Product Development and Market Creation

——Exploration by the Social Shaping of Technology Approach——

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【Abstract】This article overviews the book entitled *Product Development and Market Creation: Exploration by the Social Shaping of Technology Approach*, which won the 2017 JABA Best Book Award.

1. Introduction

My publication *Product Development and Market Creation: Exploration by the Social Shaping of Technology Approach*, (Hakuto-Shobo Publishing Company, 2016) won the JABA Best Book Award in 2017. I also had an opportunity to give a presentation about the book at the 91st JABA conference. I really appreciate everyone's support.

In this book, I focus on product developments that trigger market creation. Manufacturing firms have been having difficulties with differentiating their products; this problem is often called as commoditization. Market creation is the sufficient strategy to address the commoditization, although it is not easy. When a firm enters the existing market, it is easy to collect information from users in the market and develop products based on the information. However, to create a new market, a firm cannot collect information from users because the market does not exist at the time. Although firms are adapting to competition in existing markets, it is difficult for those firms to challenge market creation. The issue that I address in this book is the dilemma between adaptation to existing markets and market creation.

In order to tackle this problem, it is necessary to overcome barriers in academic fields. Product development has been studied mainly as a matter of organization management. However, studies concerning market creation have approached the subject from a marketing perspective. In this book, I attempted to bridge these two areas by applying the social shaping of technology approach. Specifically, I conducted detailed case studies on both the market and organization levels with three market creation cases: stain-removing tooth pastes, healthy tea beverages, and premium rice cookers.

In this book, discussion about the problem was followed by literature review about new product development management and marketing, discussion on the methodology, and case studies. For the remaining part of this paper, I present the outline and contributions of this book.

2. Overview of the book

2-1. Literature review

In Chapter 2, I examined prior research related to the development of market creating products. First, based on research about innovation typology and the product market role, market creation and the market following products are defined as the products which have discontinuous and continuous evaluation framework, respectively. Second, to understand the development of market creating products, I examined the market adaptation approach that many researchers adopted for product development management studies. The result showed that the market adaptation approach is not appropriate for studying market creating product development because it assumes the existence of the product market. Third, as a substitute for the market adaptation approach, the constructive approach was examined. According to the socio-cognitive approach (Rosa et al., 1999), market emergence can be understood as a process in which market actors share knowledge through dialogue. Further, the research on sensemaking and persuasion in an organization suggests that one must study the persuasive dialogue in an organization to understand its market-creating product development process.

Based on these literature reviews, the research gap was identified because the constructive approach is a potential vantage point for studying market-creating product development and market emergence, yet the actor's interactions concerning the market, organization, material, and structural factors are yet to be explored.
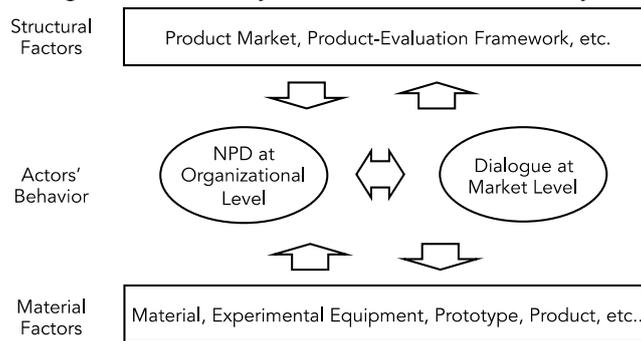
2-2. Clarification of methodological standpoint

In Chapter 3, I showed the research questions and discussed the methodology. Based on the above literature review, the research questions were to understand: 1) a dialogue process at the market level, 2) a product development process at the organization level, and 3) relevance between them.

To answer the research questions, it is necessary to consider not only the dialogue by the actors, but also the material and structural influence. This means that we must consider both materiality of products, the social and economic context as well as the subjectivity of market boundaries. This way of thinking has a methodological contradiction (Burrell & Morgan, 1979).

In this book, the *social shaping of technology* approach was employed to overcome this contradiction which is a research cluster in which authors criticize technological determinism and study mutual formation of technology and society (MacKenzie & Wajcman, 1999; Russell & Williams, 2002; Williams & Edge, 1996). The authors in the cluster not only have constructivism views, but also find the positive implications for ontological contradiction being the social shaping of technology which is an appropriate approach to study market emergence at organizational and market levels. Therefore, I employed the social shaping of technology approach as a case study method (Figure 1).

Figure 1 The analytical framework of this study

Structural Factors — Product Market, Product-Evaluation Framework, etc.

Actors' Behavior — NPD at Organizational Level ⇄ Dialogue at Market Level

Material Factors — Material, Experimental Equipment, Prototype, Product, etc..

2-3. Case study

In chapters 4 to 6, three cases of market emergence were examined. First, we examined a case about the shift of product evaluation framework from whitening teeth to removing stains in the whitening toothpaste market. In the whitening toothpaste market, the manufacturing firms have competed in the product's function for whitening teeth. However, in 2001, Sunstar introduced a product called Stain Clear, and presented its function as removing stains. As Stein Clear achieved gaining a large share in the market, the competitors also began to appeal to stain removal. The study on the organizational product development of Stain Clear revealed the process where the project leader created a new product evaluation framework. First, he got the idea of new product evaluation framework by using material and structural factors that were inconsistent with the existing product evaluation framework. Second, the other people in the organization opposed the project leader's idea because they evaluated the new product based on the old product evaluation framework. Third, the project leader persuaded the opponent.

In Chapter 5, I examined a case where a healthy tea beverage market was formed as a sub-market in the tea beverage market. Around 2000, the popular products in the tea beverage market were evaluated based on its taste. However, in 2003, Kao introduced Healthya Green Tea and presented a new product evaluation framework of health promotion with Tokuho certification, a food for specified health benefits. As Healthya Green Tea became a hit product, the other manufacturing firms released similar products, which had a 350 mL PET bottle and the Tokuho certification. These products were displayed collectively at the store.

Then, I examined the development process of three healthy tea beverages, Healthya Green Tea, Black Oolong Tea OTPP, and Catechin Green Tea. First, the development team of Healthya green tea created a new product evaluation framework by using material and structural factors that were inconsistent with the existing product evaluation framework. Second, no opponent who had an old product evaluation framework appeared. Third, in the development process of Black Oolong Tea OTPP and Catechin Green Tea, their design was modified under the influence of the new market being formed.

In Chapter 6, we examined the premium rice cooker market emergence. In the electric rice cooker market, the manufacturing firms were competing in product convenience since the beginning of the 2000s. In 2006, Mitsubishi Electric released Honsumigama which represented a new product evaluation framework for a significant difference in the taste of rice. After that, other manufacturing firms introduced the rice cookers which has similar features such as specially designed inner pot and higher prices. These products were categorized as premium rice cookers at the store.

Then, I examined the development process of four products in the premium rice cooker market: Honsumigama, Donabe Rice cooker, Kiwame Hagama, and Helshio Rice cooker. The former two were

considered as market-creating products and the latter two as market-following products. The study revealed four findings about the market-creating and market-following product development. First, the project leader noticed that the prototype and the business environment contradicted the existing product evaluation framework and was conceived of a new product evaluation framework. Second, the people in the organization who had the old product evaluation framework considered the new product as inappropriate and opposed the project. Third, the project leader persuaded the opponent using a compromise with the existing product evaluation framework, third party, physical presence, and support of structural factors. Fourth, the organization that developed the market-following product intended to enter the emerging market.

2-4. Conclusion

In Chapter 7, I examined the three cases and identified a typical market actors' dialogue during market generation, a typical pattern of product development that triggers new market creation, and interaction between them.

Market-level dialogue consists of three steps: 1) a manufacturing firm introduces a new product-evaluation framework, 2) consumers response to it, and 3) manufacturing firms react upon consumers' reaction. Product development at the organization level also consists of the process whereby organizational members conceive a new product-evaluation framework and understand it through dialogue among the members. This dialogue, at the organization and market levels, interacts through three routes: 1) a direct route by which organizations take actions as market actors, 2) an indirect route mediated by the material and structural factors, and 3) a feedback route by which the newly formed product-evaluation framework affects the organizational action.

In summary, I illustrated the dynamics of market emergence as actors' dialogue at organizational and market levels under the influence of material and structural factors.

3. Contribution

3-1. Understanding product development and market dynamics

One of the major contributions of this book is understanding product development and market dynamics. It consists of three components: 1) market level dialogue, 2) organizational level product development, and 3) interaction between them.

3-1-1. Market level dialogue

The findings on market level dialogue are consistent with previous research, but new findings were also shown. Rosa et al. (1999) illustrated product categories as knowledge shared by market actors. I extended their model as a chain of participants actions where a manufacture introduces a new product-evaluation framework, consumers response to it, and the manufactures responds to consumers responses (Table 1). In addition, I also showed the material and structural factors that influence the actors' dialogue by using the social shaping of technology approach. The result suggests that the product acted as a representative of manufacture and tells a story about the product-evaluation framework.

Table 1 Dialogue at market level which shapes a new market and new product-evaluation framework

| Cases	Introducing a new product-evaluation framework	Consumers' reaction	Manufacturers' reaction
Stain-removing tooth paste	• Sunster introduced Stain Clear • Released the information about stain-removing function through TVCM etc.	• Stain Clear achieved larger share than the other whitening products	• Kao and Lion introduced products claiming stain-removing • Sunster introduced new product lines with stain-removing concept
Healthy tea beverage	• Kao introduced Healthya Green Tea • Released the information about its fat-reducing effect by collaborating with convenience stores	• Healthya Green Team became a hit product	• Many catechin beverages was introduced but they exited from the market because of Kao's patent strategy • Suntry and Itoen introduced the tea beverage with FOSHU • Kao revised the health claim of Healthya
Premium rice cooker	• Mitsubishi introduced Honsumigama • Taiger introduce Donabe Rice Cooker	• Honsumigama and Donabe Rice Cooker became hit products	• Manufacturers introduced the expensive rice cookers that had specially designed inner pot • Mitsubishi and Tiger introduce the improved Honsumigama and Donabe Rice Cooker • Manufactures began to introduce the mid- or low-price product lines.

3-1-2. Organizational level product development

The following patterns were observed in market-creating products development:

1) Dissonance between material/structural factors and the existing product-evaluation framework triggers to create a new product-evaluation framework at the new product development process.

2) The new product that can potentially create a new product-evaluation framework receives low evaluation under the existing product-evaluation framework. It often impedes the new product development project.

3) If an opponent appears, the project leader must persuade them. So, the project leader uses three strategies. First, they get the support of either or both material or structural factors. Second, they get the support of third parties. Lastly, the leader compromises with existing product-evaluation frameworks.

Particularly, two significant findings about the market-creating product development are the development process of a new product-evaluation framework and the project leader's persuasive communication. The development process of a new product-evaluation framework is illustrated in Figure 2. In developing market-creating products, the development team causes dissonance between material and structural factors and the existing product-evaluation framework. If the existing product-evaluation framework is dominant, these material and structural factors will be eliminated. However, in the cases discussed in this book, the project leader used this dissonance as a trigger and a new product-evaluation framework was created because the new product-evaluation framework dissolved the dissonance. Thus, the project leader begins to establish a new product-evaluation framework.

Figure 2   Processes by which the manufactures conceive new product-evaluation frameworks
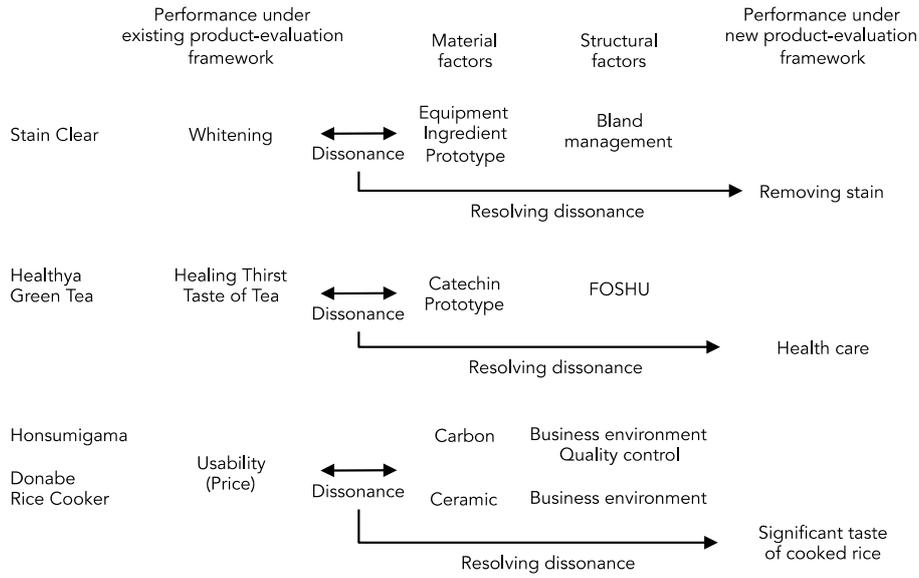

However, in the subsequent process, some people often begin to oppose the progress of product development. According to the existing product-evaluation framework, opponents argue that the product under development is worthless and the project should be stopped. Thus, the project leader must persuade other people by using the four convincing strategies.

3-1-3. Interaction between market and organization

The case studies showed that the organizational new product development and the market level dialogue interact with each other through three routes. Because of these interactions, the product-evaluation framework created by the organization is shared by the market actors (Fig 3).

Figure 3   Relationship between product development in organizations and dialogue in markets
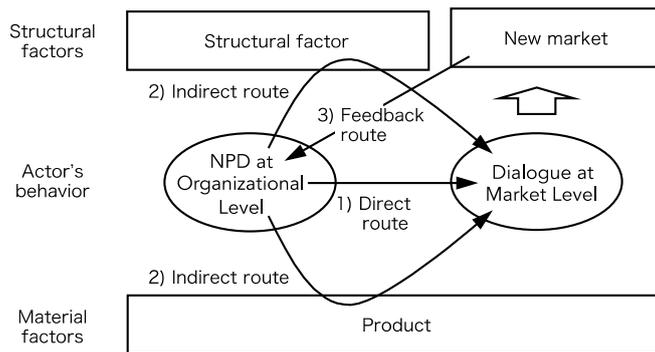
It seems that the significant finding is the indirect route plays an important role in interactions between the organization market levels. The previous research argued that achieving innovation requires external persuasion, which is equivalent to the direct route. A manufacturer presents a new product-evaluation framework by participating in market-level dialogue and intervenes in the market actors' dialogue through all marketing mixes to generate a new market and new product-evaluation framework.

At the same time, the indirect route also plays an important role for the interaction between both levels in addition to the direct route. The actor-network theory is one of the theoretical foundations of social shaping for technology. It argues that the role of material factors in the actor-network is essential to maintain the technology (Callon, 1987). Materials play their agency based on its design and supports social system (Leonardi, 2012). In other words, a new market and a product-evaluation framework cannot be maintained without the materials' support. Previous research has not argued that structural factors affect both organizational and market level dialogue to connect them. This result shows that the social shaping of technology approach is effective to illustrate the role of indirect route.

3-2. Establishing the analytical approach

As mentioned above, the social shaping of technology approach effectively produced the most findings in this book. This indicates that the social shaping of technology approach is effective in understanding product development and market dynamics.

The authors of social shaping of technology have studied long-term technological development which had a great impact on society, such as defense systems, electric power systems, bicycles, plastics, electric lights, steel, airplanes, and information technology (MacKenzie & Wajcman, 1999). However, some authors have argued that the perspective of social shaping of technology can be applied to study management (Miyao, 2013; Hara, 2007). This book clearly showed the potential for the social shaping of technology approach by using it for case studies.

As this book revealed, organizational product and technology development has a close relationship with the market formed by market actors' dialogue. This relationship was not a technology push, where an innovation impacts society. It was not a market pull either, where the firm simply develops a product based on customer needs. Rather, the product development and the formation of the market are inextricably linked and are in a dynamic relationship in which they mutually shape each other. Thus, this book established an approach to analyze the mutual formation of products and markets by applying the social shaping of technology approach.

4. Conclusion

The strategy to configure market boundaries and create a new market is crucial for manufacturing firms (Kim & Mauborgne, 2005). The research question of this book was how firms do this, and the study revealed that we cannot simply consider the market creation as the prediction of future users' needs. If the firm intends to control market emergence and configuration of product-evaluation framework, it is required for the firm to manage its strategy carefully by considering the network of market participants' dialogue, material and structural factors. To develop market-creating products, it is necessary for the firm to participate actively at the market level dialogue to create a new market rather than to predict future markets. The structural and material factors play important role in this process.

The market boundaries are nothing more than the knowledge shared by market actors. When the firm allows the market actors to interact freely, the result of the interaction and market creation is uncontrollable and unpredictable for the firm. However, as shown in the case study of this book, there are various ways to intervene in the formation of a new market and product-evaluation framework. The study showed the three major ways: 1) participation in dialogue, 2) legitimation using structural factors, and 3) story-telling by material factors. By using these methods, manufacturing firms can intervene in market emergence.

On the other hand, this book also provides several implications for the managers about new product development in an organization. Particularly, the process raising dissonance between existing product-evaluation framework and structural/material factors provides significant insight. According to the previous theory, we tend to consider that dissonance is problem and is necessary to be solved in the new product development process. Further, through the market adaptation approach, we tend to consider that the project manager has to gather the information from the market to solve the problem. However, the study of this book suggests that the dissonance is not a problem to be solved, but rather plays a positive role for organizations that triggers people to search for a new product-evaluation framework. To find the dissonance between the existing product-evaluation framework and structural/physical existence, and conceive a new product evaluation framework, the project manager has to satisfy the two conditions. First, the project manager has to discover the dissonance. Second, the project manager should not resolve the dissonance easily by adopting an existing product-evaluation framework but should construct a new product-evaluation framework through dialogue in the organization.

Even though I did find answers for the research questions, there are still several problems in this book. By applying even more diverse cases, it will be necessary to confirm the reproducibility of the found theory. Moreover, to answer the question of how to manage product development to form a new market, further verification will be necessary. In future research, I would like to address these issues.

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