This paper was presented at The XXVI ISPIM Conference – Shaping the Frontiers of Innovation Management, Budapest, Hungary on 14-17 June 2015. The publication is available to ISPIM members at www.ispim.org.

Design Policy of Local Government and SME's Innovation in Japan

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Abstract: In this paper, we report on our attempt to examine the effect that the design policy of Japanese local governments has on SME and thus to clarify the factors that contribute to an effective design policy. The results of our questionnaire survey made clear that the main players of the design policy are prefectural governments and ordinance-designated cities. The case survey we conducted revealed that the design policy has been advancing further with the passage of time. The survey results indicate that it is effective to provide comprehensive support to SME technology-based matching and product development project in order for B2B enterprises to promote B2C business activity. Small and medium enterprises lack recognition of the significance and effect of design utilization. Initiatives for enlightening on the designing activity may be vital for further enlarging the effect of future design policy.

Keywords: design policy; SME's R&D; technology-based matching

1 Introduction

In this paper, we focused on the design policy of local governments and how such policy influences the innovation of small and medium enterprises. In the economic activity of Japan, small and medium enterprises are playing a major role. As of February 2012, there were about 3.86 million companies in Japan. Of these, 3.85 million are considered to be small or medium enterprises, accounting for 99.7% of the total number. (Ministry of Economy, Trade and Industry, 2013) And, 69.7% of all employees are hired by small and medium enterprises. In the aspects of the sheer number of companies and the scale of employment, it is impossible to underestimate the small and medium enterprises when giving consideration to Japanese economy. However, the management foundation of those enterprises is fragile. Shikano (2008) conducted an analysis of the average scale of the small and medium enterprises by using their financial management database. He points out that the mean figures of the company scale are 6 employees, turnover of JPY 125 million, total assets of JPY 84 million, and company capital of JPY 10 million – lower than the initial estimations.

Between 2009 and 2012, the number of small and medium enterprises in Japan decreased 8.3% from 4.20 million to 3.85 million. The bankruptcy of Lehman Brothers is considered to be responsible for that, either directly or indirectly. Having such a fragile management foundation as mentioned above, the key management issue for those small and medium enterprises is how to disperse the management risks in order to survive economic downturns.

One of the ways to disperse such risks is to have more diverse business partners. It has been pointed out that the business structure of Japanese manufacturing sector used to be centered on transactions among affiliated company groups to ensure long-term business stability, but such a business structure has been presumably changing since 1990's. The Small and Medium Enterprise Agency of Japanese government analyzed the status of diversification of business partners by using their database containing 140,000 manufacturers. The results indicate that only 40% of their transactions are conducted with enterprises in vertical business affiliations while 60% is conducted with independent enterprises. (The Small and Medium Enterprise Agency, 2007) However, despite the changes in business relationships, approximately only half of the small and medium enterprises came to have more suppliers and sales contacts along with the passage of time while the other half had either the same or even less number of business partners. Those enterprises which had an increased number of sales contacts point out increased sales and risk dispersion as the main advantages of their business diversification. The major increase, however, is limited to the existing products, while cultivating new business partners is still a difficulty for them.

One of the major policy issues of local governments is the activation of small and medium enterprises and local industry within their jurisdiction. They are implementing their support to the local small and medium enterprises by offering subsidies to R&D, encouraging industry-academia collaborations and other promotional schemes. In recent years, their policy in connection with designing activity has been gathering attention as a new initiative of industrial innovation. The effect of such an initiative is a matter of interest. Designing activity has been drawing attention as a means for enterprises to realize business innovation as a variety of studies have pointed out that designing activity is vital for corporate management and innovation. (Lorenz, 1986, Utterback, 2006, Verganti, 2009, etc.)

Large Japanese corporations, however, carry out product development while giving priority to technical functions and performance instead of designs. (Hasegawa, 2012) When it comes to the small and medium enterprises which have less business resources than those large corporations, it is difficult to imagine that they are proactively incorporating designing activity in their business.

In case designing activity surely brings about positive effects on corporate management, it is likely for the local governments that give various forms of support to the local industry and small and medium enterprises to incorporate designing activity into their policy. In fact, there are some local governments in Japan that have assisted the local small and medium enterprises in connection with design utilization since around 1950's. Little investigation of actual situations, however, has been carried out so far by way of case studies. For example, there was one survey regarding design policy of one prefectural government in Kyushu that made clear the actual condition of that policy. (former Kyushu Bureau of International Trade and Industry of Ministry of International Trade and Industry, 1991) The current Ministry of Economy, Trade and Industry also conducted investigation on a few local governments regarding their design policy in 2008 and 2014. These surveys, however, were carried out by the government and they are viewed as rather exceptional. It is still difficult to state even now how the design policy of local governments is implemented and the extent of the effect on local enterprises.

The research questions we designated in this study are as follows: To what extent has design policy been implemented in the local governments in Japan? What initiatives are being implemented in the policy? What effects does design policy bring out upon the innovation of small and medium enterprises? And, what are the characteristics of the effective initiatives? This study purposes to clarify these matters.

2 Data Acquisition

To find the answers to the designated research questions, we carried out a case survey on the design policy by acquiring data through a questionnaire survey regarding design policy and then analyzing the obtained results.

The data regarding the design policy was acquired from all local municipal governments in Japan by the questionnaire survey. The questionnaire survey was conducted by Center for Science, Technology and Innovation Policy Studies, Kyushu University (hereinafter, abbreviated as "CSTIPS") as part of the investigation related to the "Development of the Case-Based Reasoning System for Regional Science and Technology Policy" project that is being prompted with the grant of "Strategic Basic Research Programs (Research for Science and Technology for Society)" from Japan Science and Technology Agency (JST). The survey target was a total of 1,789 local governments consisting of the 47 prefectures in Japan as well as cities, towns, villages, Tokyo 23 wards belonging to those prefectures. The survey was conducted during the period between April and December, 2013. In our study reported in this paper, analyses were carried out on the data comprising 1,777 replies (collection rate of 99.3%) that had been collected as of the end of September, 2013. In Japan, some cities are designated as ordinance-designated cities (hereinafter, "designated cities") as well as core cities, which are categorized in our analyses separately from the other cities.

Through the questionnaire survey, we asked them whether they implement design policy, the purpose of their design policy, contents of the implemented design policy, budget set aside for design policy and the responsible department.

In our case survey, we searched the cases that have produced positive results through discussions with experts of design policy. As a result, we decided to take up "Tokyo Business Design Award" granted by Tokyo Metropolis as our case study. The interview was conducted on the staff responsible for policy making and implementation as well as the participating enterprises. The survey period was from January to March, 2015. In the interview with the policy making and implementation staff, we asked them the characteristics of the initiative and the ingenuity they devised for the implementation. In the interview with the participating enterprises, inquiry was made on the reasons for participation, how they developed the product for the project and the results that came out of their participation.

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3 Outline of Design Policy of Local governments

Under this section, an outline of the actual situation of design initiative is provided as it was made clear from the results of the questionnaire survey.

Definition of Design Policy

Design policy especially focuses on initiatives taken in connection with manufacturing. Design policy is hereby defined as "initiatives taken for dissemination, enlightenment, and use promotion of designing activity that are targeted to enterprises, universities and citizens in the locality." Specific examples are given in the 4 areas of 1. designing

activity for external shapes of products, 2. activity for improving the user-friendliness / interfaces, etc. of the products, 3. activity for designing the product packages, and 4. activity for developing products or services that involve professional designers.

3-1 Implementation Status of Design Policy

First, the overall status of implementation of design policy is as follows. 1,773 local governments replied to the question whether they implemented design policy in fiscal year 2012. The results show that 128 of them (7.2%) implemented design policy. Looking at the results sorted out for categorized municipal units as show in Table 1, it is clear that design policy is being implemented in large-scale municipalities. In other words, almost 70% of the prefectural governments are implementing design policy. The designated cities also implement design policy at almost the same level as the prefectures. The implementation rate of design policy in the other municipalities is about 10% only, indicating that there are large differences among the municipalities in the implementation of design initiative.

Table 1 Implementation status of design policy by size of municipalities

	N	*Implementing municipalities*	*Implementation rate*
Prefectures	38	26	68.4%
Designated cities	20	13	65.0%
Core cities	40	5	12.5%
Cities	724	49	6.8%
Tokyo Wards	23	3	13.0%
Towns	745	31	4.2%
Villages	184	1	0.5%
Total	1774	128	7.2%

Purpose of Design Policy

Design policy is being implemented for various purposes. As indicated in the survey results (Table 2), the most important purpose is the promotion of regional industry. 73.8% of the replying local governments mention regional industry promotion as the purpose of their design policy. It is then followed by the promotion of small and medium enterprises and the branding of products developed in their municipal area, which are viewed as policy purpose by over 50% of those municipalities. As mentioned earlier, the implementation status of design policy largely vary among the prefectures, designated cities and core cities or smaller municipalities. Therefore, we made a categorization of prefectures / designated cities (Group A) and core cities / other cities, wards, towns, villages (Group B) in order to see the purposes prioritized in those groups. The results show that the purpose commonly viewed as important is regional industry promotion. On the other hand, there are certain purposes that are highly regarded by either of those groups. Among other things, “small and medium enterprise promotion,” “utilization of corporate technology capability,” and “community revitalization” were not viewed

similarly by those groups. Group A puts emphasis on “small and medium enterprise promotion” and “utilization of corporate technology capability,” while Group B especially views as important policy purpose the “branding of products developed in their municipal area.” Group B shows a tendency to put more emphasis on the “branding of products developed in own municipal area” than Group A, although the difference is not statistically significant.

Table 2 Purposes of Design Policy by Size of Municipalities

	Total	*Group A Prefectures, designated cities (n=39)*	*Group B Core cities, other cities, wards, towns, villages (n=87)*
Local industry promotion	73.8%	74.4%	73.6%
Local employment creation	22.2%	25.6%	20.7%
Educational, cultural promotion	11.9%	10.3%	12.6%
SME promotion	54.0%	84.6%	40.2%
Utilization of corporate technology	31.0%	56.4%	19.5%
Branding of local products	53.2%	43.6%	57.5%
Community revitalization	42.1%	12.8%	55.2%

Note : Figures are ratios of municipalities that set above items as their design policy goals

Implemented Design Initiatives

Next, we consider what initiatives are being implemented for design policy. We first conducted interview and document research in order to figure out certain initiatives that some of the local governments are implementing, and then arranged an inquiry regarding 12 initiatives related to design policy to find out the implementation status of those initiatives. (Table 3) The results show that the implementation rate of these initiatives is 24.3% on average. Among other things, the promotion of collaborations among industry, academy and government is the initiative that is most highly implemented by the municipalities. Its rate is 35.9%. It is followed by such initiatives as the human resources support for design development and installation of exhibition space for local brand items (33.6%), and hosting of exhibitions (32.0%), that are implemented by many of the municipalities. Similarly to the analysis of the design policy purposes, we categorized those municipalities into Groups A and B, and found out varying trends in the initiatives they are putting into practice. First, the initiatives that are highly implemented by Group A are, in order from the highest, human resources support for design development (71.8%), hosting of exhibitions (61.5%), and offering of opportunities to get acquainted with designers (48.7%). The trend of their activity is focused on providing support for the designers and enterprises to get to know each other and to practical assistance for carrying out product development. The average implementation rate of design policy of Group B is not averagely high. Even the most highly implemented initiative is put into practice by a little more than 30% of the municipalities. Those initiatives implemented by them are the installation of exhibition space for local brand items, promotion of collaborations among industry, academy and government, and financial support for design development. This presents a different trend from that of Group A.

Table 3 Implementation status of design policy by size of municipalities

	Prefectures, designated cities (n=39)	*Core cities, other cities, wards, towns, villages (n=89)*	*Total (n=128)*
Setting up promotion committee	23.1%	18.0%	19.5%
Setting up promotion organization	20.5%	6.7%	10.9%
Managing shops of developed products	5.1%	13.5%	10.9%
Setting up exhibition spaces for local brand products	33.3%	33.7%	33.6%
Promoting industry-academy-government collaboration	43.6%	32.6%	35.9%
Hosting exhibitions	61.5%	19.1%	32.0%
Arranging competitions	20.5%	20.2%	20.3%
Award system	33.3%	16.9%	21.9%
Financial support for design development	15.4%	29.2%	25.0%
Human resources support for design development	71.8%	16.9%	33.6%
Offering information on external designing activity	35.9%	16.9%	22.7%
Offering opportunities to get acquainted with designers	48.7%	14.6%	25.0%

Summary

This chapter has discussed the outline of design policy that is implemented on a municipal level. The implementation level greatly differs between Group A (prefectures / designated cities) and Group B (core cities / other cities, wards, towns, villages). While the implementation rate of design policy is about 10% for Group B, it is around 70% among the municipalities belonging to Group A, which indicates that the main players of design policy are prefectural governments and designated cities. Groups A and B also show different tendencies with regard to the purposes and initiatives of design policy. Group A implements design policy for the purposes of activating small and medium enterprises and utilizing the technical capability of such companies with such initiatives as hosting exhibitions, providing human resources support for design development, and offering opportunities to become acquainted with designers. On the other hand, Group B focuses on community revitalization and branding of products developed in their own municipal areas as their purposes of design policy by managing shops, installing exhibition spaces for their local brand items and providing financial support for design development.

The question is why the implementation rate of design policy is relatively high in the prefectures and designated cities. The answer is that, first of all, the designated cities are very similar to the prefectural governments in their scale and authority. In Japan, cities with population of 500,000 or more are eligible to be qualified as designated cities. Once a city becomes a designated city according to the Local Autonomy Law, it is entitled to special privileges. One of them is the transference of some of the authority and finances from the prefectural government. This gives the city a status with authority that is similar to a prefecture. In reality, a city that has been appointed as a designated city had a population of 700,000 at least or usually more. Therefore, it is comparable to a prefecture in their financial and human resources, availability of designers and the number of small and medium enterprises. They thus opt for implanting design policy as they have a good basis of financial and human resources and local industry to carry out the policy. Also, a municipality has a tendency to observe the trend of other municipalities rather than that of the national government. (Hasegawa, 2013) This may be the reason why a certain design policy adopted by one municipality is influencing other municipalities in the neighboring region or of a similar size.

4 Case Study

The analyses of the results of our questionnaire survey made clear that the main players of design policy are prefectural governments and designated cities which implement their policy for the purposes of supporting small and medium enterprise and utilizing the technology they possess through such initiatives as hosting exhibitions and providing human resources. The next point is the characteristics of those initiatives that produce positive results. We interviewed the experts of design policy. As a result, we singled out Tokyo Business Design Ward (TBDA), an initiative of Tokyo Metropolis that has been producing effective results in recent years among other design initiatives that are targeted for small and medium enterprises. We also discuss two cases of design policy that have been commercialized in the market.

4-1 Tokyo Business Design Award

Tokyo Metropolis has been promoting a support scheme for utilizing the designing capability of the small and medium enterprises in the metropolis since fiscal year 2004 based on the program, "Tokyo Strategy for Utilization of Intellectual Property of Small and Medium Enterprises (August, 2003)." The scheme consists of the four activities of hosting seminars, creating guidebooks, managing designer databases, and enterprise-participating design competitions. (Table 4)

Table 4 Main Activities of Design Policy of Tokyo Metropolis

Hosting of seminars	Introduction to the functions and implementations of designs targeting small and medium enterprises
Preparation of guidebooks	Guide on basic concepts of design utilization and how to use designs effectively
Management of databases	Creation and operation of database of designers who can work jointly with small and medium enterprises
Design competitions	Design competitions for providing opportunities to small and medium enterprises to collaborate with designers (e.g. Tokyo Business Design Award)

TBDA is a design policy scheme that was launched in fiscal year 2012, whereby designers and small and medium enterprises can be matched. The first step of this scheme is to call for advanced proprietary processing technologies or special materials from small and medium enterprises with high technical ability in Tokyo as a competition theme. Next, designers in Japan are invited to provide new business models for utilizing the technology on a proposed theme. The presented proposals are examined by experts to select a competition winner who will be awarded and given support to eventually commercialize their product.

The predecessor of TBDA was a design scheme called Tokyo Design Market (TDM) that lasted for 8 years prior to TBDA. This business scheme was an exhibition that was held in autumn every year where designers presented their proposal for a new product development from their professional viewpoint. The visiting company staff from small and medium enterprises was then matched with a proposal presented at the exhibition. That was the purpose of the scheme. Roughly 300 proposals were exhibited during the

eight years, and about 10 of them were materialized to be commercialized eventually. TBDA is an initiative that has been further developed from TDM, and its scheme is as follows:

In April every year, a call is extended to enterprises to participate in the scheme. Each of the participating enterprises then selects one or more of their proprietary processing technologies or highly advanced materials to submit an application. Next, the review committee makes a selection of participants. In August, the selected enterprises and their technologies are announced to designers. The designers check the list of enterprises and technologies to choose one of their preference, and then spend two months from then on to create a business plan that utilizes the technology that they have chosen. In the process, the municipality holds a joint presentation meeting of all participating enterprises and visiting tours on the manufacturing plant of each of the enterprises so that the designers can better understand the company and its technology. At the joint presentation meeting where all selected enterprises attend, each of them gives a presentation of their technology for about 5 minutes. The plant visiting tour is arranged for a limited number of visitors so as not to impose burden on the enterprises. The designers understand and comprehend the scale and facility of those enterprises by actually visiting their plants and offices. As a result, their proposals can be more realistic and feasible in harmony with the operating condition of each enterprise. When the designers visit the plant, they are obligated to sign a non-disclosure agreement with the enterprise so that they can safely disclose their corporate information.

October, two months thereafter, is the deadline for the designers to submit their proposals. One designer can make a proposal alone or two or more can present their own proposal jointly. A proposal is submitted as a presentation document consisting of within five sheets that explains a proposed product and a business plan associated with it. It cannot be simply a sketch of a product, but they need to present a business plan for the product. After the proposals have been submitted, the first examination will be carried out wherein the examiners narrow down the proposals to nominate only several of them. In the second examination, the enterprises that will receive proposals also join the examiners to participate in the examination. They have an opportunity to select a business plan that they wish to collaborate with. At this point, the participating enterprises can opt for withdrawing themselves from the subsequent process in case they have not been able to find a proposal of their interest.

If an enterprise decides to work with the proposing designer in the second examination, a matching has been made successfully. In December, there is a public notice that a matching has been made. From this point onwards, the enterprise and designer become a business team that works on refining the business plan through discussions. Their next goals are the final examination that is held at the end of January and commercialization of the project product beyond the examination. The team works together for the next two months to refine their business plan and create a presentation material that is to be shown during the final examination. Although prototyping of their product is not obligatory, some candidates who are determined to commercialize do make a prototype in order to transform their business plan into a feasible project.

In addition, between the second and final examinations, the host holds seminars on intellectual properties strategy and design agreements. These seminars provide the enterprises and designers with an opportunity to study the rights they can obtain through the business project, the preparation they should make to secure industrial property rights before the public examination, and the agreements that are necessary when continuing the project even after the examination. The participants can also consult the experts individually about these matters.

Feburary, final examination of opened proposals is held. After that, enterprises set as their goal commercialization of the project product and TBDM support their activity as realization phase.

These processes are included in business schemes of TBDA. TBDA began in fiscal year 2012, and has been held three times so far. During the past two years, this initiative has realized 23 successful matches between the participating enterprises and designers. Also, four projects have been already commercialized or advanced up to immediately before that stage. TDM exhibited about 300 projects in the eight years, of which only about 10 eventually reached commercialization. This means the commercialization rate is 3.3 %. In contrast, that of TBDA is 17%. Of the four successful business projects, we now report one from 2012 and another from 2013, both of them reaching the stage of commercialization.

Table 5 Scheme of Tokyo Business Design Award

	Events	*Meetings*
April	Call for project themes (for enterprises)	
		Explanation meeting
July	Theme examinations (for enterprises)	
	Themes announced /	
August	Call for designers' proposals	
		Explanation meeting for designers
		Plant visiting tour
October	1st examination of proposals	
November	2nd examination of proposals	
December	Theme Award proposals announced	
		Consultation for intellectual property strategy and design agreements
January	Final examination of opened proposals	
February onward	Realization phase	

Source: Documents of Tokyo Business Design Award

Table 6 Number of applicants and commercialized projects in Tokyo Business Design Award

	2012	*2013*	*2014*
Applying themes from enterprises	36	26	23
Selected enterprises	15	19	12
Applying proposals from designers	205	147	104
Successfully matched enterprises	11	12	11
Commercialized cases	1	3	-

Note: Data is counted in January 2015.

4-2 Case 1: Taiyo Toryo Co., Ltd. and Masking Color

Masking Color is a product owned by Taiyo Toryo Co., Ltd. (hereinafter abbreviated as “Taiyo Toryo), a water-based paint maker. This product is an application of paint called water-based strippable into painting colors that can be used on glasses, mirrors and walls. Taiyo Toryo is an enterprise that has been conducting B2B business. They have promoted business collaborations with their customers in the sense that they customize their paint products according to the specifications presented by the buyers. They,

however, had never had any joint projects with designers. Their participation in TBDA goes back to when the ward office where they are based contacted them for a call to participate in the competition. Initially they thought participation in TBDA could be a good memory for them. The company had a pool of various paint technologies that they have created, so they used elimination method to single out a technology to be submitted with the application, which proved to be a paint called water-based strippable that can be stripped off afterwards. Originally, this technology of water-based strippable was used mainly for the purpose of protecting automobiles in stock for delivery. A strippable paint was not very rare in the coating material industry, but they decided to see how the market responds to it as consumable goods.

For the technological offer made by Taiyo Toryo, there were several proposals from designers. In the first examination where the designers' proposals were screened. In the second examination, Taiyo Toryo would get to see screened proposals. Of them, the one made by professional designer Ryuichi Kozeki had a high level of completion. The company decided to proceed with commercialization in a relatively early stage. The proposal was to increase the number of colors, adjust the viscosity and commercialize the paint as pen-shaped paint. For Taiyo Toryo which had mainly engaged in B2B business, B2C-based product development was the first experience. Collaboration with a designer also was their first undertaking. In December when Designer Kozeki and the Taiyo Toryo staff held a meeting, Ms. Kamiyama, Technical Director of Taiyo Toryo proposed a milestone leading up to product sales, after which they worked as a team in drawing up a schedule for product development and sales. Kozeki suggested a plan to display the product at an exhibition called Interior Lifestyle that was scheduled in June 2013, and then quickly proceed with launching in the market. The product development involved two undertakings; expansion of color variations up to 12 and designing an original package. The color variation was realized with the know-how that the company had accumulated. The metal mold for the original package was completed after two prototypes. On the other hand, the business plan proposed by Designer Kozeki was close to completion as it was incorporated with specific ideas regarding the package and product name. These were adopted almost as they were proposed, and the package development was completed. At the exhibition held in June, a variety of major distributors inquired about the product. In August, the product was put on sales in advance at retail shop "Loft," and then other retailers including Amazon followed in carrying the product for sale.

After the sales began, 10,000 units were sold in 18 months. The sales have been in good shape since then. The product has also won a number of design awards; Good Design Award Best 100 and Special Prize (awarded by Director-General of Small and Medium Sized Enterprise Agency) and iF Design Award in 2014.

In addition, due to the increased mass-media coverage, the company became known more widely, which also pushed its sales upward, facilitated new recruitments, and enhanced the staff's motivation.

Figure 1 Masking Color Products and Their Usage

Source: http://www.maskingcolor.com/

4-3 Case 2: Bushu Kogyo Co., Ltd. and Pipegram

Pipegram is an intellectual training toy wherein the pipe processing technology of Bushu Kogyo Co., Ltd. (hereinafter abbreviated as "Bushu Kogyo) has been applied. (Figure 2) This product was developed through a collaboration between Bushu Kogyo and Designer Kozeki in the TBDA competition in 2013. Bushu Kogyo is a B2B manufacturer which specializes in supplying automotive parts. Their first encounter with designing was when they were contacted by a designer with a request for industrial processing as he was developing lighting equipment that required highly advanced processing technology. Before that, they once thought about consigning their original B2C product with a designer, but the project did not actually get started. Therefore, the participation in TBDA was their first experience of engaging in product development that involves designing in their own business. They got to consider participating in TBDA after the design policy staff of Tokyo Metropolitan Government Bureau of Industrial and Labor Affairs advised to take part in TBDA. Initially, they were hesitant to participate as they worried that designers might not be interested in pipes, but they decided to accept the invitation finally. The technology that they offered for the competition was capable of bending a pipe freely and continuously. As the engineering development of this technology had been completed, they were about to begin their search for a possible market.

In the TBDA, several designers made their business proposal for the technology of Bushu Kogyo. After the first examination, Bushu Kogyo had a chance to give

consideration to these selected proposals. The proposal made by Designer Kozeki to create an intellectual training toy was matching the desire that the company always had to contribute to Japanese manufacturing in some way. The proposal was also based on the technological application that could be easily realized with the existing machinery installed in the company through consignment to affiliated companies.

After the matching with the designer, an additional development was promoted with the goal of displaying the product at Interior Lifestyle Exhibition in June 2014. The development of the product moved forward smoothly after the second examination as Bushu Kogyo made a trial production on their own. An extra project was the development of product package and production of sales promotion goods. The matters related to intellectual property rights and contracting procedure were supported by the advisors specialized in these fields who were introduced by TBDA.

The product was launched in the market in November 2014, and it has been already on the sales routes of major distributors including Amazon. Since the product has been put on sale only recently, we may have to wait and see the real market response. On the other hand, there are already some positive results besides product sales. The product has been featured more on TV and it is contributing to the branding of the company. The TV coverage is also gathering the attention of students who are looking for a job. The company also has received more business inquiry regarding the pipe bending processing which is their core business.

Figure 2 Pipegram

Source: http://www.pipegram.com/about/what.html

5 Discussion

Both of the two manufacturers reported in this study are small and medium enterprises that mainly focus on B2B business, and they had an opportunity to develop a new B2C product in the design policy. They participated in TBDA, selected one of their proprietary technologies, and gave a presentation to designers. Then they chose one proposal from those offered by the designers, and began to develop a new product in collaboration with the designer. Within one year after they first met with the designer, their new product gets to be put on sales at shops. The participation in TBDA has brought to these two enterprises a number of positive results. As sufficient time has not yet passed since the product launch, it may be a little too early to discuss the sales status at this point, but for

both products, the sales has been steadily increasing so far, and it is expected to turn the business profitable before long. In addition to the sales revenue, the product launch has already contributed to the branding and advertising of the enterprises as they are more exposed in the TV and other mass-media, the improvement in the working staff's motivation, the success in recruiting more young workers and increased sales in their core business.

The superior technical potential of small and medium enterprises that do not handle final consumption goods was drawn out through their participation in TBDA. Then, they succeed in developing final consumption goods that has sophisticated design. The product then brings about monetary and non-monetary advantages. It is the power of design policy that helps small and medium enterprises which have little to do with designing activity to have a success in developing a new product.

Then, why is the design policy able to produce a positive result in a relatively short period of time? One major factor may be the evolution that the policy initiatives have gone through during the 10 years since the launch of TDM, the predecessor of TBDA. We now discuss the process of this evolution from the two viewpoints of ingenuity in the matching method and comprehensive support for open-ended new product development.

5-1 Ingenuity for matching methods

From designer's pull to technological push

In the TDM scheme, the predecessor of TBDA, the designers first proposed what they want to create, and those enterprises were invited to offer their expertise for what had been proposed. The scheme was what may be called, "designer's idea pull style." On the other hand, TBDA gives priority to the technology possessed by the enterprises, and the designers then make proposals regarding products and business models that utilize the technology offered. We may be able to term this method as "SME technology push style."

There can be several reasons why the designer's idea pull style matching is not very suitable to small and medium enterprises. First, it is difficult for the enterprises to see if and how the designer's proposal is related to their technology. It may not be possible to materialize a proposal with the technology that an enterprise possesses alone. For an enterprise which has never had a chance to collaborate with a designer prior to the exhibition, it is not clear how to work together in a project. It will be difficult for an enterprise which does not have a good judgement on designing to make proper appraisal of the offered design. In case the offered design proposals are far from what the enterprises are specialized in their business, chances are small for a collaborative project to be launched. Another problem is that an idea cannot be used exclusively if it has been publicized in an exhibition already.

On the other hand, the SME technology push style is based on the technology that an enterprise already has, for which the designers make a proposal, so it is easier for the enterprise to come up with a project image and how a product can be developed. An enterprise with highly advanced technology can easily grasp a business plan that is based on their proprietary technology and then figure out the required process of the product development and the degree of difficulty associated with the project. Also, if the proposal is based on its own technology, the existing facility can be used without making an additional capital investment. Being able to select a proposal privately is advantageous for making arrangements regarding intellectual property rights and drawing up a business development schedule thereafter.

Shift to competitive environment

The TDM method is a method wherein a designer proposes his idea at an exhibition and then waits for a small or medium enterprise which is interested in the proposal. In other words, the designer makes a proposal without any specific target for it. The TBDA has adopted a competition style. In this matching style, a number of designers make a proposal for a particular technology or enterprise. In order to surpass the other proposals and to be selected, it is necessary for them to have a deeper understanding on the enterprise and its technology and to come up with a proposal more refined than the competitors. Especially, the TBDA requires them to make a business proposal. Its competitive environment focusing on manufacturing an end product eventually may have helped to produce more feasible business proposals.

Comprehensive Support for Open-ended New Product Development Project

As discussed earlier, the matching method has shifted from the designer's idea pull style to SME technology push style, or from a non-competitive to competitive environment. It is, however, not enough. After the matching takes place, there is a stage where the product development needs to be promoted as business, and this stage presents other challenges. When an enterprise and designer are successfully matched with each other to collaborate together, what they now undertake is a new product development project. This project, however, is not limited to the realm of the enterprise's activity. They now embark on what may be called an open-ended new product development that goes beyond the sphere of their routine business. A variety of issues that may not appear in their own project can pose a challenge when collaborating with an external business partner. In the above matching scheme, an enterprise and a designer meet each other for the first time to work in a collaborative project. They need to move on while solving the variety of issues that are associated with the project launch and execution.

Some of these issues are; who bears the cost for the development and in what way, how the enterprise and designer make an agreement regarding the timing of payment of expenses, how they apply for and manage the intellectual property rights that will be involved during and after the product development, and how they share the fees that the product sales may produce.

The two enterprises that have been discussed in the case study above are both well-performing companies with high technological capability, but it was their first time to conduct a B2C business as well as a joint development with a designer. As mentioned already, there were no major technical issues in the development phase. Although certain additional technological development was necessary for the designer's proposals, but there was no major difficulty with it. Rather, what troubled them as revealed in the interview with them was how to deal with the contract issues and intellectual property rights and how to secure the sales distribution routes after the product development.

The TBDA staff became aware of such issues, so they improved the scheme by setting up a system that provides comprehensive support to the open-ended new product development. In the second year after the scheme launch, they incorporated a support system for handling agreement protection and intellectual properties. One of the examination committee members is a patent attorney who can provide advice on various aspects of agreement contract and intellectual property rights. Another committee member is an expert in the sales distribution who also serves as an advisor in this field. The TBDA obligates participating designers to submit a business plan along with their design proposal. Those designers, however, cannot always provide a complete business plan. Therefore, the examination committee member of TBDA who has knowledge on

the sales distribution routes and retail outlets gives advice on these matters to help making a sales plan as well. By making a great advancement in these two areas of matching method and comprehensive support, the TBDA scheme has become a more effective policy measure.

5-2 The policy related implications

An enterprise with highly advanced technology has a potential to develop a new product through a collaborative matching with a designer. Japanese manufactures in particular have a tendency to carry out product development that focuses on the technological aspect only. The local governments, however, can provide such small and medium enterprises which do not have a design–focused viewpoint with an opportunity to meet with a designer. Through participation in the design policy scheme, an enterprise meets a designer, experiences a successful new product development and thus takes note of the importance of design. A successful development can bring about a wide variety of benefits to the enterprise such as improved brand image, more employment, risk dispersion and more profit from launching in a new market. A local municipality has a potential to draw out the capability of small and medium enterprises in their municipality by giving support in connection with the design policy. The key of the policy is how to support the enterprises to meet a designer and to promote the project smoothly. The possible implications are as follows though they may be limited to B2B enterprises.

There are a number of matching methods. When it comes to giving support to a B2B enterprise which is launching a B2C project, it may be more effective to use a matching method of SME technology push style. This method is advantageous for the enterprise to utilize their own technology and easily reduce the investment cost.

The proposals from designers are made in a visualized manner. It makes it easier for the enterprise to figure out the end product and issues that may arise in the development process. It can motivate the enterprise with technological capability to take actions for product development. Looking at it from another viewpoint, an open-ended new product development is conducted jointly by a team of a designer with limited experience and resources and a small or medium enterprise. If no support is given to them to solve problems associated with such a project, it may easily collapse halfway. The technological development itself is not the issue that the municipality has to provide support so as to promote the smooth functioning of the design policy. Rather it is the variety of issues that arise in the process of promoting the project.

The above two cases are successful examples, but about 80% of the projects proposed at TBDA did not reach commercialization. The policy promotion staff need to follow up so that the participating enterprises and designers desire to give another try even when a project did not achieve commercialization.

Enterprises having highly advanced technology have a potential to realize design innovation. The current situation, however, is that most of them have almost no connections with designing activity. The two enterprises reported in this study initially had no intention of proactively having collaboration with a designer. It is vital for municipalities having small and medium enterprises in their jurisdiction to carry out education and enlightenment activity on developing a design viewpoint. It may not have results immediately, but steadily increasing successful cases and patiently conducted enlightenment activity will invite more enterprises having a potential for designing activity to participate in the policy scheme.

5-3 Future Issues

In this paper, the case study was chosen from the initiatives of Tokyo Metropolis. Tokyo Metropolis, however, is the largest local municipality in Japan. It has much larger population and fiscal budget than any other municipality. Tokyo also has a sizable concentration of designers and enterprises. We deem it necessary to research the cases in other municipalities to find out whether they can be similarly successful by implementing a similar design policy.

The designers can perform their professional skills in other fields than product designing. The above cases are of B2B enterprises developing B2C products. We are now planning to research cases other than product designing and those of B2C enterprises to find out what policy can achieve a higher success rate to come up with generalization possibilities of design policy.

Acknowledgment

We hereby express our gratitude for all those who were interviewed for making this study report.

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