

T M & A R G

Discussion Paper No. 129

**Managing Ambidextrous Organizations for
corporate transformation
:A case study of Fujifilm's transformation
process , Japan**

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Feb.2017

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Managing Ambidextrous Organizations for corporate transformation

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Abstract: Within previous research on innovation management, the concept of ambidextrous organizations that allow the two different activities of exploration and exploitation with their different objectives and characteristics to coexist within an organization while being separated has been presented. Regardless of the fact that the relationship between exploration and exploitation differs depending on situations, existing literature does not consider these differences and therefore has only limited relevance and effectiveness. This paper focuses on the product substitutability of exploratory product and existing core products, proposes the cannibalistic and complementary types of ambidextrous organizations, and discusses effective management respectively. Then, through in-depth case study of Fujifilm, the paper illustrates how contingency framework of an ambidextrous organization will be effective for explaining the survival of Fujifilm in the emergence of digitalization. Thus, this paper aims to refine and enhance the concept of ambidextrous organization.

Keywords: ambidextrous organization, Fujifilm, technological change, diversification strategy, exploration

1 Introduction

Most of the companies involved in photographic film either withdrew or went bankrupt with the onslaught of digitalization. Konica Minolta quit the film and camera businesses in 2006, and Polaroid went bankrupt in 2001. Then in 2012, Kodak, a company that had made major contributions to the film camera industry, also failed. All of these were the results of photographic film business being at the mercy of the invading wave of digitalization. Among these businesses was Fujifilm, a photographic film business that survived by dramatically shifting its business domains to become a total health company. Why then, was Fujifilm able to survive? Of course, this entails a variety of complex factors. This paper investigates Fujifilm's success from the perspective of an ambidextrous organization, an organization in which exploration and exploitation are executed in parallel.

Exploration and exploitation are two different types of activity with different objectives and characteristics. Exploration is essentially trial and error through various experimentation with a number of choices, while exploitation is characterized by expanding and refining current capabilities and technologies (March, 1991). The difference between the two can be understood

by their learning styles and the knowledge that is acquired. To grow sustainably, it has been identified that a company must engage in both these activities (March, 1991).

The differences of this knowledge acquired in the context of specific business activities leads to forays into new markets or new market creation, or improvements to flagship products and main businesses. In this regard, exploration is the innovation activity of discovering the seeds of new businesses or markets and nurturing them, which requires exploration activities beyond the scope of current main business, and requires diverse experimentation and trial and error (He and Wong, 2004). In contrast, exploitation is activity that entails further refinement and development of existing knowledge, know-how and experience accumulated in current core businesses to develop improved products and services (He and Wong, 2004). Exploitation is directly related to improving earnings, whereas exploration contributes to future profitability. Although different in objective and character, these two types of activities are necessary for a company to sustainably maintain its competitiveness. Thus, as an organizational model, the concept of the ambidextrous organization in which exploration and exploitation are separated but allowed to coexist within the organization was put forth (O' Reilly and Tushman, 2004).

The academic significance of this paper is to contribute to the refinement of the concept of the ambidextrous organization, and raise its relevance and effectiveness. An issue facing an ambidextrous organization is that of the differences between exploration and exploitation not being considered regardless of the fact the relationship between exploration and exploitation varies and differs depending on circumstances. New products brought about by exploration can obstruct demand for existing core products. The technological shift from the film camera to the digital camera was one such example. In principle, the exploration into the digital camera will lead to the reduction of demand for photographic film and film cameras. In an alternative scenario, the relationship between exploration and exploitation would have been different had there been exploration for new business to enable diversification. Thus, pressing business issues are not the same, and hence the required management must be different. Those differences must be considered to raise the relevance and effectiveness of the ambidextrous organization, depending on the circumstances.

This paper is structured as follows. The following section first conceptually extracts a theoretical framework for adapting to changing conditions depending on the relationship between exploration and exploitation in light of existing research, and then presents the two concepts of the cannibalistic and complementary types. After that in the third section, the paper considers to what extent the present framework is valid and effective through a detailed analysis of transformation at Fujifilm - management of an ambidextrous organization to respond to circumstances can be seen in this company's transformation. Then, the fourth section considers management required to make an ambidextrous organization function.

2 Theoretical considerations on ambidextrous organizations

2.1 Exploration and exploitation

Sustainable corporate growth requires the two types of activities, exploration and exploitation, activities which are different in objective and character (March, 1991). However, excessive inclination toward either is not desirable. Excess bias toward exploration activities will impact on profitability due to the costs and time involved. Conversely, tendencies toward exploitation can lead to short-sighted profitability, but can be detrimental to medium-term competitiveness due to neglecting to foster new business. For these reasons, existing research suggests the importance of reaching an appropriate balance between exploration and exploitation (McCarthy and Gordon, 2011; Gibson and Birkinshaw, 2004). However, in general, excess bias towards exploitation can occur easily, since it is directly linked to business performance. Rather than engage in time-consuming exploration, inertia arises as decisions are made to go in the direction of further strengthening improvements and upgrades of existing core business and companies are drawn into its core business mechanisms and operational processes. One of the main reasons established large corporations are sometimes poor at generating innovation is because of the influence of such inertia from their core businesses.

In these situations, existing research asserts that exploration and exploitation activities should be structurally separated to achieve a balance between them. The organizational concept that deals with structural separation and balancing exploration and exploitation is that of the ambidextrous organization (O'Reilly & Tushman, 2004). In this concept, divisions specializing in exploration are separated from those specializing in exploitation of main business, and their activities are pursued both autonomously and in parallel. Since the objectives and character of activities for exploration and exploitation are not the same, the mechanisms of incentivizing staff, business processes and organizational culture should also differ. Thus, it is rational to structurally separate the two and enable them to conduct autonomously. In contrast, if there is no suitable mechanism for connecting the activities of the two, exploration activities can easily become isolated from the main lines of business leading to conflict between the two within a company.

In other words, allowing exploration and exploitation to coexist in the same company with their dissimilar characteristics requires skilled management of strategic contradiction (Smith and Tushman, 2005), creative abrasion (Leonard-Barton, 1995) and productive friction (Hagel III and Brown, 2005), because the focus needs to be on bringing about synergies rather than discord. To do this, what is important? Existing research focuses on the role of top management, and asserts the importance of top management presenting organizational visions to both entities, and supervising the allocation of resources (Smith and Tushman, 2005; Tushman and O'Reilly,

1997; Lubatkin et al., 2006). There is also existing research that identifies the importance of middle and staff-level information sharing and communications (Govindarajan et al., 2005). Thus, regarding what is important for making an ambidextrous organization function well, existing research doesn't offer sufficient knowledge, and some research is in conflict. However, the research commonly recognizes that in any case, the combination of exploration and exploitation is related to sustainable competitiveness (He & Wong, 2004; Govindarajan & Trimble, 2005; Markides & Charitou, 2004; Adler et., 1999; Holmqvist, 2004; Katila & Ahuja, 2002).

The findings of existing research can be sorted as follows. While the character and objectives of exploitation activities for improving core business and those of exploration activities for pioneering new business are different, both are necessary for sustainable growth. Thus, existing research commonly suggests that if an ambidextrous organization can be made to function well, it will lead to higher performance over the long term. Currently, the point about making an ambidextrous organization function by circumventing discord and conflict at the same time as bringing about synergies has not been sufficiently clarified. Hence, this paper presents a contingency framework of an ambidextrous organization in terms of relationship between exploration and exploitation, and illustrates its relevance and effectiveness.

2.2 Analytical framework - the relationship between exploration and exploitation

To deepen understanding of the relationship between exploration and exploitation, I will begin by discussing specific circumstances surrounding exploration activities. Exploration refers to the activities of experiment and trial and error related to learning and the acquisition of new knowledge. For example, technology exploration through experimentation and trial and error in R&D, external exploration in search of external resources, and market exploration to experiment with channels and effective access to a market. Ambidextrous organizations run these exploration activities in parallel with exploitation to improve core products within the same organization.

In these circumstances, a factor that determines the relationship between exploration and exploitation is the effect the achievements of exploration activities will have on demand and sales of core products. To what degree are products born of exploration activities substitutable for core products? If they have high substitutability, exploration activities will reduce demand for core products and hinder their growth. Thus, exploration products and core products could be in a cannibalistic relationship.

Typical examples can be seen in companies that engage in exploration activities when faced with technological change. When a new product emerges that has potential as a substitute for an existing product, the company that has been successful with the existing product has to further

improve and upgrade it at the same time as engage in parallel exploration activities into the emergent new product (Shibata, 2012a; Shibata, 2012b). In competitive markets and technical advances, the object of exploration in this case is set regardless of whether there is a cannibalistic relationship with the company's core products. As a result, there are many cases where the new product exploration results in substitution and expulsion of the existing product. For example, Fujifilm is a company that faced the emergence of the digital camera, and even though the digital camera was a substitute for the company's core products, they went ahead and explored digital camera development anyway. It could also be said that they the company didn't really have any other choices, merely because the competition would explore digital cameras even if Fujifilm didn't.

It is easy in such cases for discord and conflict to arise between divisions engaged in exploration and those engaged in exploitation. It is not unusual for there to be a backlash from divisions engaged in core products. Therefore, how to make ambidextrous organizations function while avoiding conflict between the two is an important management issue.

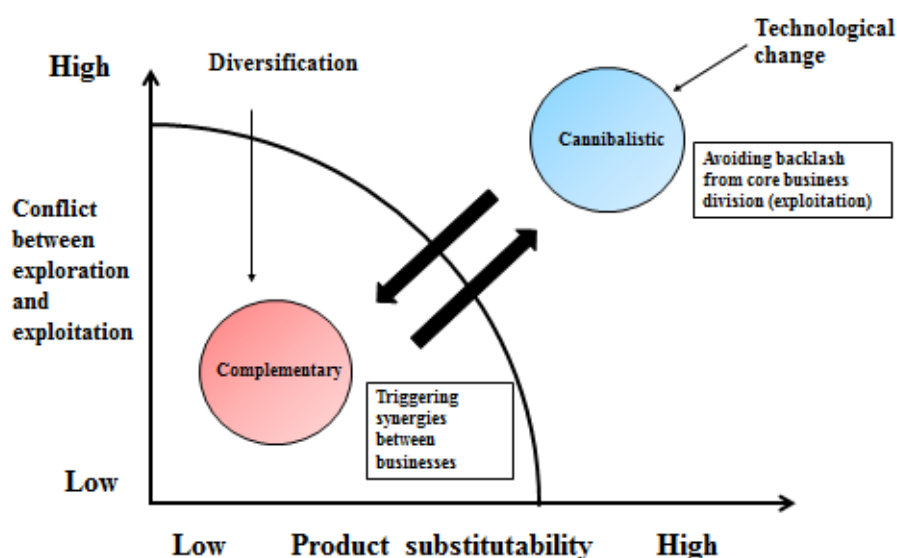
In contrast, if products born from exploration have low substitutability, then they won't impact negatively on demand for core products. Rather, products born of exploration should create new customers for the company. Typical case is when companies try to diversify their businesses. When a company wants to diversify, it has to explore specific business areas after investigating which areas are candidates for new business. For example, when Brother Industries faced a slump in demand for sewing machines and had to diversify, the company first considered whether to move into home appliances, printers or fax machines etc., and narrowed down its candidate business areas. Finally, the company selected and clarified which business areas to explore as new domain. Compared to cases in which technical change force the company to select business area in competitive markets, there is much room for discretion in selecting exploration area. Thus, in case of diversification, it is rationale for the company to explore business areas that have low substitutability with core products.

If product substitutability is low, it is not likely that conflict will arise between the exploration and exploitation sections. The managerial issues for an ambidextrous organization are those of effective resource allocation and promoting synergies between the two entities. Management issues differ for low substitutability and high substitutability cases, even when company adopts ambidextrous organization.

Thus, depending on the degree of substitutability, the relationship between the two is different. Figure 1 classifies the idea of the ambidextrous organization from the perspective of product substitutability. This paper calls high substitutability cases "cannibalistic" and low substitutability cases "complementary". Appropriate management that can deal with different managerial issues is required for the cannibalistic and complementary types. Existing research

has not considered their differences so far. However, distinguishing these relationships will refine the concept of the ambidextrous organization and bring more effectiveness and relevance to it. Following, the paper analyzes the corporate transformation process at Fujifilm from the perspective of the ambidextrous organization, and presents the relevance and effectiveness of a framework for adapting to circumstances.

Figure 1 Classifying ambidextrous organizations



2.3 Research Method

This research has exploratory aspects of extracting details of certain people and organizations involved in corporate innovation activities, gathering data regarding the processes of their activities, and carefully analyzing these. Therefore, the authors have adopted a qualitative survey and case study analysis as their methodology. This research methodology provides for the rich gathering of data and rich analyses for introducing a new theoretical framework that cannot be found in previous research.

Many scholars have already pointed out the effectiveness of case studies (e.g., Eisenhardt, 1989; Pettgrew, 1990; Yin, 1994). Case studies are a very effective methodology for explaining the relationship between causes and results of business phenomena and their appropriateness from multiple perspectives and interpretations through deep insights based on objective qualitative information and the researchers' subjective interpretation regarding individual cases, which cannot be obtained from statistical methods. Case studies are important not only in complementing generality through statistical methods but also in constructing novel, creative theories.

The case study in this paper focuses on research questions relating to corporate transformation process and provides an in-depth analysis and observations regarding how that company achieved transformation. The case study of Fujifilm, which is the subject of this research, is based on the authors' interviews of a number of persons at the helm of the company including one board member and three officers, as well as internal information and data (including general corporate information prepared by the company for the general public). Furthermore, the accuracy of details of our case study were reviewed and confirmed by the company. Based on the above research approach, we first prepared details of the case study and then proceeded with our analysis and observations regarding the ambidextrous organization and new business development based on the case.

3 Case Study: The Fujifilm corporate transformation process¹

Established in 1934, Fujifilm today has approximately 78,400 consolidated staff worldwide and 272 consolidated companies (as of December 2015). As a group under FUJIFILM Holdings Corporation, Fujifilm has operating companies Fujifilm Corporation and Fuji Xerox Co., Ltd. as well as Toyama Chemical Co., Ltd., acquired in recent years, and Fujifilm Business Expert Corporation, which provides shared services.

In countries all over the world, the Fujifilm group maintains global research, production and sales operations. In manufacturing as well, in addition to its main production bases in Japan, it has manufacturing operations in China, North America and countries across Europe in locations that are close to consumption areas. In addition to production, it also actively engages in R&D overseas at a local level in open collaboration with various universities and research institutes in the United States and in countries in Europe. At present overseas sales account for more than 65% of all sales.

To give an overview of Fujifilm's history, it was established in 1934 to manufacture domestically produced film. In the 1970s, as the digital era was about to begin, the first signs of digitalization began to appear in Fujifilm's respective business areas.

After that, Fujifilm's transformation process happened in two stages. In the first stage the company dealt with the pressing issue of digitalization. Fujifilm took initiatives in the early stages to explore the digital camera, as it was in a cannibalistic relationship with photographic film. With the initial success of the FinePix4700Z digital camera with the company's

¹ The Fujifilm case was created from books, magazines, information published on the company website and interviews with company staff. The interviews were conducted on July 17, 2015 and January 29, 2016, with participation by 3 interviewees, a company director, and directors of related departments.

proprietary CCD, Fujifilm held a 23% share of the global market in 2000. However, stiff competition cut its share down to 10% in 2005 and then 8% in 2008. The first stage, that of a market environment in which digital technologies were rapidly emerging, was a period in which Fujifilm was positioned by taking proactive steps to explore digital cameras.

The second stage of the transformation was in 2003, when Shigetaka Komori took over as CEO. Having reached its peak in 2000, the global demand for color film was in rapid decline, and by 2005, the company's photographic film business had fallen into the red. Apart from digital cameras, Komori accelerated diversification to non-digital camera businesses such as healthcare and cosmetics at the same time as restructuring the photographic film business. For this, the company set up an R&D headquarters to integrate research and development and at the same time separated functions as the company's corporate labs and division labs. Thus, by dramatically overhauling its R&D systems, the company enacted exploration into new businesses.

While meaning the same thing as exploring new territory, the market and competitive environments faced in the first and second stages were different, which also affected the relationship between exploration and exploitation. The following analyze the state of exploration carried out in each stage.

3.1 Exploration for digital cameras

Fujifilm started research and development of digital technology very early. In 1983, Fujifilm shipped the medical world's first digital X-ray image diagnostic system, the Fuji Computed Radiography (FCR). FCR technology can provide doctors with digitalized diagnostic data without using conventional X-ray film. After that, the digital wave eventually came around to the area of printing, an area in which Fujifilm proactively invested. CEO Shigetaka Komori had the following to say about a wave of digitization:

“We had witnessed the penetration of digital technologies into the medical and printing fields, and we knew it would spread to photography.”²

Although Fujifilm took up digital technology early on with healthcare and printing, the impact of digital on ordinary photography had a much bigger impact on the company. This was because it had the potential to threaten its core photographic film business. If the company could sell film, it could also sell developer and paper to print photographs. Since this business was killing three or four birds with one stone as it were, it accounted for 54% of total sales included those of related businesses, and was a money tree generating almost 70% of the

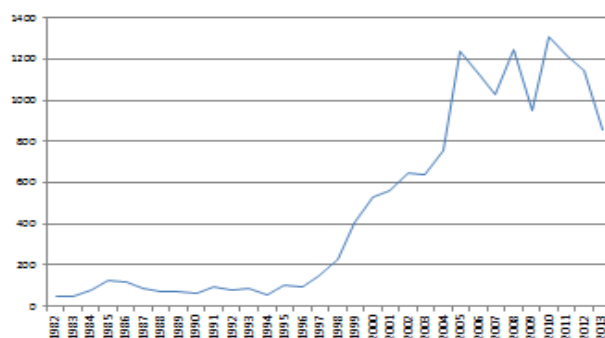
² Chapter 3 Fujifilm: A second Foundation. In: Harvard Business School, *Case Study Japan Corporate Collection*. Diamond. (in Japanese)

company's operating profits. Nevertheless, Fujifilm took the initiative to proactively explore digital cameras.

In 1977, Mizuki, head of Fujifilm's central laboratory, embarked on a digital camera research and development project. The basic parts of a digital camera are its lens and charge coupled device (CCD), which is a semiconductor. The lens was optical technology fostered with film cameras and could be used with digital cameras, whereas the CCD is a semiconductor that would be necessary to convert light into digital data, and was not required for film cameras. Hence, since Fujifilm did not have CCD technology and know-how, the company procured it from outside sources at the initial stage of development. At the time, CCDs were said to cost around 300 thousand Yen. Hence, Fujifilm began R&D into the CCD so they could develop them in-house. The company thus commenced semiconductor-related technical exploration as part of its exploration activities into the digital camera.

Figure 2 shows Fujifilm's trends in patent applications in the semiconductor technology area. As mentioned, one of the core components of the digital camera is the image sensor which can be a CCD or CMOS, and which requires semiconductor technologies for development. Thus, presumably the trend in semiconductor-related patent applications indicates the state of exploration in the new fields of the digital camera. Looking at this, it can be seen that the number of patent applications rose by about 100 after 1984, then leveled off around 70 for a while, but then skyrocketed after 1995. The rise post-1984 was brought about by technical exploration into semiconductor-related areas, and was again accelerated with the sharp increase from 1995 onward when the prospects for the spread of digital cameras became more certain as discussed later.

Figure 2 Trends in Fujifilm semiconductor patent applications



From EPO Worldwide Patent Statistical Database.
Fujifilm annual semiconductor (IPC:H01L) patent applications aggregated based on WIPO IPC AND TECHNOLOGY CONCORDANCE TABLE.

In 1981, Hirozo Ueda, who was serving as director of the Fujifilm Ashigara Laboratory (Ashigara Lab director from 1977, Vice President and head of R&D from 1995 to 1998) opened a micro electronics research laboratory for developing the CCD in-house. The company sent 5 engineers to study semiconductors over a period of 3 years to Tohoku University's Junichi Nishizawa laboratory, which was the leading semiconductor research facility at the time. After that in 1990, the company established Fujifilm Microdevices as a subsidiary in Sendai for design and manufacture of image processing semiconductors, in which the R&D and manufacture of the CCD was continued.

In 1985, the company had formally established an electronic imaging department to accelerate the development of the digital camera. This department started out with 30 engineers including some hired from Toshiba and 5 marketing staff. Then, the company released a number of digital cameras onto the market in 1988, 1989 and 1991, and by 2000 the Electronic Imaging Department had grown to 400 persons.³ The company was proactive in commercializing digital cameras at the time, although they had not reached a quality level making them a substitute for film cameras. The image quality of the digital camera could not yet match that of the film camera, and with it the company could not provide image quality standards demanded by customers.

On the back of these developments, there were signs that the digital camera market was finally getting established in 1995 when Casio released the QV10. With the achievement of a million pixels the film camera image quality level was reached, and the device showed prospects for actual use as a camera. Then in the same year, Windows 95 was released and the PC became widespread, and because of the convenience of being able to connect a digital camera to a PC, the digital camera brought with it unique value that was not available with film cameras.

In 2000 Fujifilm had a 23% share of the global market and 28% of the domestic market with the FinePix4700Z, a device that features the company's super CCD honeycomb. The success of this device was mainly due to the proprietary Fujifilm Microdevices-developed CCD honeycomb, which enabled in 60% per inch increase in brightness with light capture. This doubled digital camera sales from the previous year.

³After the electronic imaging department was established, the company announced the "FUJIX DS-1P," the world's first digital camera at an exhibition in Germany. This device used a memory card for the digital memory, which is now a standard system. Then in 1989, the company first mass-produced the 400,000 pixel CCD "FUJIX DS-X", although the prohibitively high 1.3 million yen price tag did not lead to satisfying sales. As well as that, the consumer-oriented "FUJIX DS100" digital camera was commercialized in 1991.

However, stiff competition in digital camera market made it difficult to turn a profit, and hence it was necessary to cut down manufacturing costs to stay competitive. Thus, companies moved their manufacturing to Taiwan and Korea. Since Fujifilm did not enter the market with standard low-priced products, its market share fell to 10% by 2004. Fujifilm had been successful in the initial phases of the digital camera industry, but its share fell due to the tough competitive environment.

3.2 The strategy of coexistence of digital cameras and film - coexistence of exploration and exploitation

Since the emergence of the digital camera was a threat to Fujifilm's main business of photographic film and would render it unnecessary, the digital camera and film businesses were in a cannibalistic relationship. The digital camera had high substitutability over photographic film. Furthermore, for employees working in the film business, the emergence of the digital camera meant that the value of the know-how and technologies they had accumulated so far would be destroyed. Thus, digital camera development wasn't something that those working in the film business should welcome.

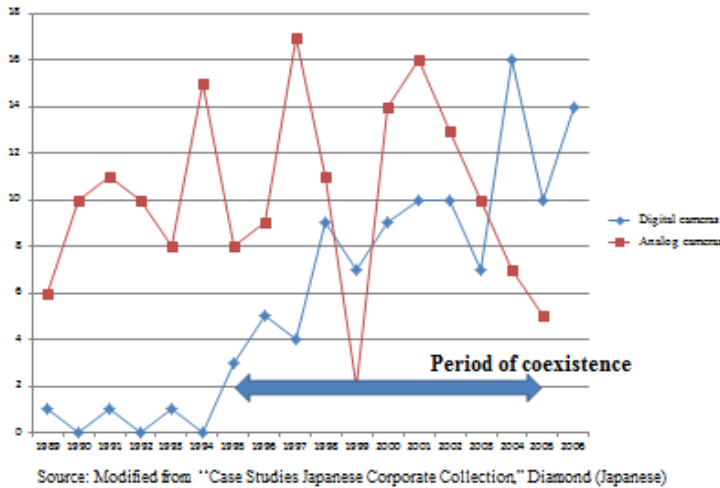
Fujifilm ran its digital camera and film businesses in parallel for 20 years from the late 1980s until around 2005 - an environment in which conflict could easily arise. The company had thought that the image quality of digital cameras would pale in comparison to film cameras, and that the demand for film would continue to grow. By 2000, there were 500 million silver salt cameras in use, and it was thought that demand in China and India would increase. Engineers also thought that developing even more sensitive film for developed countries of Japan, the US and Europe would lead to increased demand. Ueda also says "I thought photographic film and digital could coexist".

Actually, in 1986, the "Fujicolor QuickSnap" was released, which was based on the new idea of film with a lens attached. This was an explosive hit. With a million sold in its first year of release, shipments of these devices more than doubled each year and by 1994 had reached 55 million in Japan, and 18 million overseas. The company also released a camera compliant with the new Advanced Photo System (APS) specifications in 1996. APS was a camera and film standard jointly developed by Fujifilm, Kodak, Canon, Nikon and Minolta, and had a number of advantages such as enabling miniaturization. In this way, the company continued with improving and upgrading its photographic film, its core business.

At the same time, the company continued the development of the film camera. Figure 3 shows the 10 years between 1995 and 2005 in which both new digital and film camera products were continually developed and released onto the market. Even with the rapid decline in demand for photographic film beginning in the 2000s, the company continued to develop film cameras.

Thus, Fujifilm improved its film business by exploiting its accumulated technology and know-how, and in parallel engaged in exploration activities into the digital camera.

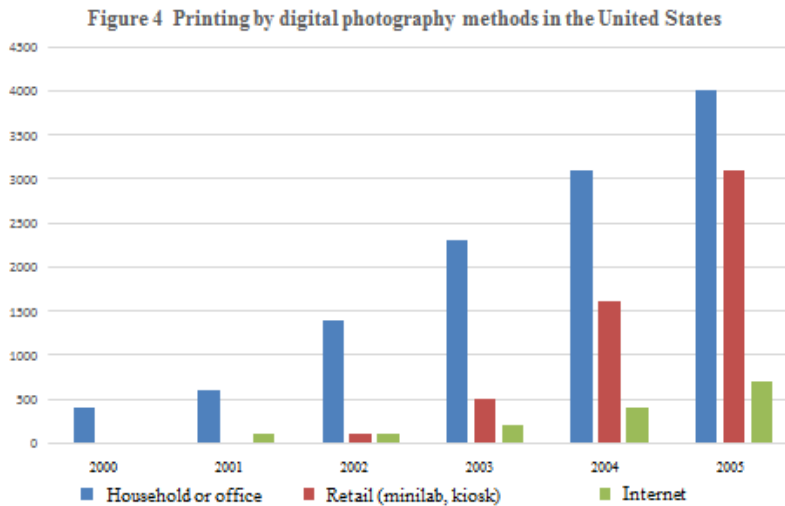
Figure 3 Digital and film camera coexistence



As well as that, the company also drove a strategy of coexistence with its development and print processes. Film that has been used to capture images only becomes a photograph through the processes of development and printing. Fujifilm’s network of photographic shops spread around the country provided rapid development and printing services, and the network supported Fujifilm’s competitiveness. However, since the digital camera made it possible for people to use a PC and a printer to print their own photographs, photograph development and printing services became unnecessary, jobs in photography shops became fewer, and discord with the company’s traditional business partners became a probability. Thus, in 1996, Fujifilm developed a digital minilab called “Frontier”, which enabled color prints of digital camera photo data using laser exposure. Not only did this dramatically raise the quality of photographic prints, but also extended color printing paper usage from the conventional film camera to the digital camera. For this, the company developed high-speed digital image processing hardware, the laser exposure unit and color image paper specialized for laser exposure. Then in 1999, Fujifilm developed a low-cost version of the popular system called “Frontier 350/370”. These digital minilab developments promoted the strategy of coexistence of photographic film and digital cameras, provided some relief to the photography shops, who were the company’s important business partners, and must have contributed to mitigating objections.

There are three ways to print photos taken with a digital camera. The user can print them at home on a printer, or have them printed at a photography or retail outlet with a minilab, or have

them printed over the Internet. Since the digital minilab prints were much more beautiful and longer lasting than prints done at home, the demand for these rose quickly. Figure 4 shows this growing demand, and suggests that the strategy to coexist with the development and printing processes was a success.



Source: Photo Marketing Association "Photo Industry 2005: Review and Forecast," pp. 8-9

In this way Fujifilm allowed its improvements of its film business and exploration into the digital camera to coexist, not only upstream in product development, but also downstream in development and printing processes. However as mentioned, by 2005, the company's share of the digital camera market had fallen, and the demand for film had also fallen to half of what it was at its peak.

3.3 The second stage: Systematic exploration for new business

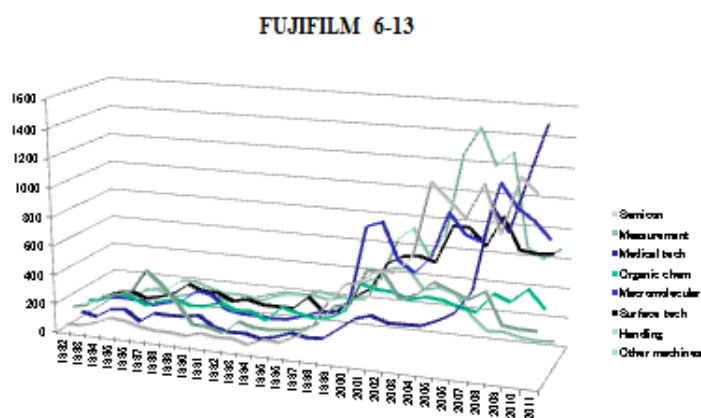
From 2003 onward, as the company's digital camera market share shrunk and demand for its photographic film fell away rapidly, the need to find and develop new business became a pressing issue. Traditionally, Fujifilm's new businesses started by naturally splitting off from existing businesses, actions that were supervised by the company's production materials division. However, in stage 2, the company adopted a more proactive and systematic exploration mechanism. Specifically, this entailed refining the exploration area and radically reviewing the company's R&D system.

This second stage differed from the first stage exploration area in which the digital camera was obvious, and had to be started with a wide-area exploration to find out exactly what business areas should be explored. Hence, in 2001, Fujifilm explored business areas based on a

two-dimensional matrix of technology and the market. Since its inception, Fujifilm had accumulated highly versatile fundamental technologies such as organic and inorganic materials chemistry, imaging technologies, optical technologies and analysis technologies fostered in fields such as photographic light-sensitive materials. The company spent 2 years taking stock of these accumulated technologies to match them with market needs. Finally, the company plotted their existing and new technologies on a horizontal axis and plotted the present and future markets on a vertical axis to create a four quadrant map. Based on the results of this study, Fujifilm identified six business areas in which the company could apply its technological capabilities to grow - the areas of healthcare, high-function materials, graphics, optical devices, digital imaging and documents. This stage was the first time the company was able to clarify the business areas to specifically explore.

We can look at the patent application situation in Fujifilm’s peripheral technical areas to infer the state of its technical exploration. To see the trends in patent applications in these peripheral technical areas we counted the cumulative patent applications by technical field between 1982 and 2012, and looked at the top 6th to 13th fields in which patent applications had been made. As shown in Figure 5, it can be seen that from 2000 onward, the number of patent applications in all technical areas rise consistently from the top 6th to 13th fields. Differing from the core business, it can be seen that technical exploration accelerated widely in the peripheral technical areas. It could be said that the company had engaged proactively in a uniform diversification strategy. CEO Shigetaka Komori spoke of the difference with Kodak saying “our diversification was broader and deeper”, which is consistent with these trends in patent applications.⁴

Figure 5 Trends in patent applications from the top 6th to 13th

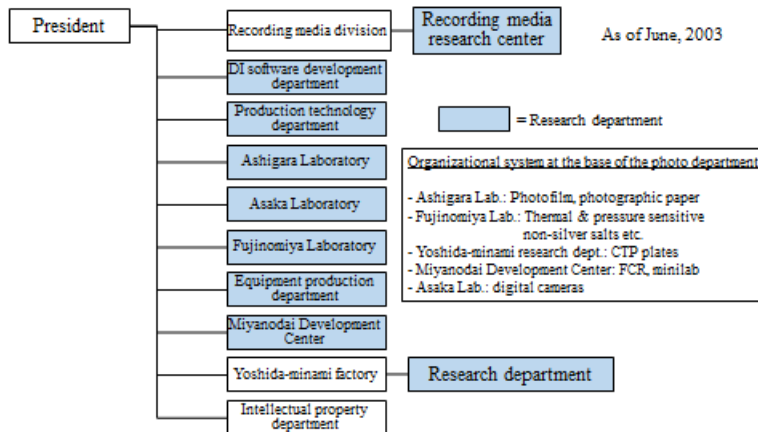


From EPO Worldwide Patent Statistical Database.
 The number of annual patent applications in the top 6th to 13th fields containing many Fujifilm applications from among 35 technical classes, aggregated based on WIPO IPC AND TECHNOLOGY CONCORDANCE TABLE

⁴ *Creating new value through innovation: the Fujifilm challenge*. Fujifilm Holdings (in Japanese)

In addition, the company's R&D organizational system was radically overhauled. In 2003, the R&D organizational system was centered on the photograph business, the core business of the company. As shown in Figure 6, as film research was carried out at Ashigara laboratory and photographic paper R&D was done at the Fujinomiya Laboratory, the company's R&D mechanisms were separated according to the elements that made up the photograph business, and there was almost no sharing across them. When the photographic film sales rapidly declined, the company recognized that the lack of a mechanism to command and oversee R&D in its entirety and flexibly position engineers as necessary was a huge hindrance to creating and fostering new businesses.

Figure 6 R&D organizational systems in the photograph era



Source: Created by the author from Fujifilm materials

Thus, in 2004, the company set up an R&D headquarters, and under it created a technical strategy department (currently the innovation strategy planning department), an intellectual property department under the CEO, and “divisional labs” to support those various divisions. In addition, the company established a “Corporate lab” system for engaging in company-wide basic and advanced research for support of its business divisions. The thinking behind this move was to transform the R&D organization systems to clarify its roles and functions. Having only the Divisional Lab pursuing development related to business would not have been enough to bring about innovation, hence, Fujifilm set up the Corporate Lab with separated functions for advanced and basic R&D at the pan-company level. The advanced research laboratories established in 2006 were part of the Corporate Labs.

These resulted in the company achieving the shift in the business areas in the second stage.

Figure 7 chronologically plots sales in the imaging and information sectors to indicate how the shift in business areas was made. Imaging sector includes conventional film, photographic paper and digital camera-related businesses. The information sector includes medical devices, pharmaceuticals, cosmetics, printing systems and FPD materials etc. In the fiscal year ended March 2004 (FY 2003), sales in imaging were greater than those in information. However, as sales in imaging fell and those in information rose, the trajectories of these finally crossed and reversed. By 2015, information was achieving sales about 3 times those of imaging. Thus, in stage 2, there was a shift away from the imaging area, which included the company’s traditional core business, to the information area.

Figure 7 Sales trends in imaging and information



Source: Created by the author from Nikkei NEED

3.4 Exploration and creation in the cosmetics business

In the second stage, as mentioned, the company set down six growth areas. One of these was cosmetics business in healthcare area. Here, let’s look specifically at how Fujifilm executed its exploration activities in this business. Fujifilm made its foray into the cosmetics market in 2006. Sales of its flagship brand “Astalift” broke through 10 billion yen in its fourth year after release. It has to be said that the sales of cosmetics are only a tiny when viewed in the context of the entire company. However, in terms of synergies between core business and exploration, creation of cosmetic business, having been born through synergies with the photographic film business, is indicative.

Due to loosening of regulations, the number of companies in the cosmetics market is now more than 2000, and the market size has changed little over the past 10 years. Since it’s OK to call it a saturated and mature market, it most certainly is not an attractive one. Nevertheless, Fujifilm went in. The company determined that by using its technologies and know-how

accumulated in the photo film business, its core business, it could differentiate itself from other companies.

The exploration into the cosmetics business was done under the direct control of Yuzo Toda, director of life science research laboratories at the time (Vice Present and CTO as of 2016). Fujifilm selected healthcare as a new business field around 2004 - a business domain that covers a significantly large area. Among those possibilities, Fujifilm explored by considering specifically what to do, what should be done and which of its basic technologies of which it had taken stock could be applied. It was known that collagen was the source of firmness of the skin, and was actually also a key ingredient in photographic film. Thus, the company thought the base technologies accumulated in its photographic film business could also be used in cosmetics.

However, the path to turning this into a business in cosmetics entailed exploration activities into technologies and the market as well as uncertainties that had to be surmounted. Certainly, the company had the fundamental technologies, but there was no conclusive evidence that they could actually be applied to cosmetics. In addition, the company had no prior experience in the cosmetics business, and neither did it have an established sales mechanisms or channels to get cosmetic products to customers. Thus, the company didn't have solid prospects not only for the technology but also for the market. This situation was met with questions and opposition from both inside and outside of the company. Toda, who led the cosmetics business, looked back on the time as follows:

“Maybe we were like the 7 Samurai - we had to face a headwind. Only 2~3% of the company approved of the new business at the time, with the remainder being politically independent or indifferent. Those who thought “whatever” eventually became the opposition, and for us were just insurgents. So, to make them think it was interesting, we thought about creating an example of success, even if it was only small.”⁵

When entering the mature cosmetics market, Fujifilm thought about what it should do to develop cosmetics which cosmetics companies would not conceive. Hence, the company rethought cosmetics from a fundamental perspective on what exactly was necessary for the skin. They settled their focus on how to deal with blemishes and wrinkles, problems that really bothered females. Yoshisada Nakamura, (Product Group Director, Life Science Division as of 2013), had the following to say:

⁵ <http://forbesjapan.com/articles/detail/2803> Forbes JAPAN article on Yuzo Toda's beliefs - a man who supported Fujifilm's new business strategy (in Japanese)

“Cosmetics have both functional and emotional value. We focused on functional value, as it was our area of strength. We said let’s make cosmetics that have never been possible. That was our starting point.⁶

When the company engaged in technical exploration to find out exactly what was good for skin, they found it was possible to apply the company’s proprietary nanotechnology to raise photographic particle function and stability to improve the function of collagen. The company also focused on antioxidant technology to find out whether it was possible to eliminate active oxygen with antioxidants to protect the collagen. Here, the company selected a plant-derived natural compound called astaxanthin from its proprietary database of compounds. With cooperation from the analysis technology center, the company found in its research of its antioxidant capabilities that it had the ability to scavenge extremely active oxygen. For the astaxanthin to reach deep into the skin, the particles would have to be made small down to the nano level ($\times 10^{-9}$ m), which presented many problems that could not be solved easily or independently. Hence, the researchers sought help from the emulsifier and dispersant group who had been involved in research into emulsions with photographic film. The group’s support enabled them to successfully maintain the astaxanthin performance while making it in smaller particles. This was how an “anti-oxidation technology” to prevent skin aging was developed.

In this way, Fujifilm explored functional cosmetics differentiated with technology and trod the path to commercialization. The three fundamental technologies behind this were related to collagen, anti-oxidation and nanotechnology to control the fine particles, and were all technologies accumulated in the film business, but transferred and applied to cosmetics. Thus, in that process, the R&D system played a critical role in enabling cooperation and partnering across departments with other groups in the company such as the analysis technology center and emulsifier and dispersant group.⁷

4 Discussion

The paper has presented a contingency framework covering differences in the relationship

⁶ Ikujiro Nonaka, *Essence of Success* Vol. 64 Astalift/Fujifilm. Works Dec 2012 ~ Jan 2013 (in Japanese)

⁷ Fujifilm had to think about a marketing strategy to suitably convey the value of its cosmetics to customers. As a result, the company thought about starting out with mail order to get onto the market and then expanding sales to shops. To convey the value of this technology-backed cosmetic product, the company thought mail order would be a good way to deeply transmit detailed information about it. Thus, in 2008, Fujifilm began broadcasting TV commercials. Currently 60% of sales are from mail order, and sales are executed through 8,000 stores.

between exploration and exploitation depending on circumstances and the different management issues faced in ambidextrous organizations, and has analyzed the business transformation process of Fujifilm from the perspective of the ambidextrous organization. This section considers management to solve business issues of the ambidextrous organization.

4.1 Contingency framework relevance and effectiveness

As already stated, Fujifilm's transformation process can be understood in two stages, both in which exploration was enacted. In stage 1, the company partnered with Tohoku University and other companies and engaged in exploration activities into semiconductor technologies, and in stage 2 engaged in technical exploration to eliminate active oxygen and market exploration. These stages were the same in terms of exploration activities into new areas, but differed in the relationship between exploration and exploitation.

In the first stage, the exploitation of the company's film business and exploration into digital camera business were in a cannibalistic relationship over the same customers. The spread of the digital camera was due to its substitutability with photographic film and resulted in reduced demand for film. Since avoiding opposition from the photographic film business division due to this relationship was a major business issue, the appropriate management was critical. In contrast, in exploration and exploitation in the second stage, the relationship was not a cannibalistic one, but one that brought about synergies. The result of Fujifilm's exploration activities into cosmetics brought it new customers, and was not a development that had substitutability with the company's core business, and hence did not obstruct those demands. Thus, it's difficult to assume that there was opposition from core business divisions. In this way, bringing about synergies between businesses is an important point. These are the major differences between the first and second stages.

Hence, in the processes of transformation at Fujifilm, both exploration and exploitation were performed in parallel in both stages, but the relationship between exploration and exploitation in each stage was different, meaning the business issues facing the company were different, and different management was required to solve problems in each stage. Fujifilm's case shows that contingency perspective into the ambidextrous organization indicates effectiveness and relevance to actual corporate transformation process.

4.2 Conflict avoidance in the cannibalistic type

With the cannibalistic type, in other words the case in which exploration activities have substitutability with the company's core business and reduce its demand, the critical managerial issue in running an ambidextrous organization is that of avoiding backlash from and conflict with core business divisions. Considering that the digital camera popularization would destroy

demand for photographic film, obviously the company's divisions involved in its film business could have expressed strong resistance to the digital camera development.

In actual fact, existing research reports that there were fierce clashes between the two at Kodak (Lucas & Goh, 2009). In 1994, Kodak separated a new digital camera division from its conventional photographic film division, and discord arose between the two divisions, hence the company had to reconfigure these organizations many times to try to eliminate it (Lucas & Goh, 2009).⁸

Conversely, as shown by the Fujifilm case, both the film and digital camera divisions poured their efforts into developing the products for which they were responsible. Despite the fact that the company had set up the electronic imaging department and started digital camera development early in 1984, why wasn't there any opposition from the film division?

This paper points out two things – expanding and redefining business domains to include both the analog and the digital, and enabling deep involvement in those tasks from employees. Fujifilm formally listed the business domain of Imaging & Information (I&I) in late 1980s. Beginning as a film company, Fujifilm redefined itself as an imaging company by expanding its domain. Ueda, who was serving as director of R&D, said the following:

“This company is not a film company, it's an imaging company. With the I&I slogan, we make efforts to convert information into high-quality images.”⁹

The definition of imaging encompasses both digital and analog. Redefining and expanding the meaning of our businesses so that the company unified its people enabled the photographic film and digital camera divisions to commit to their areas of responsibility and coexist, and prevented opposition.

As well as that, middle management was involved in the process of redefining domains, as follows: In 1987, the middle managers' group autonomously launched a strategic planning committee (Kuwashima, 2009). This committee had 10 members who came from various different departments such as laboratories, manufacturing and personnel. Around this time, the electronic imaging department had already been formally established to develop digital cameras, and this group formed around middle management with interest in the future identity of Fujifilm, and was thus created as a place for discussion on the future directionality of business. This

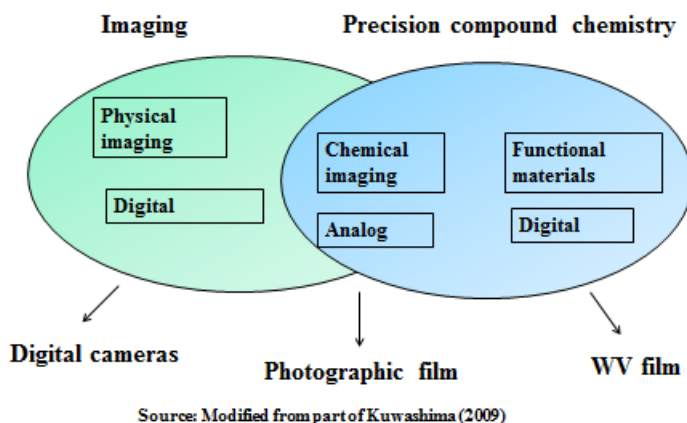
⁸ According to Kodak, it was Kodak development supervisor Steve Sasson that invented the world's first digital camera in 1975. This was a 100 x 100, 10,000 pixel device, whose images could be displayed on a television. Up to 1993, Kodak invested around 5 billion dollars in digital camera technology R&D. In other words, the company top management knew the digital technology era was coming.

⁹ Chapter 3 Fujifilm: A second Foundation. In: Harvard Business School, *Case Study Japan Corporate Collection*. Diamond. (in Japanese)

group came together about once a month, and submitted a final report to senior management.

As shown in Figure 8, this report contained the two business domains of imaging and precision compound chemistry, drawn as two large circles (Kuwashima, 2009). The area of overlap between these two domains was chemical imaging, in other words the domain in which photographic film was positioned with digital cameras and high function materials typically used with WV films at the edges. At the time, it was middle management that conceived this business domain. In 1987, the middle level management had already discussed future business domains, and had agreed a business direction that covered both photographic film and digital cameras. These discussion and agreements had probably already been made with the official redefinition of the I&I business domain.

Figure 8 New business domain proposals



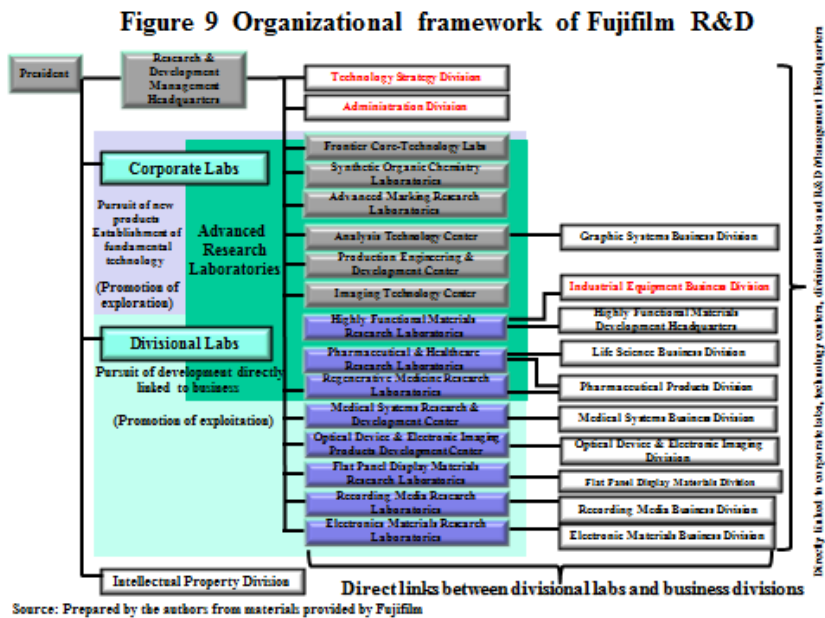
To proceed technical change smoothly in the company, the involvement and understanding of the employees was of major significance. Because engineers are normally strongly committed to the technologies they are working with, it is very difficult for them to see their limitations (Shibata, 2012a; Shibata, 2012b). It is difficult for them to recognize their limitations when selection mechanism (Burgelman, 1991) don't work in organizations. Much more, the global demand for film continued to grow until 2000, and it had not reached the limit of its performance or quality. Hence, it would have been impossible for engineers to recognize the limitations of photographic film. In such a situation, without understanding and involvement of the engineers, shifting to the digital camera would have been difficult. In 2006, Fujifilm's first restructuring of its photography-related businesses, meant that the company had continued with its strategy of coexistence right up until the time that engineers themselves could understand the

limitations of the photographic film business.¹⁰

4.3 Triggering synergies in the complementary type

In the second stage, since exploration activities had low substitutability with core products, the relationship was not the cannibalistic type but one of increasing new customers. This paper has described ambidextrous organizations with these types of relationships as “the complementary type.” The crucial managerial issue with complementary type is how to bring about synergies between businesses.

Firstly the important thing is to configure a suitable R&D organizational system. At the same time as enabling flexible allocation of funding and exchange of resources across boundaries between business and technical fields, the organizational system must also enable flexible feedback from the market in the product development process. The former means flexible resource flow horizontally between businesses and between technologies. The latter means enabling flexible resource flow along the vertical direction from basic research through to sales, in other words adopting a chain model of product development processes rather than a linear model. Secondly, the important thing is to surmount the superficial differences between products and markets etc., and direct attention to resources sharing at a deeper level (Shibata, 2012a; Shibata, 2012b).



¹⁰ After that, Fujifilm entered its second foundation in 2006, and redefined the meaning of the company. The company shifted from its culture of imaging and information to become a company aiming to contribute further improving the quality of life of people. With its newly redefined business domains, Fujifilm now lists itself as a “total healthcare company.”

In case of Fujifilm, up to 2003, R&D organizational system was centered on photographic film, as shown in Figure 6. This system was based on a linear, one-way model from basic research to product development, manufacture and commercialization, which functioned well in the film era with its self-evident demand. However, this model didn't run so well in the second stage when the company was pressed to foster new business. This was because demand could not be guaranteed. In 2004, with the establishment of Fujifilm's new R&D headquarters, the company put in place a chain of command governing the whole, as shown in Figure 9. What can be understood from Figure 9 is an organizational design in which laboratories are divided into Corporate Labs that carry out basic research and Divisional Labs for their respective businesses, and at the same time, the divisional labs also belong to R&D headquarters and each business division. This entails coexistence in a matrix containing mechanisms differentiate developments in line with market characteristics and mechanisms for integration across the boundaries between businesses with the R&D headquarters. Hence, this try to maximize balance between differentiation and integration.

As well as that, this organizational design enables feedback to Corporate Labs via divisional labs on issues or the market needs of business divisions. Not only does development process operate for one-way sequential flow from upstream to downstream, but also enables flow from downstream to upstream. This mechanism thus enables flexible resource exchange and sharing across the boundaries in the horizontal direction between business division and the boundaries in the vertical direction between processes. For example, this cross-functional system enables flexible and optima allocation of resources for research and development costs. This resulted in imaging R&D cost reduction up to 18% by 2006, which had been 30% of the total R&D costs in 2002, and increases in investment in other new growth areas. The R&D headquarters enabled flexible resource allocation between exploration and exploitation.

In addition to reforming the R&D organizational system, Fujifilm also directed attention to technologies at deep level. On the surface, the product characteristics, value offered to customers and applications of photographic film and cosmetics are completely different, but had a high level of commonality when looked at fundamental technologies. Both have a relationship with control of collagen and both have an important focus on eliminating active oxygen. Because these technologies were pretty exploitable, it was possible to bring about synergies through sharing and integration transcending the boundaries between product areas and produce functional cosmetics differentiated from other companies.

In this way, Fujifilm changed the R&D systems radically from stage 1 to stage 2. This enabled the company to create synergies with core film business in the complementary type.

5 Conclusion and implications

This section briefly summarizes what has been discussed here and considers theoretical and managerial implication.

This paper aimed to clarify the differences in the relationship between exploration and exploitation brought about by product substitutability, then proposed a framework for the two types of ambidextrous organization, and then discussed the management issues and effective management in each type. Then, the paper illustrated usefulness of contingency framework through the detailed case analysis of Fujifilm. In stages 1 and 2 of the company's transformation process, the company adopted two types of ambidextrous organization accordingly.

The effective management of the cannibalistic type and the complementary type must be different, even in ambidextrous organization. Since crucial managerial issues are different, management to handle them must be also different. Despite that, existing research has not made this distinction, and has handled these issues as the same ambidexterity. It has also treated organization as the same, despite there being differences in the relationship between exploration and exploitation. One of the reasons existing research has derived opposite findings relating to management of ambidextrous organizations is possibly due to this point. In this way, the contingency framework of ambidextrous organization will enhance explanatory power through more refined classification of the concepts that existing research has grouped together and viewed in the same way. This is the theoretical implication of this paper.

In addition, as markets and technologies change increasingly rapidly, capability of corporate transformation will become all the more important. The concept of the ambidextrous organization is valid for corporate transformation, and how to manage it can influence whether a company rises or falls. The reason why Fujifilm was able to survive and grow was adopting ambidextrous organization appropriately in response to market conditions, which can be possible answer in terms of ambidextrous organization. Fujifilm started with initiatives to manage the cannibalistic type to develop the digital camera, and then complementary type initiatives to accelerate new businesses creation. In other words, the shift from the cannibalistic type to the complementary type entailed the company taking steps to bring about synergies to foster new businesses. This required shifting to an appropriate organizational structure, which led Fujifilm to radically transform its R&D system in 2004.

This paper demonstrates the relevance and effectiveness of contingency framework with just single case of Fujifilm. It would be desirable to add more case analyses and further raise the level of relevance and effectiveness of the ambidextrous organization.

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