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

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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.
Table 1: Transition of category

<table>
<thead>
<tr>
<th>Year</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Home appliances</td>
<td>Interior design for families / Daily use products</td>
</tr>
<tr>
<td>2001</td>
<td>Personal use products</td>
<td>Interior design for families / Daily use products</td>
</tr>
<tr>
<td>2002</td>
<td>Product design</td>
<td>Interior design for families / Daily use products</td>
</tr>
<tr>
<td>2003</td>
<td>Architectural design</td>
<td>Interior design for families / Daily use products</td>
</tr>
<tr>
<td>2004</td>
<td>Product design</td>
<td>Interior design for families / Daily use products</td>
</tr>
<tr>
<td>2005</td>
<td>Architectural design</td>
<td>Interior design for families / Daily use products</td>
</tr>
</tbody>
</table>

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


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)
All the group names that have ever existed are listed in 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Toshiba Design</th>
<th>Mitsubishi Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>HVAC Design</td>
<td>HVAC Design</td>
</tr>
<tr>
<td>1985</td>
<td>HVAC Design</td>
<td>HVAC Design</td>
</tr>
<tr>
<td>1990</td>
<td>HVAC Design</td>
<td>HVAC Design</td>
</tr>
<tr>
<td>1995</td>
<td>HVAC Design</td>
<td>HVAC Design</td>
</tr>
</tbody>
</table>

Table 4: organizational change of design section (Mitsubishi)
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

![Design Domain Map (Toshiba)](image-url)

Figure 1: Design Domain Map (Toshiba)
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

