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| タイトル | Strengthening Design in Product Development : The Case of Nissan Motor Company |
| 著者   | 森永, 泰史   |
| 引用   | 北海学園大学経営論集, 4(3): 17-24  |
| 発行日  | 2006-12-00   |

# Strengthening Design in Product Development: The Case of Nissan Motor Company

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The purpose of this paper is to clarify how the structure of a product becomes important to its development organization changes when design management strategy and to point out the differences made by such a change. A Japanese automobile manufacturer is taken as an example of the organization. We also reexamine the meaning of the organizational structure with special emphasis on the existing research, showing clearly why the structure of the present product-development organization differs from that emphasized in existing research.

## I Introduction

Some enterprises have restructured their organizations to position design as a major factor in their management strategy<sup>1)</sup>, but what exactly is the product-development structure which emphasizes design? The purpose of this paper is to clarify how the structure of a product-development organization changes when design becomes important to its becomes management strategy and to point out the differences made by such a change. Nissan Motor Company (hereafter Nissan) is taken as an example of an organization,

that altered its structure to put greater emphasis on design. We also reexamine the meaning of the organizational structure with special emphasis on the existing research, showing clearly why the structure of the present product-development organization differs from that emphasized in existing research.

The existing product-development studies mainly analyse the product-development organization by focusing on quality of manufacturing, speed, and efficiency. In Japan, most automobile manufactures, including Nissan, have employed a "heavyweight" product manager to coordinate among the various sections effectively and to make decisions speedily (Womac et. al, 1990; Clark & Fujimoto, 1991). How does the organizational structure, that supports such capabilities perform in terms of utilizing strategic design? While Japanese companies firmly maintain an advanced manufacturing capability, weaknesses in design strength and brand construction power have been pointed out. Therefore, a change in viewpoint may enable us to suggest insights that have been missing in conventional research and to further advance product-development studies.

## II Case Study<sup>2)</sup>

### 1 Background of an Organizational Reform

For years, Nissan has held the second largest market share in the industry in Japan. However, since the latter half of the 1970s its market share has gradually declined, and since 1991, it has shown deficits 7 times in 8 years. As a result, Nissan received a 585,700 million yen capital injection from Renault, the French automobile company, in May 1999. “Technical Nissan” (Ikari, 1987) is a company highly regarded for technical innovation and reliability. However, weaknesses in cost competitiveness and product strength became a stumbling block. Product strength here refers to areas such as product planning and design. At Nissan the valuation of design was not always high. Its designs were not necessarily individualistic and lacked consistency. Therefore, since July 1999, Nissan has regarded design as an important element in its management strategy and has made a change in its product-development organization<sup>3)</sup>.

### 2 The Structure of a Product-Development Organization, and the Positioning of a Design Section

#### 2.1 The Downside of the Heavyweight Product Manager

Starting in 1987, Nissan's product development gave considerable authority to a product manager. His leadership could be exercised in the realms of concept creation, engineering, and profit planning. without a doubt, the development of new products was furthered under the “heavy-

weight” product manager (Clark & Fujimoto, 1991).

On the one hand, the heavyweight product manager could manage the various sections effectively and make decisions speedily, given his powerful position. But on the other hand, such an organizational structure has three demerits inherent downsides. First, since the product manager has a vague job description, he may be careless and untidy in his work. Particularly, during the 90s, Nissan's scale of product development became so large that it began to be difficult for the product manager to control each functional section. Second, with this conventional organization structure, the product manager has the final responsibility for products, so the question of who should take responsibility for this or that aspect of the work becomes ambiguous. And third, product manager has such a powerful position, he may become despotic.

For the individuality of design, the second pitfall is especially problematical. First, compromise in design development can occur under this conventional organization structure. Because the product manager has final responsibility for the products, the range of each contributors responsibility is ambiguous. In other words, none can be called to account, compromise is likely to occur. At Nissan, before the restructuring, since the engineering, manufacturing, and technical sections were relatively strong, design development was sometimes restricted by engineering demands. As a result, design didn't become individualistic.

Moreover, under such conventional organization structure, task evaluation

becomes so ambiguous that it is likely to cause a sort of psychological dependence in the designers. Since design development is inherently a creative activity, inventiveness is always demanded. But, invention requires risk. So, if the designers evaluate whether the designs are to be creative or not, nobody takes a risk. In other words, under such circumstances design tends to be based on the current trend in the field.

In addition, for consistency of design, the third downside was a problem for consistency of design. Under the heavyweight product manager, each project tends to have its own aims in keeping with the discretionary authority of each product manager, and it is difficult to secure the consistency and unification of designs. Design was often influenced by the product manager's personalite. As a result, the difference, from project to project is quite apparent.

## 2.2 The Move Away from the Heavyweight Product Manager and its Effects

To solve the problems mentioned above, Nissan decided to make a change from the heavyweight product manager organizational structure (Figure.1). Concretely, the authority that used to belong to the heavyweight product manager is now divided among 5 individuals represent each section as follows:

- ① Chief Product Specialist (CPS) is the representative of the product planning section.
- ② Chief Product Designer (CPD) is the representative of the design section..

- ③ Chief Vehicle Engineer (CVE) is the representative of the engineering section,
- ④ Chief Marketing Manager (CMM) is the representative of the marketing section.
- ⑤ Program Director (PD) is the representative of the profit planning section.

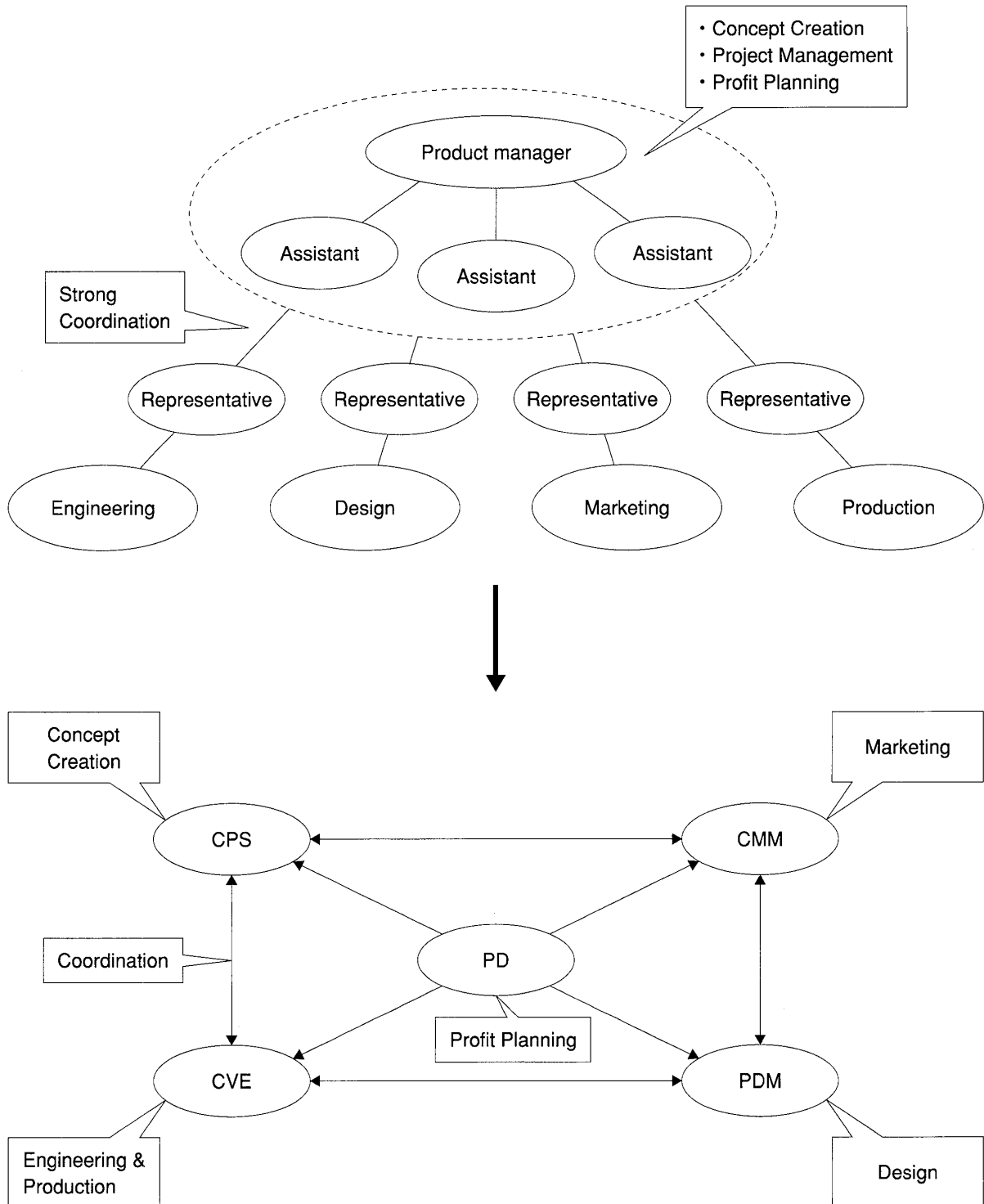
Nissan adopted this new structure, in which these 5 persons' position and rank are equal, and each is empowered to express opinions based on his responsibilities.

As a result, the product manager's task became simpler, and the density for work of each functional section was improved. Also, the product manager's potential tyranny is avoided. Moreover, the range of responsibility for each section is clear. Regarding design development, Nissan has built the system centering on CPD. CPD is the representative of the design section, and he has complete responsibility for design development. Thus, in the present organization the responsibility and authority for design is clarified.

Furthermore, at Nissan each of representatives is obliged to set targets for product development and promise to achieve them. Such promises are called "commitments", and they are negotiated and signed at meetings chaired by the president, Carlos Ghosn. The tendency is to set targets low to avoid risks. However, Nissan targets require approval of the president, so it is difficult to set a low target. Also, the targets are clearly stated in concrete numerical values, so there is no ambiguity as to where they have been achieved.

In this way, the design section's range of responsibility is clear, and compromise and the feeling of psychological depen-

dence are reduced. Moreover, consistent design development becomes possible. Because design development is independent



**Figure.1 Change of Product development organization**

Source: Author's creation based on an interview.

of the control by a product manager, unified communication within the design section as a whole is strengthened.

### 2.3 New Problems

As seen above, as a result of organizational change, Nissan developed a clear responsibility structure for design development and promoted unified communication of design section. However, there are not only merits about this organizational change. Since functional specialization of the design section is promoted in comparison with the conventional one, the present organization structure has a possibility of lacking internal integration. Especially, since design has inherently strong relations with various sections, the cost for adjustment among them is high. And a form will be not attractive if they cannot adjust these sections well. In order to secure the integration nature of the whole organization in Nissan, the three following devices were set up.

#### 2.3.1 Co-operations Strengthened by a Functional Crossing Team

The First device for securing the integration of the whole organization is co-operations strengthened by a functional crossing team.

Mentioned before, in Nissan, each of representatives sets the targets of product development and promise to achieve them. But usually, the development target that each section sets up cannot solve as integration, without each of them sharing their wisdom. Because advanced adjustments are needed in many cases (e. g. target cost versus design quality or design quality

versus target of functions). Therefore, each of them has to cooperate mutually for clearing the target that they committed. 'CFT (Cross Functional Team)' functions in that case. In Nissan, a common problem solution is aimed between some sections, and CFT is set up to promote integration.

For example, when design development starts, about five people constitute a team including members of the products planning section, which makes concept creator first in a roll and then selects designers. Moreover, if they need the required budget to visualize design, CVE, CPS and PCD set up a team and cooperate together.

#### 2.3.2 Introduction of a Gate Management System

The second device to secure internal integration is the introduction of a gate management system. As mentioned before, the authority that used to belong to the product manager is now divided among 5 individuals. But that doesn't mean is no project leader. The present project leader is the actually, CPS because the CPS creates the product concept and is wholly in charge of the competitiveness of the product. For that reason, the CPS needs to be certain that the product concept is understood and carried out by the other members of the project team. He can't direct design work or engineering work directly because unlike heavyweight product manager he doesn't have authority for them. So, there is an apparent gap between the responsibility and authority of the CPS.

Thus, Nissan has introduced a gate

management system to bridge this gap, and the CPS therefore controls the design or engineering section indirectly through the CPD or CVE. At Nissan, some gates are set in the process formally and the CPS evaluates the results after the fact. For example, the CPS can override the CPD in a case where the concept is “friendly”, but the design is proposed with small windows and aggressive design. Moreover, the CPS can override the CVE in a case where a car is running on the test course and the driver feels a roll (an inclination of the body while cornering) or pitching (a gradual shake when running). In such cases, the CPS can tell the CVE not to make that kind of product.

### 2.3.3 Installation of the Project Design Manager

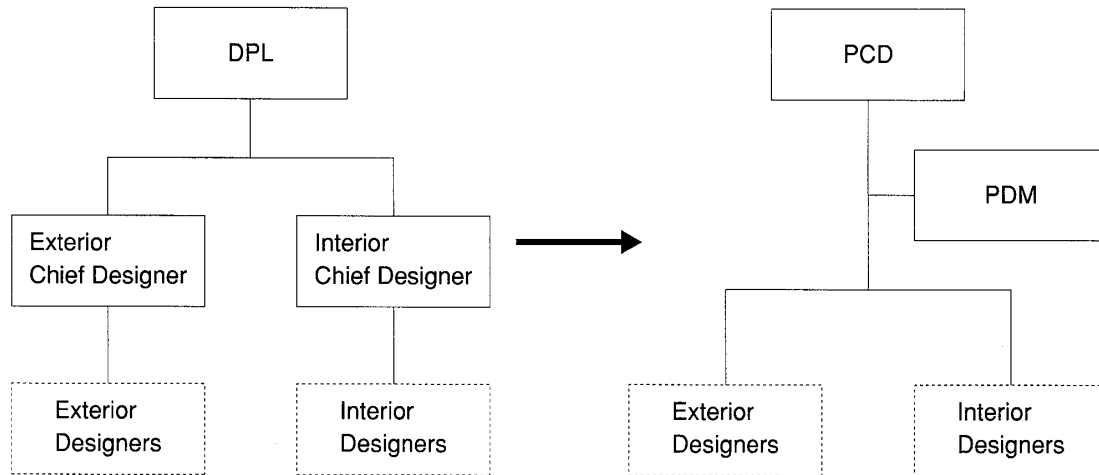
The third device for securing the integration of the whole organization is the establishment of a new position called the project design manager (PDM) within the design team. His duty is to facilitate the adjustments between designers and engineers. In the past, adjustments between them were made under the heavyweight product manager, but the design section is no longer under the control of such a product manager. Therefore, the design section itself must integrate and adjust. Compared with before, the cost of adjustment is therefore increased, and the design section needed a device for reducing the adjustment tasks of each designer and improving the capability for information processing.

Nissan thus established a liaison to reduce these adjustment costs. Previous-

ly, the design section didn't have a liaison to communicate with the engineers, and each of designers negotiated with them directly. But, as the task of making adjustments increased, the designers were potentially overburdened. If negotiations with the engineers become too complicated, the designer can't concentrate on his/her regular work. So, Nissan established the new post of PDM, which guarantees the coordination with the engineers, and reduces exhaustion of the designers. However, the PDM does not prevent the designers from negotiating with engineers spontaneously when preferable.

Moreover to improving the problem solution capability, it was necessary to clarify the range of the responsibility. In the past, Nissan had an exterior chief designer, interior design chief designer, and design project leader (DPL), who were in charge of managing the exterior, the interior design, and development, respectively (Figure.2). They participated in a problem solution team crossing over the various engineering sections. However, in the conventional organization, the range of responsibility between the three position was not always clear, and duplications or oversight of information arose. Thus, the problem solution was not always effectively seen.

In the present organization, the range of responsibility for both the PDM and CPD is classified clearly. The CPD is mainly in charge of the management of design itself and market research. The PDM is mainly in charge of coordination with engineers. In addition to dividing such tasks, the PDM and CPD prevent compromises by committing to their own



**Figure.2 Change of team organization in design development**

Source: Author's creation based on an interview.

achievement goals in advance.

### III Discussion

We would like to review the example of Nissan given above, and to examine the meaning of its organizational structure, particularly the heavyweight product manager structure from the viewpoint of facilitating design strategy. Design was regarded as an import element in Nissan's management strategy, and thus the organizational change was undertaken, and the new organizational structure was built.

The merit of the old organizational structure, as emphasized in the existing researches, was its ability to facilitate efficient product development. When the design section was under control of a heavyweight product manager, the efficient adjustment between sections was possible. For that reason many Japanese companies, including Nissan, have adopted such an organizational structure until now. On the other hand, with the heavyweight product manager structure, the ambiguity

of the range responsibility may cause compromise or a feeling of psychological dependence designers. Moreover, with the organizational structure emphasized in existing research, the manager's discretionary authority for each project becomes large. Therefore, even if the overall strategy and designer's guidelines are agreed upon, once divided into separate project units, it becomes difficult to put strategic instructions into uniform practice.

Therefore, we can state the following findings: there is a limit in the heavyweight product manager structure from the viewpoint of facilitating design strategy, and there is basically trade off relationship between the organizational structure that excels in efficient product development, and the organizational structure that considers design an important priority.

On the other hand, it should be pointed out that with the present structure, there are downsides produced by separating the design section, such as a lack of adjustment or communication between it and the other sections. These, however, were conquered



at Nissan at the same time it made the design section separate from the control of product managers and strengthened control of the design director. Making the design independent leads to the increase of adjustment tasks between the design section and other sections. As a result, it can cut off communication with the other sections, and there is a possibility that the designers' knowledge and abilities will not be reflected in the final products. However, at Nissan, they secure to the integration of all sections by combined target setting from the top down, strengthening collaboration by establishing the CFT, and setting a PDM in the design section, who facilitates negotiation with engineers.

These findings may lead to an opportunity to reconsider the ideas in the existing research, such as "being managed by one leader who has abilities leads to improve the integration" and, "if it is promoted to separate specialties, it will decrease integration". The case of Nissan, where high specialization is consistent with successful integration shows that they need not be the case.

#### IV Conclusion

This paper explored the subject of how the structure of a product-development organization that stresses design has evolved in organizational changes occurring from 1999 to the early 00s, and the reasons why it differs from the organizational structure emphasized in the exist-

ing researches. We also exemplified the meaning of the product-development organization structure emphasized in the existing researches from the perspective of these breakthroughs. However, this paper cannot fully discuss the best structure for utilizing designers effectively and what the particular theory in design management would be.

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- 1) In this paper, design refers industrial design, and design development means activities such as creating the form and color whose produces satisfaction and joy to users, or industrial products which have good appearance.
- 2) The cases in this paper use data from interviews with Nissan conducted by the author and from other materials and magazines articles
- 3) These changes are carried out collaboration with Renault as a part of the "Nissan Revival Plan".