Methodology of dynamic alignment in research and development strategy

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Abstract

In recent years, several companies have faced various types of dilemmas regarding innovation. One such dilemma is that research and development (R&D) achievements alone are insufficient to improve business outcomes. In order to address this dilemma and obtain multiple perspectives on the issues involved, we propose a methodology called the “multi-program platform structure.”

In this study, we extend the parameters of the multi-program platform structure by introducing to it the concept of time passage. With this introduction in mind, we explain that the gap between two R&D programs (one from the customer perspective and the other from the business process perspective) is bridged by the dynamics of R&D activities.

Keywords: multi-program platform structure, orchestration, dynamic alignment, R&D strategy.

1. Introduction

In recent years, several companies have faced dilemmas concerning innovation. One such dilemma is that research and development (R&D) achievements alone are insufficient to improve business outcomes. In order to address this dilemma, discussions from various viewpoints (e.g., marketing and innovation) have been conducted (e.g., “Crossing the Chasm,” “The Innovator’s Dilemma,” and “Reengineering the Corporation” *inter alia*)^(1–3). We believe that a concrete methodology has not yet been presented in these discussions.

To address this dilemma, we propose a “multi-program platform structure” by which to obtain multiple perspectives (i.e., customer perspective, business process perspective, and learning and growth perspective)^(4–6). This

structure is composed of three main elements: super program, program, and projects.

However, this structure was not developed so as to include the concept of time passage. We extend the multi-program platform structure by introducing to it the concept of time passage, as companies are constantly updating their business strategy in accordance with changes in the business environment. Moreover, we explain how the addition of the concept of time passage helps bridge the gap between the two R&D programs discussed (i.e., customer perspective and business process perspective) by dynamic alignment, through R&D activities.

2. Review of our previous research

2.1 Silo structure in companies

Previously, we discussed the application of a multi-program platform structure to companies’ R&D activities.

We considered that R&D projects are not able to perform collaboratively with one another, because the projects operate from different perspectives (i.e., customer perspective, business process perspective, and learning and growth perspective). This is depicted, along with the self-learning objectives in the silo structure, in Fig. 1 (a).

The silo structure begins with the customer satisfaction project. Operating from the customer perspective, the project contains the self-learning objectives of service management, customer experience management (CEM), and customer relationship management (CRM). The second is the business process innovation project. Conducted from the perspective of the business process, this project contains the self-learned objectives of total quality management (TQM), the environmental management system (EMS), and supply chain management (SCM).

Fig. 1. Conversion to Multi-Program Platform Structure in Management Structure.

Fig. 2. Hierarchy Diagram of Multi-Program Platform Structure.

According to the process discussed above, we consider that R&D activities have migrated from short-term research designed for immediate business outcomes (e.g., technology development) to long-term research (e.g., basic research) conducted with overall improvements in future business outcomes in mind. This process developed as the self-learning objectives of each perspective in the silo structure were achieved. In short, it can be thought that R&D has become a long-term mission conducted in corporate laboratories and research departments.

2.2 Multi-program platform structure

To obtain multiple perspectives, we propose the multi-program platform structure illustrated in Fig. 1 (b). This management structure has three layers: super program, programs, and projects, as illustrated in Fig. 2. The detailed elements and roles of each layer of this management structure are as follows.

(1) Super program:

The “Customer value collaborative creation program” has the role of carrying out integrated adjustments to the two R&D programs, to achieve their goals.

(2) Programs:

(a) The “R&D program for customer satisfaction” manages R&D in order to enhance customer satisfaction from the customer perspective.

(b) The “R&D program for business process innovation” manages R&D to increase productivity of the internal business processes, from the business process perspective.

(3) Projects:

(a) The “Customer satisfaction project” carries out activities to enhance customer satisfaction, from the customer perspective.

(b) The “Business process innovation project” carries out activities to increase the productivity of internal business processes, from the business processes perspective.

(c) The “R&D project” conducts activities to create and realize new value.

In particular, we believe the following points of discussion are integral to achieving R&D goals regarding improved business activity. It is important that R&D relating to the customer and business process perspectives be conducted simultaneously, as they contribute to the building of company-wide commonalities. Therefore, two R&D programs that manage R&D for both the customer and business process perspectives have been introduced to achieve this goal.

Furthermore, the concept of the super program was developed to fulfill orchestration between both R&D programs. We introduced the super program because we recognized the necessity of aligning the two R&D programs simultaneously.

Fig. 3. Conceptual Diagram of Dynamic Alignment in an R&D Strategy.

2.3 Summary review of our previous research

To summarize the discussion above, we describe how the self-contained activities in the silo structure have led R&D activities to develop from short-term projects, with the goal of improving the specific business outcomes of long-term advanced research designed to improve foundationally the function of the overall business. In addition, we consider that the self-contained activity of the structure is the difference between business strategy and R&D strategy.

To address this, we introduced the concept of a management structure for R&D through a multi-program platform structure. However, this management structure represents a business at a particular point in time. Therefore, we recognize the need to extend the structure further, by introducing the concept of time passage and applying the structure to companies.

In the following, the concept of time passage is introduced to this structure.

3. Dynamic alignment in R&D strategy

3.1 Dynamic alignment structure

Fig. 3 is a conceptual diagram of a dynamic alignment

structure of the R&D strategy. For the multi-program platform structure, the passage of time is introduced to the dynamic alignment structure of the R&D strategy, as described above, and is extended in the time-axis direction. The features of the dynamic alignment structure of this R&D strategy are as follows.

First, the super program orchestrates the two R&D programs, which are performing respective, autonomous activities. Second, each individual program self-manages the R&D of their respective projects.

Two features that play an important role in the dynamic alignment of R&D strategy will be described in detail below.

3.2 Orchestration between the R&D programs

The first feature of the dynamic alignment structure of the R&D strategy is described in detail below.

The super program becomes the mediator between the two R&D programs (i.e., the “R&D program for customer satisfaction” and the “R&D program for business process innovation”), and it plays two roles:

- (1) It conveys discoveries and information acquired from the R&D activities between programs.
- (2) It orchestrates the activities of each R&D program, based on the information acquired in the R&D activities.

Fig. 4. Conceptual Diagram of Dynamic Alignment between Organizations.

Here, information acquired during the R&D program activities signifies that information was learned in line with either the customer perspective or the business process perspective.

3.3 Scrum structure under the R&D programs

The second feature of the dynamic alignment of R&D strategy is as follows.

First, each R&D program on the second layer of the structure manages R&D activities performed by the subordinate projects. Second, projects on the structure's third layer are responsible for three functions within R&D activities—namely, scheme, system, and services. These help achieve the objective of the upper layer program (Fig. 3). These three functions are arranged in a spiral shape on the time axis to form management cycles.

These three functions that occur in tandem with the project are as follows.

- (1) Scheme: To develop plans for R&D
- (2) System: To develop structure for R&D
- (3) Service: To operate, maintain, and improve R&D

The scrum structure, in this management cycle, accumulates the information acquired from the R&D activities as a shared value of the R&D program in the upper layer. Besides, this scrum structure, in a case of simple improvement or similar activities, might skip a scheme or system project. We refer to this spiral-shaped

management cycle as the scrum structure, as the management cycle has a gradual and proceeding state that resembles a rugby scrum.

3.4 Dynamic alignment in corporate organization

Fig. 4 is a conceptual diagram of the dynamic alignment of the business organization. The left side of this figure shows the organizations as seen from the customer perspective, while the right shows the organizations from the business process perspective.

In this figure, only R&D belongs to both organizations, and only the R&D division can convey information acquired from R&D activities to both customer and business prospect perspectives, and influence other organizations based on that information.

3.5 Dynamic alignment in R&D strategy

Dynamic alignment in R&D strategy takes place according to R&D performance, as follows.

- (1) To achieve alignment between the “customer perspective” and the “business process perspective”
- (2) To contribute to business divisions through top-down activities (i.e., orchestration by the super program) and bottom-up activities (i.e., the scrum structure in R&D programs)

These activities can connect R&D achievements to companies' business outcomes.

4. Illustrative example of the multi-program platform structure: the case of Sharp Corporation

4.1 Case selection rationale

We adopt the case of Sharp Corporation, a Japanese electronics manufacturing company, as a preferred case that validates dynamic alignment in the multi-program platform structure, as proposed in this study. Sharp is a corporation that, especially from the 1970s to 1990s, has brought about various significant innovations. Those innovations are product families (such as a liquid crystal display (LCD) calculator and a LCD television) with a focus on the liquid crystal that is one of expertise area of Sharp Corporation. However, we have recognized that, currently, Sharp Corporation has lost the balance of the customer perspective and internal process perspective. The case of Sharp Corporation, in terms of its corporate history, is described on its web page ⁽⁷⁻⁸⁾.

4.2 Sharp Corporation and the multi-platform program structure

First, referencing the multi-program platform structure, we describe the case of Sharp from both the customer perspective and the business process perspective.

From the customer perspective, the activities of the organization—which were undertaken by the so-called Attack Team of Market (ATOM)—have been significant, and started from the time of an economic slump in 1965 that occurred after the 1964 Tokyo Olympics. One aim of ATOM units is to undertake sales promotion and marketing activities through client service (e.g., “free TV health-check”) in their group sales shops. These activities are beneficial in terms of obtaining customer trust and recognizing “invisible” customer requirements.

On the other hand, from the business process perspective, the activities of the Sharp Taskforces that started institutionally in 1977 have been significant. The Sharp Taskforces are organized company-wide to resolve critical management issues, and their goals are to develop non-price competition products based on own originality. In addition, we recognize that one aim in institutionalizing the Sharp Taskforces was to enable their repeated operation, to bring about continuous innovation.

4.3 A description of the selected case by the multi-platform program structure

Fig. 5 shows that applying the multi-program platform structure to the selected case. From the customer perspective, the execution of customer research (i.e., by ATOM teams) has led to subsequent innovation. For example, the market of the television sets changed, from the Braun tube to the LCD TVs (Fig. 5).

Fig. 5. Applying the Multi-Program Platform Structure to the Selected Case of Sharp Corporation.

From the business process perspective, the Sharp Taskforces, by connecting the laboratories and business headquarters, have developed various unique products based on the company's own key technology (e.g., the liquid crystal devices and semiconductor devices for LCD applications.) The collaborative creations on the development of the key devices and end products have enabled this "spiral up" in their innovation.

Furthermore, the Sharp Taskforces have developed synergies by bridging the customer and business process perspectives.

In summary, the Sharp Taskforces have played the same super program role in the multi-program platform structure, as it is directly controlled by Sharp Corporation's top management team. Moreover, ATOM teams are directly controlled by the top management team, too, and so the top management team can orchestrate the customer and business process perspectives.

In addition, the Sharp Taskforces that "spiral up" innovation for key devices and products has a scrum structure identical to the multi-program platform structure described in this paper, as it is preparing for the next innovation (i.e., the review and update of its R&D strategy).

It is clearly possible to explain the example of Sharp Corporation by applying the multi-program platform structure described in this paper.

5. Conclusions and remarks

In this paper, we introduced the concept of time passage to the multi-program platform structure we had proposed; furthermore, the structure was extended in terms of time-axis direction, as companies often need to review and update their R&D strategy to manage business in line with environmental factors. In addition, we found that the multi-program management structure extended in the time-axis direction has two adjustment functions. First, it has the function of orchestrating the super program, to harmonize the customer and business process perspectives. Second, reviews and updates of the R&D strategy were frequently undertaken as a management function within the scrum structure, in each R&D program. These two adjustment functions work together to align the dynamics of the R&D strategy. Furthermore, it is clearly possible to explain the case of Sharp Corporation by applying the multi-program platform structure extended in the time-axis direction as described in this paper.

Finally, we discussed relatively short-term R&D (e.g.,

technology development) from a perspective that connects R&D achievements and business outcomes. The application of this study's outcomes to the matter of long-term R&D (e.g., basic science) is an issue left to future research

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