprises Prize	Universal design Prize	Interaction Design Prize	Urban design prize	Ecology design prize	Year theme prize (Chairperson of JIDPO)	Design management prize	
2001	Good design grand prize	Good design Gold prize	Long-selling Good design prize		Small and Medium Enterprises Prize	Universal design Prize	Interaction Design Prize		Ecology design prize	Media design prize	Design management prize	
2002-2003	Good design grand prize	Good design Gold prize	Long-selling Good design prize		Small and Medium Enterprises Prize	Universal design Prize	Interaction Design Prize		Ecology design prize	Prize of Chairman of The Japan Chamber of Commerce and Industry		

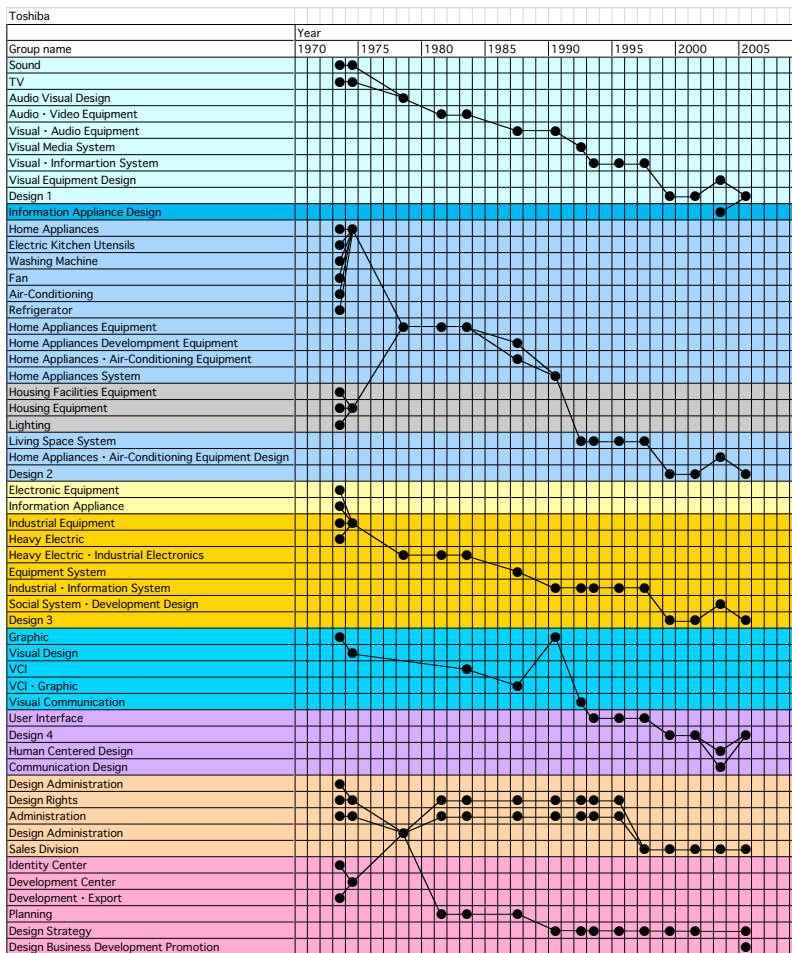
Table 2: Transition of special prize

In addition, the emergence of new design domains in a company is shown by the use of words such as software design, usability design, solution design, human centered design and design management. But each company only grasps such extension of design activities from its original viewpoint, and doesn't confirm it with a common index. In other words, at present there is not a tool for grasping how a design domain spreads concretely. In this study, such a tool is offered. A theme of the 2005 ICSID CONGRESS beginning in 1967 was "The Changing Role and Challenges of Design" and this study takes up a similar contemporary problem, and must help to grasp the change role of design.

3. THE ORGANIZATIONAL TRANSITION OF A DESIGN SECTION IN ELECTRICAL EQUIPMENT INDUSTRY

It is generally said that there is some powers are exercised in design (by designers). Some examples are as follows: the 5 powers of designers: Abilities in hypothesis construction, imagination, visualization, coordination and sensitivity [Takesue(2005) Ability of Designer, "Design Management", Japan]; the 4 powers of design: Differentiator, Integrator, Transformer, Good Business [Brigitte Borja de Mozota(2006) The Four Powers of Design, A Value Model in Design Management, Design Management Review DMI, Boston USA]; the 5 characters of design: Problem Resolution, Creation, Systemization, Coordination, Cultural Contribution [Brigitte Borja de Mozota(2003) Design Management, DMI Allworth press] .

The abilities of Visualization and Creation are needed conventionally, but Problem Resolution and Systemization are needed particularly in more recent years. As the design domains change gradually, design involves a broadening range of abilities.



To grasp this development, the organizational transition of the design section in the electrical industry (Toshiba and Mitsubishi) was investigated, and at the same time " a Design Domain Map" to be used as a tool was built (cf. tables 3 and 4). Investigation was mainly done by interviews and questionnaires to a general manager, some group managers and administration group in both companies. Principal question were as follows. " What ability do you require a designer?" " What standard do you use to judge designs (products)?" " What number of people does belong to each groups in the design section?" And also we were provided documentary materials

Table 3: organizational change of design section (Toshiba)

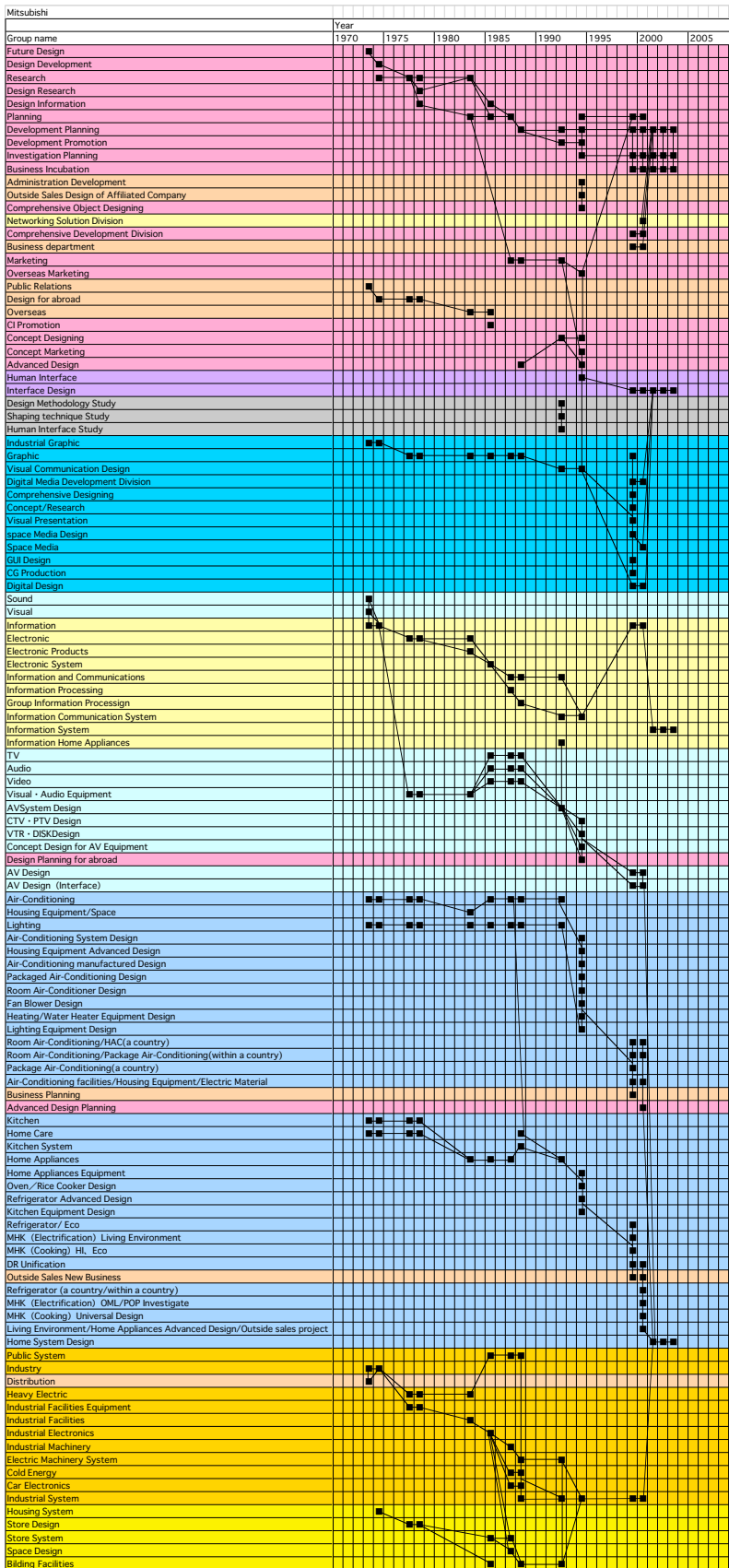


Table 4: organizational change of design section (Mitsubishi)

concerned with organizational transition and transition of design work domains by both companies.

All the group names that have ever existed are listed the first column of the table. The other column each represents a year. A black dot indicates a name was actually used for a group in that year. A black dot at the end of a black line indicates a group name was used to replace an older one, or to name a new group formed by merging older groups. A color scheme is used to shown design domains that are similar. The tables show that, at both Toshiba and Mitsubishi, from the mid-1980s to the mid-1990s, “systematization” became a key term, and in the first half of the 1990s “software design” was used as a keyword. At Toshiba, the positioning of the design section in the organization varies with the times. For example, it has been a part of the engineering division, or the sales division, or the service division. Thus, the meaning of “design” in the organization has been changing. And at Mitsubishi, “human centered design”, “interface of communication” and “concept” were attracted attention in the middle of the 1990s. It is possible that the emergence of these new

concepts was due to the diversification of customers. However, it is not easy to grasp a domain's transition by using such a list to show organizational change. Therefore, we created the "Design Domain Map" as a tool to show visually changes such as the above.

Product design development in the Japanese electrical industry generally passes through "corporate strategy", "planning", "development", "design", "production" and "sales". Extension of design activities is shown in tables 3 and 4 above, but it is necessary to look at specific Japanese electrical manufactures to see how the range of design activities broadened in the product development process concretely (which area of work does fall under the category of design upstream and downstream of the product development process) [Cf. Mitsuo Kawaguchi(2005) "New role of in-house design section in the 21st century", Special issue of Japanese society for the science of design, Japan]. Accordingly, the horizontal axis to express the workflow in the product development process was set. In addition, because the core competences of an electrical manufacturer were still engineering (technology) and business, two domains on the map were set: the upper

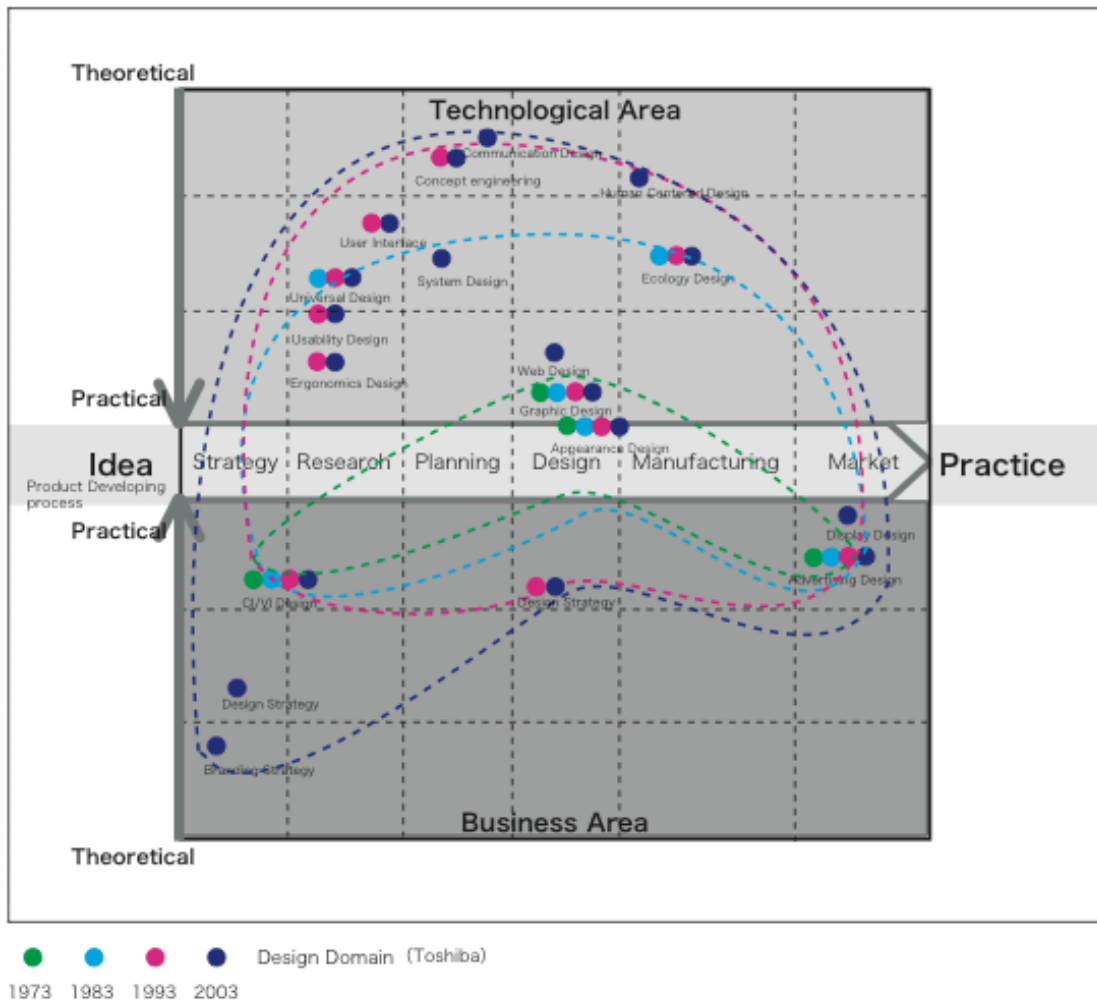


Figure 1: Design Domain Map (Toshiba)



Figure 2: Design Domain Map (Mitsubishi)

part is the technological area and the lower part is the business area. And a vertical axis to indicate the development from “theoretical” to “practical” to in each area was set. Then, the group names of the design section and the substantial design work at Toshiba and Mitsubishi in the 1970s, 1980s, 1990s and 2000s was put onto the map (figures 1 and 2). When putting an entry on the map, an interview with an experienced manager of the Design Center of each company and examination of documents from each company (qualitative data) were involved.

4. CONSIDERATION

Some interesting points were shown and became clear through the "Design Domain Map".

(1) Although a difference in business focus exists to some extent between the two companies, similar developments took place.

(2) In the 1970s, the design activities in these companies concentrated on the so-called handed-down tasks in a part of the product development process. In addition, it is realized that the involvement of design in the business area was small.

(3) As time went by, design activities extended to the upstream and downstream of the product development process (with particularly strong expansion in the upstream areas), and came to play a bigger role in the theoretical part (i.e. the initial stage) of the technological area.

(4) At the same time, the domains with little involvement of "design" became clear, too.

5.CONCLUSION

Concurrent engineering advances in the Japanese electrical industry. This study identified the domains of "design" that have developed in specific companies by using a "Design Domain Map". It may be said that the "Design Domain Map" is effective as a tool to intentionally connect the areas of work (top and bottom right and left) included in the map. In addition, we think that the "Design Domain Map" is an effective tool to find out whether design may develop in the domain where "design" is not practiced at present. The "Design Domain Map" functions as a tool to show design domains visually to facilitate intuitive understanding.

REFERENCES:

Takesue(2005) Ability of Designer, "Design Management", Japan

Brigitte Borja de Mozota(2006) The Four Powers of Design, A Value Model in Design Management, Design Management Review DMI, Boston USA

Brigitte Borja de Mozota(2003) Design Management, DMI Allworth press

Mitsuo Kawaguchi(2005) "New role of in-house design section in the 21st century", Special issue of Japanese society for the science of design, Japan