

The Core SME in *Ba* Leads to Smooth Change Mechanisms

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【Abstract】The aim of this paper is to discuss the dynamics of *ba*. The concept of this study argues that *ba* is which a leading SME sets the structure of efficient firm-relationships. *Ba* is constructed by the core SME intending to achieve his business strategy at first. The rest of the members in *ba* do not depend on the core SME but they remain autonomous and spontaneously play the key role in coordination among members, gradually. This phenomenon is to explain by theoretical interpretative mechanism of *ba*. We discuss based on a case study. Then we suggest the mechanism of *ba* has changed by a certain factors.

Based on the case study, following facts and implications are revealed. First, in former times of the formation of *ba*, the SME will be core, with its accumulated abilities plays a critical role in organizing and managing the other members, and in accumulating technological knowledge and skill at the same time. The extent of efficiency of particular *ba* varies depending on these mechanisms.

Second, the mechanism of *ba* is included potential change. In the case study, it is shown that although the core SME has grate leadership and controls *ba* at early stage, other members gradually generate autonomy and ability to coordinate *ba* dynamic rather than static. The key element of this phenomenon is that the core SME not only foster them but let them act spontaneously based on its experience. To make this dynamism, there are three important factors: (1) not to control them with rigid structure just like vertical integration; (2) let them spontaneous actions; (3) *ba* is being economically and effectively for every member.

1. INTRODUCTION

This study is focused on the effects of having a core and leading small and medium-sized enterprises (SME) create a structure called “*ba*” (“field” in Japanese). Here, the leading SME creates an efficient firm-relationship structure⁽¹⁾. The *ba* is constructed by the core and leading SME in order to achieve its business strategy at first. The other members of *ba* remain autonomous and spontaneously and gradually play a key role in developing coordination among members, rather than depending on the core and leading SME. The core and leading SME informs the other SME members about technological information and up-to-date technological trends, and provides guidelines on how to handle duties, and encourages them to be autonomous and independent identities. Furthermore, the core and leading SME does not affect member SMEs by controlling and compelled fiat, but let them grow autonomously in order to develop and revitalize the *ba*. The focus of this study is to recognize and acknowledge the importance of the capabilities of the core and leading SME for accomplishing change mechanisms in the *ba*.

Thus, the aim of this paper is to determine the required conditions and dynamics of *ba*

constructed by a core and leading SME that will enable flexible, mutual interaction among autonomous members of the *ba*.

The paper is structured as follows. First, we review existing studies on the concept of *ba* to understand and examine the theory of inter-organization. Second, we analyze a framework and the phenomenon based on this theory. Third, we discuss a case study of *ba* which consists of 13 SMEs with TOSEI-ELECTROBEAM Company Ltd as the core and leading SME in Tama area of Tokyo. Fourth, we examine how the mechanism of *ba* has been changed by certain factors.

2. REVIEW

2-1. Theoretical Studies on Network Theory

Piore and Sable (1984) and Perrow (1992) examine the importance of the conversion of manufacturing from a mass production system, supported by integrated systems of large companies, to “flexible specialization” (Piore and Sable, 1984) and “flexible production” (Perrow, 1992), supported by SMEs that adapt quickly to new circumstances using specialization and division of labor.

In addition, Perrow (1992) points out the factors and merits of SMEs adopting flexible production, and describes a network of about 10 SMEs that share information, equipment, personnel, and orders with other (Perrow, 1992; 455). Perrow (1992) states that the main feature of the network is trust, which is generated by the network structure and context rather than maximizing personal benefits.

Powell (1990) defines a network in which one entity depends on and benefits from other entities’ shared resources. In addition, every member of the network agrees not to seek their own profits by sacrificing other members (Powell, 1990; 303). Powell (1990) tries to examine the network from sociology standpoint, and finds that factors contributing to a successful network are knowhow, speed and confidence.

Dyer and Singh (1998) uses an economics standpoint to examine the network theory, which they call “relational rent.” Relational rent is a supernormal profit, jointly generated in an exchange relationship, that cannot be generated by each firm in isolation and can only be created through the joint idiosyncratic contributions of the specific alliance partners. Relational rents are possible when alliance partners combine, exchange, or invest in idiosyncratic assets, knowledge, and resources/capabilities, and/or they employ effective governance mechanisms that lower transaction costs or realize rent through a synergistic combination of assets, knowledge, or capabilities (Dyer and Singh, 1998; 662).

A review of these network studies shows that there is no single definition of a network among academicians. Nevertheless, these network try to capture a theoretical framework based on existing relationships or each study’s definition of a network, and determine the implications of mechanisms and functions using empirical methods. These studies also analyze existing networks under given conditions to clarify the network structures and mechanisms of ex post facto. However, it is important to analyze the process, factors, and mechanisms of constructing a network, because it is difficult to construct effective, efficient, and functioning networks. Thus, it is necessary to examine the process of constructing a network and the reasons of organizing and forming a network.

Some studies examine innovation, learning organization, and knowledge creation at a regional level, for example the theory of local milieu (Camagni, 1991)⁽²⁾, learning regions (Florida, 1995; Mogan, 1997), and collective learning processes (Keeble and Wilkinson, 2000). Yamazaki (2002) quotes these studies and discusses the importance of a cluster strategy and the theory of local milieu when determining the appropriate industry for a certain region from the early stage of coincidental regional accumulation to the later stages setting the structure of collective learning for the region.

Even if there are rare and precious resources in a particular region, the mechanism that connects the resources must be identified. Otherwise, the resources remain buried and not used appropriately. The mechanism that connects the resources in a region need to be explained from the viewpoint of regional studies and industries. It is important to identify and clarify the regional studies from the stand point of learning regions and knowledge creation. Moreover, regional and network studies also needed to examine how to remove constraints and limitations in resource utility in the region and to connect appropriate resources. In this study, we analyze the level below unit of analyses that of other studies, and reinvestigate the phenomenon from the standpoint of acting entities. To do so, we use the concept of *ba*.

2-2. Existing Studies on the Theory of *Ba*

The concept of *ba* originated in physical science from the 19th to 20th century (Yamashita, 1999; Nishiguchi, 2000), borrowed from life science, and was then applied to epistemology and social science (Nishiguchi, 2000).

Itami (1991) discusses and interprets *ba* from the standpoint of organizational theory. The central concept of this study is the paradigm of *ba*, which he examines. We apply the concept of *ba* from Itami (1991) in this study, rather than from the concept of networks, in order to interpret inter-organization for three reasons. First, *ba* focuses on organizing members and constraints a reciprocal semantic and physical space compare to network theory⁽³⁾. Second, the range of analysis provided by *ba* is broader than that of networks, allowing us to consider existing aggregate and emerging processes. Third, we can explicitly express the subtle nuances of changing relationships, its processes, and state the connections among members.

Itami (1999) defined *ba* as a circumstances framework in which members participate, observe each other consciously or unconsciously, communicate, understand one another reciprocally, influence each other, and shared common experiences. Then, Itami (1999) pointed out the importance of exchanging information via various channels and stimulating informational interaction. Itami (1999) claimed that the most important aspect is how to handle and manage of *ba*, and bundling informational reciprocal interaction. In his discussion, *ba* is important to the efficient management strategy for members. However, the essence of the discussion is not limited management issues, and coverage of the concept of *ba* is broader. Based on his reasoning, the study of *ba* is a management issue for members, as well as a method of handling reciprocal relationships effectively⁽⁴⁾. This is because *ba* is interpreted as container of informational reciprocal functions.

We can also define *ba* based on the following discussions. Itami (1999) pointes out four fundamental elements of *ba*: agenda, code of interpretation, informational carrier, and wants of social solidarity. When participants share these fundamental elements each other in some extent, they learn to act collectively in *ba* and generate dense informational reciprocal functions. This type of *ba* creates many informational reciprocal functions, forms order and discipline by informational convergence, then generates energy in *ba*. It is necessary for *ba* to have feedback loops that connect entities to the overall *ba*, called micro and macro loops. By creating these loops, members exchange information, learn reciprocally, and find out what to do and how to do it as a whole. Then, members of *ba* decide what to do and send information via the feedback loop. The concept of *ba* potentially contains dynamic unfolding.

Furthermore, Itami (1999) clarified four types of *ba*, based on how they are generated (see Figure 1). Figure 1 shows that *ba* can be generated intentionally (named “establishment”) or unintentionally (named “emergence”), and germination that, which means the opportunity to generate *ba* in a context, is occurs inevitably (named “establishment”) or accidentally (named “emergence”). The horizontal axis is labeled “generation” and the vertical axis is labeled “germination.” Thus, four types of

generated *ba* are understood as categorical variables (Itami, 1999; 141-147)⁽⁵⁾.

Figure 1 Four types of generating *ba*

		Generation	
		Establishment	Emergence
Germination	Establishment	<i>Designing ba</i>	<i>Blooming ba</i>
	Emergence	<i>Fostering ba</i>	<i>Self-supporting ba</i>

Source: Itami (1999)

The horizontal axis named “Generation” is divided into two types. The first type is called “*designing ba*,” in which managers commit to and set up *ba*, and then manage *ba*. In the second type, managers commit to and set up *ba*, but operating staff manage *ba*. This is called “*blooming ba*.” The vertical axis is also divided into two types. In the first type, operating staff create and set up *ba*, and then managers take responsibility for fostering it. This is called “*fostering ba*.” In the second type, operating staffs create and set up *ba*, and then also manage it. This is called “*self-supporting ba*.” These typologies have two implications. Each type of *ba* is faced with different conditions that give rise to how to information is exchanged as a reciprocal function, how members connect, and how to manage the fundamental qualification as a result. Second, the context and the unit of analysis of *ba* in Itami (1999) is a single organization. Thus, he states that *self-supporting ba* is unusual in a single organization because of a lack of commitment and decision-making by managers. However, the concept of *ba* applies and extends to the study of inter-organizations. Thus, we can find new possibilities for the concept, especially within discussions of industrial clusters. An industrial cluster is defined as a small and limited area where interrelated companies collect within the same or similar industry. The study of industrial clusters focuses on the mechanism inside inter-organizational relationships (Burusco, 1982; Seki, 1993; Nukada, 1997, 1998).

Hence, we focus on each type of *ba* based on the framework of Itami (1999) and its features from the standpoint of inter-organizations. *Self-supporting ba* applies to industrial clusters, because they are generated, operated, and managed by regional organizations. Even though we can confirm the historical and geographic factors of *ba* as industrial clusters, this is not enough to explain the emergence of *ba* and the industrial relationship itself. Nishiguchi and Caspary (1999) focus on a case study of IVAM in Dortmund, Nordrhein-Westfalen, Germany, where the local government intervened and create an industrial policy to foster a regional industrial network⁽⁶⁾. The case study of IVAM corresponds to *blooming ba*, because the opportunity to generate *ba* was first provided by the local government, after which regional organizations began to organize the network and foster *ba*.

In our study, we focus on SME generating *ba*. The importance of our study is that the type of *ba* can change under certain conditions. In particular, the core and leading SME generates *ba* intentionally to accomplish competency and strategic superiority. At first, the other members of *ba* are dictated to by the core SME, which also manages *ba*. Thus, we have *designing ba* in the early stage. Thereafter, the members of *ba* begin to coordinate and exert themselves in order to become one of the core members at a later stage. Therefore, *designing ba* can change to *blooming ba*, if the core and leading SME that generated *ba* in the first stage has certain capabilities.

This discussion has two implications. The case study does not correspond to a school of resource-based view, such as that of Pfeffer and Salancik (1978). Pfeffer and Salancik (1978) claim that the entity that is in a disadvantaged position of power, because it depends on another entity’s proprietary resources is faced with behavior restrictions by other entity. This means that the relationship is able to be measured and clarified by possession and the degree of power (e.g.

independent, reciprocal, not related each other). However, the case study of the changing mechanism of *ba* shows that members with less power and presence than the core SME do not depend on the resources of the core and leading SME. Each member of *ba* has a unique and indispensable technology and entity with which to organize and function within *ba*. The core SME is willing to not restrict the independence of the other members and to demonstrate the other members' capabilities. It is not adequate that members accept full power from the core SME or other members would leave *ba* when they improve their capabilities and have power.

The second point is the four types of *ba* in Figure 1 are understood as continuous variables, not as categorical variables, based on chronological order and inter-organizational. If so, the type of *ba* can be fluid⁽⁷⁾.

In the remainder of this paper, we examine the process of changing and developing *ba*, and the required conditions of *ba* that means change is possible.

3. FRAMEWORK

We focus on the circumstances generating the capabilities needed to establish *ba* by the core SME, the business strategy by the core SME until *ba* established, the role of the core SME in the early stage of *ba*, the changing role of the core SME, and the changing mechanism of *ba*. We try to interpret how to accomplish and change from *designing ba* to *blooming ba*. The fundamental data we collect are qualitative studies such as interviews and questionnaires survey⁽⁸⁾. In the following section, we study each topic, understand and analyze a case study.

To begin with the framework and case study, we must understand the importance of the core SME's capabilities and its business strategy, based on organizational capabilities and innovation management of an SME in management theory⁽⁹⁾. Itami (1999) discussed generating *ba* within an organization. This means that the unit of analysis in Itami (1999) is a single organization.

Even though we focus on *ba*, our discussions on the unit of analysis is multiple SMEs, and we analyze the phenomenon in which these organizations eager to generate *ba*. Thus, we focus on the phenomenon in which a single SME cannot achieve high value on its own, but can do so when acting and interacting in *ba*. *Ba* is a space with the potential to maximize value, assuming that each member has unique and valuable proprietary technology, skill, and capacity. Therefore, our aim is to elucidate the process to implement organizational capability and to achieve high performance of product development among members by generating and managing *ba*.

3-1. Two capabilities of core SME

The target of *ba* is the space constructed by the core SME to implement a business strategy effectively on purpose. However, it is not easy to construct and manage *ba* by force. Even if the technology of a member is valuable and unique, this is not enough to achieve competency. Full members must have sophisticated and unique technology in order to maintain *ba*.

From an inductive stance, the core SME of *ba* that was chosen for our case study constructed and controlled *ba* and achieved high economic performance. We first discuss the background and reasons for the success in demonstrating the leadership to the other members. This means that the core SME should generate the capabilities to construct and manage *ba* in advance.

These capabilities, which we elicit inductively from the case study, and named the "capability of organizing and managing tasks" and the "capability of accumulating and judging knowledge of technologies"⁽¹⁰⁾ in the paper. The former is the capability of organizing and managing inside and outside resources. In *designing ba*, the core and leading SME of *ba* takes the initiative to generate *ba*,

has an important role, and takes responsibility for managing *ba*. This might be a critical to changing and developing *ba*.

The latter is the capability of analyzing and judging technology which needed in the future. This capability is critical, because this provides the evaluation criteria for judging and selecting technologies and new candidates as members of *ba*.

Ba which is vessel for informational reciprocal function is strategic means for members to interpret and understand information, heighten organizational capabilities through collaborating processes, and achieve high performance to make product development. These two capabilities of the core and leading SME is supposed to be critical factors for generating, changing, and developing *ba*.

3-2. Business strategy of the core SME

In our discussion and analysis of the paper, we assume that *ba* is generated as *designing ba*. Thus, we have to consider the intention of the designer which is SME tries to generate *ba*. This designer is the core SME of *ba* in the future. In this section, we understand the intention of the core SME as constructing *ba* in line with its business strategy, focusing on business domain selection and the process of decision-making in allocating managerial resources, based on our research and case study.

In general, SMEs are faced with orders and customer needs that they cannot meet on full their own, as well as a changing business situation. In particular, this trend would be remarkable when the SME tries to expand its business size and extend the business field. In this case, the SME has three choices: 1) ignore the chance to change and maintaining its current state; 2) seek outside matching resources; 3) absorb duties inside the company and do in-house production. The first choice requires no further discussion, so that the possibility of choice is eliminated in the paper. In terms of the other two choices, it is no easy for SME to absorb duties inside the company for in-house production in the short term. In this case, the SME might opt for the second choice. When the SME has time to adjust to a changing situation such as industrial business trends and customer needs, it may be opt for the third choice.

Here, we assume the SME takes the second choice, which means seeking and using outside resources to help it to cope with the situation. This is because that SME has short time to perform its duties and to deliver its goods and products. We do not intend discussing in-house production, and the second choice is only one related to generating *ba*.

After an SME opts for the second choice, it becomes the core and leading SME of *ba*, and must select further members to implement the business strategy and decide how to manage the internal and external resources of the core SME and the members. For example, the core and leading SME has to find and assign the candidates of SMEs that have unique and complementary technologies to those of the core SME, or that foster the member's resources and technologies if they are not sufficient at the time being selected.

Furthermore, the core and leading SME has to consider how and what to conduct the *ba*. Should they assume full leadership and mandate specifications, materials, tools, and orders to other members or select and assign other members that have the potential and sophisticated technologies to connect and collaborate, sometimes foster each other, and achieve high economic performance?

This case study of the core and leading SME of *ba* connects and collaborates with other members, rather than ordering duties outside the company. Thus, the core SME tries to construct and generate *ba* to coordinate members, share information and aims, and foster growth among members to teach them to trust each other. This is the grand design of *ba* constructed by the core SME.

3-3. The role of the SME to set and modify *ba* in the early stage

After the core SME decides to construct *ba* to implement its business strategy effectively, the next step is determining the grand design and implementing *ba*. The core SME focuses on finding and preparing resources to set *ba* and to implement the core SME's business strategy. In this process, the core SME modifies the design and construction of *ba* by trial and error. According to Itami (1999), the conditions of generating *ba* includes choosing members, setting on the the fundamental factors of *ba* such as the agenda, encouraging sharing of the fundamental factors of *ba*, and deciding how to work with micro and macro loops. These conditions should be decided on in the early stage. Needless to say, the core and leading SME decides on the type of *ba* as the designer of *ba*.

The first important point in this stage is that the capability of the core SME, namely to organize and manage tasks, and the capability of accumulating and judging knowledge of technologies is strongly related to the good or bad construction and generation of *ba*. The second important point is about the role of the core SME inside *ba*, which is constructed and generated by the core SME.

First role of the core SME is to foster the other members through *ba*. This implies that the core and leading SME can penetrate the potential of the candidate members that have unique, indispensable, and complementary technology for growing *ba*, based on the core SME's ability to accumulate and judge knowledge of technologies. The core SME needs to be careful in fostering the other members. The core and leading SME promotes members to improve their technology, and encourages them to be independent in *ba*.

The second role of the core SME is to select appropriate candidate members. The criteria it uses include technological skill, such as degree of proprietary technologies, running *ba*, having the potential capability to support the core SME in future, not to depend on orders from the core SME. In addition, it must have a strong will to try hard, and advance, based on its own technologies and a collaboration process, and operate within the functioning of *ba*. However, it is important that the core SME does not prevent the possibility of admitting new entrants. When the core SME judges that candidates have the potential to be supporters of the core SME in *ba*, it will have the choice of admitting that candidate as a member of *ba*, as a result.

The third role of the core SME is to lead the *ba* and coordinate members in the early stages. This role means the core SME has a responsibility to divide the duties based on members' technological skills, to transfer and interpret technological information, and to make and deliver the order. The three roles of the core SME in *ba* are critical, especially in the early stages of *ba*.

Furthermore, the core SME and the members of *ba* generate reciprocal relationships gradually by selecting and fostering the member process. This is fundamental to the changing mechanism of *ba*, which is focused on in the next section.

Hence, though the core SME design, generates and manages *ba*, the other members depend on and accept orders from the core SME. In addition, the bundle of informational reciprocal interaction exists which is important to *ba*. This is the unique point of *ba*. This type of relationship can exist only when each member has unique, indispensable, and complementary technologies that other member do not possess, and each member's technology is needed to manage *ba*. As a result, *ba* is not composed of a relationship in which the core SME dictates to the other members or the members depend on and accept the authority of the core SME. With regard to the members, they do not try to act opportunistically on behalf of their own technologies, and there is no incentive to leave *ba*. If a member does leave *ba*, it would not be able to achieve the same level of performance of product development, because this can only be accomplished by informational reciprocal interaction.

This is the background of the reciprocal relationship between the core SME and the members, and the changing mechanism of *ba*. The detail of phenomenon is discussed further in the case study.

3-4. New mechanism inside *ba* in the developing stage

The business strategy of the core SME has the effect of heightening the capabilities of the members of *ba* such as autonomy and dependency. This effect also led to evolving and changing the mechanism of *ba* at the same time. This is because the members had experience and accumulated knowledge and capabilities, which coordinated and dealt with duties through their technological capability, generated by the top-down relationship with the core SME.

Thus, *ba* changed from *designing ba* to *blooming ba*, which emerged through the exchange and reciprocal behavior of each member. For example, a member improves the coordination capability among the other members, and the sophisticated technology of a member connects the capabilities and diversifies the duties, allowing them to enter other industries and verifying specificity of *ba*. This leads to multilateral relationships with other members, and increases the flexibility of *ba*.

At the same time, the value of *ba* increases for the clients, members become more autonomous entities and expand the opportunities to get orders from new customers and to implement the duties with other members of *ba*. An important part of this change of *ba* is that the functions and duties that were the sole responsibility of the core SME, such as getting orders, dividing duties based on members' aptitudes, and dictating to the members, are transferred to the members. Thus, members that depended on and accepted the authority of the core SME coordinate their actions, increase their technological skills, and dispatch business information to potential clients. The core SME still has leadership of *ba*, but the role of the core SME has also changed at the same time. Its main role now changes to an indirect role for the other members, focusing on dispatching business information, considering the strategy, and making decisions in *ba* for the future. Although the relationship among the members has not changed, the roles of the members have changed. This is an important part of changing to *blooming ba*.

Even if the members became independent from the core SME, which could accomplish the coordination ability, increase the technological skills, and dispatch business information, if the core SME still tries to dictate to the members, it will be faced with a problem, especially with increasing the orders and expanding technological fields and industries. This is because it will incur a coordination cost that will burden on the core SME, preventing members from being independent entities and promoting the withdrawal of members owing to their dissatisfaction as being members. One way of avoiding this situation is for the core SME to change its role in each stage of the development process, as in the case study. In this way, *ba* could change its mechanism in each stage of the development process.

This implies that the changing mechanism of *ba* and the multilateral relationships among the core SME and the members means the complexity, and diffusion change at the same time because of the expanding authority of each member. Nevertheless, the situation can be avoided, as follows: 1) the core SME grasps the important information to manage *ba*; 2) the core SME maintains its leadership and multiple relationship, but has strong reciprocal relationships with members, as necessary; and 3) the core SME controls the direction and strategy of *ba* through leadership and monitoring of the members.

As a result, this type of *ba* can effectively allocate duties, reduce the cost of duties and coordination, reduce the time to deliver, increase the accuracy of duties, improve production, and suggest better solutions to clients. These are valuable aspects that no single SME can achieve on its own, but can be achieved by the coordination among members of *ba* can do.

4. A CASE STUDY

In this section, we collates a framework for analysis using a case study based on our interviews and questionnaire survey. Through the case study, we can understand the changing mechanism of *ba* and its process.

4-1. Summary of *ba* and the core SME

The case study consists of 13 SMEs with TOSEI-ELECTROBEAM Company Ltd (TOSEI EB) as the core and leading SME in Tama area, Tokyo. TOSEI EB was established in 1977, and provided sophisticated processing technologies using electron beams, laser beams, electric discharges, waterjets, ion vapor deposition, sprayed coating, test of non-destructive processing machinery, and making unique tools through *ba*. Thus, the *ba* consisted of TOSEI EB and the other members as “*designing ba*,” with TOSEI BE as the core and leading SME in the first stage. This *designing ba* has a double structure of 40 members that handle the manufacturing processing, and each processing technology is indispensable in dealing with orders from specification to delivery. Then, 12 of 40 members have valuable and sophisticated processing technologies that achieve the competency of the *ba*, creating strong ties with the other 28 SMEs. The members are selected by orders and duties to make a temporal team, which they called a “project,” so that selected members are different for each project. The team members are selected by the member that received the order. Once a project has started, the project members meet to decide the concept, method, procedure, possibility of improvement, processing time, profit allocation, and so on. The core SME and 12 main members are often selected as members of a project, lead and manage the project, are connected by strong relationships, and exchange information on a daily basis. Therefore, the *ba* is dense.

In the processing industry, the clients of this *ba* were used to have some difficulty with placing orders, because they had to order each part of the processing and the duties were complicated and troublesome. Furthermore, the clients had to consider compatibility and subsidiarity among processing technologies. In this case, the clients had high potential risk that one technology would prevent other technology from working. However, the *ba* with TOSEI EB and the members provided these solutions to these difficulties for clients.

The *ba* was constructed by TOSEI EB, the core SME, as a *designing ba*, which the core SME generated and managed in the first stage. However, the mechanism later changed to a *blooming ba*, in which members were independent and fostered each other. Thus, we have clarified the process of changing a *ba* mechanism.

4-2. Two capabilities of TOSEI EB as the core SME

The case study is led and managed by TOSEI EB as the core SME. We cannot ignore the key person and founder of TOSEI EB, Tamotsu Ueno, who shows significant leadership.

The starting point was traced back to his personal carrier⁽¹¹⁾. He accumulated two capabilities in his carrier as a board member of subsidiary company of a listed car manufacturer. First, he needed to manage resources such as personnel, goods, and money, and fostered organizational management capabilities through his experience. When he was the president of the subsidiary company, he managed the manufacturing factory, supervised processing, checked and chose suppliers, commanded and led personnel, paid attention to the accounting and financial departments, and so on. Thus, he knew about the cash flow in a company, controlling managerial resources, and how to foster working staff. Through his various work experience, he also accumulated knowledge of technologies and could judge the key and critical point of each.

The knowledge and skills helped him acquire core technologies when he started TOSEI EB. It

was useful that he could judge and be aware of the features of technologies and possible markets to access. The technology he chose was melting, the processing and heat treatment part of electron beam that was his niche market in 1970's. It is no exaggerated that his experience of accumulating electron beam technologies was the starting point of the idea that prepared receiving order by unifying order system in order to construct *ba*.

4-3. Business strategy of TOSEI EB as the core SME

TOSEI EB, the core SMEs in *ba* later on, started business mainly making processing parts by controlling electron beams in the early stage of establishment. However, the processing parts business has the inherent feature that the quality of finished parts and products cannot be judged by a particular processing. In addition, the failure of only one part means the finished parts and products are poor quality. TOSEI EB realized this and was sometimes faced with this problem. This was in 1985.

At that time, a client requested that they did everything from material procurement to all manufacturing of parts and products. The client was willing to introduce them to potential partners, if necessary. TOSEI EB was forced to make a difficult decision. TOSEI EB could gain internal resources by their own to extend the technology based on the clients' needs and became a large-scale company, or spread the function to partners, and focus on TOSEI EB's peculiar and competitive technology. TOSEI EB decided on the second choice intentionally, because Ueno was an engineer and regarded the core and competitive technology as important, rather than expanding the company. He also realized it would not be easy to achieve a high level of technology as his core technology as an SME short of financial and human resources. He would need to hedge risk, and heard that there were many SMEs with core and sophisticated technology and the possibility of finding these SMEs and being partners in Tama area, famous for its manufacturing cluster. Furthermore, he paid attention and potential to improve the business via selecting and cultivating new partner SMEs, and provided value to the clients. It was matched with clients' needs.

Thus, TOSEI EB chose the strategic means of *designing ba*, which was to select and cultivate partner SMEs providing and supplementing unique and sophisticated technology, and deciding to generate and manage the *ba*.

4-4. The role of TOSEI EB as core SME which set and modify *ba* in the early stage

The turning point of designing the *ba* was in 1985. TOSEI EB tried to construct the *ba* and arranged to receive the processing parts order system at once, but the system did not work, causing problems such as increasing subcontract costs, delaying the date of delivery, taking responsibility for failed processing parts, and so on. The system failure in the early stage came from the style of designing the *ba* that TOSEI EB tried to implement as a top-down order and instructed each subcontractor with all directions and details on how to process the parts. Furthermore, TOSEI EB did not know some of subcontractors, because the client only introduced them to TOSEI EB, which meant they did not have business with them before, so that TOSEI EB did not have important information on implementing duties, such as the core and sophisticated technology, weak points of processing, habits in making processing parts, and so on. These were critical to constructing and managing *ba*.

Thus, informational reciprocal inter-action in *ba* was impeded and, as a result, TOSEI EB had to pay a lot of attention to adjusting processing technologies among subcontractors. Furthermore, there was no bilateral relationship, but a multilateral relationship is needed and requires the adjustment of entities. In this case, the leader SME increased the numbers of grasping, conducting, and managing in order to finish processing products. In fact, TOSEI EB was a burden on adjusting operations, incidental tasks, indirect financial cost, and taking time. When a subcontractor is faced

with unexpected trouble during processing, it did not have the authority to solve the problem because of a subcontractor. In these cases, TOSEI EB had to judge and make decisions on what to do next every time, stopping its own operations. This caused further delays, increasing incidental tasks, indirect financial costs, and time.

Hence, constructing the *ba* that TOSEI EB tried to design was not enough, with TOSEI EB taking over the clients' business and complicated duties, from delivering materials to testing processing parts and products on behalf of clients. The clue and solution to this problem was not to transfer complicated duties from clients to TOSEI EB, but to reduce the burden on complicating duties as a whole in *ba* and drop the costs of incidental tasks and adjusting duties.

Then, TOSEI EB had to create effective alternative means to make functional *ba* instead of using the top-down structure. This occurred in the early stage, and was the first procedure in generating *ba*. TOSEI EB did lead the means and solution by identifying the problems and the reasons for failure inductively.

By this process, TOSEI EB identified the procedure for making functional *ba*. First, TOSEI EB selected the candidate SMEs strictly and fostered them to increase the accuracy of processing technology in the *ba* as a whole. For example, Ito Manufacturing Laboratory⁽¹²⁾, one of the core members, introduced the machinery for cutting and processing by laser, as recommended by TOSEI EB.

After Ito Manufacturing Laboratory bought the machinery, TOSEI EB kept instructing the technological utility of the machinery. When some engineers of Ito Manufacturing Laboratory were sent to a factory of TOSEI EB, TOSEI EB held training on how to use the machinery and the features of the processing materials, for them for three to four months. When the machinery of Ito Manufacturing Laboratory did not work or was in trouble, engineers of TOSEI EB went to Ito Manufacturing Laboratory to help to fix it. In this way, TOSEI EB helped and supported Ito Manufacturing Laboratory to give technological information and utility of the machinery. However, TOSEI EB also insisted that Ito Manufacturing Laboratory promote technological skill and make an effort to improve the laser technology by itself. TOSEI EB let Ito Manufacturing Laboratory participate when processing using laser machinery with the clients, and to understand the heavy responsibility to the duties and operations. When TOSEI EB expanded the processing technology to a new field and increased its equipment, it asked Ito Manufacturing Laboratory to invest in the equipment, which is related to the business field of TOSEI EB and to take risk by its own responsibility.

In the case of Yoneyama Factory⁽¹³⁾, TOSEI EB was moved by the enthusiasm and ambition for business and technology of Yoneyama, the president of Yoneyama Factory. Yoneyama went to the Tokyo SME University to attend a lecture on learning management after work, made good use of the support center for SMEs, and took action foreseeing his own business and technology. TOSEI EB evaluated these actions of Yoneyama. Thus, TOSEI EB, which had leadership and Yoneyama Factory cooperated and tried to improve the accuracy of processing technology and develop 3D processing, which had not succeeded at that time, using water-jet machinery. There is no doubt that Yoneyama Factory was fostered by these experience with TOSEI EB and increased their processing technologies.

The second procedure of generating *ba* in the early stage by TOSEI EB was to enclose the core member, which had sophisticated and complementary technologies for keeping clients' needs and achieving high-value orders of TOSEI EB, and to let them seek and improve their own processing technologies. For example, when TOSEI EB considered specializing and heightening the processing technology by laser machinery in welding and surface reforming area, it recommended Ito Manufacturing Laboratory to get into cutting technology area by laser machinery, which was

indispensable technology for TOSEI EB because it was better than the previous process of welding and surface reforming. With regard to TOSEI EB and providing high processing value to the clients in *ba*, it was necessary for *ba* to increase and expand to sophisticate and effective processing tools and machineries.

Lasers processing by heat, so there are materials that are too weak for thermal energy and cannot be processed with heat. In this case, TOSEI EB had to find alternative processing technology without heat. This was the water-jet machinery of Yoneyama Factory.

There is another case that TOSEI EB took, selected, and fostered candidates of the core members which had potential, sophisticated and indispensable technology, such as Bushu Kogyo Corporation. Bushu Kogyo Corporation made pipes for cars and radiators for large car and specially permitted commercial vehicles. Bushu Kogyo Corporation was suffered with costs down requirement and reduced profits from car maker each year. Then, Bushu Kogyo Corporation tried to find new business and to convert the main business. Hayashi who is the president of Bushu Kogyo Corporation and Ueno, who is the president of TOSEI EB met when on a tour of inspection abroad held by a local support center, and participated in same lecture on manufacturing and machinery, getting to know each other. Hayashi asked for advice about new business from Ueno. Then, Bushu Kogyo Corporation decided to introduce rapid prototyping machine for receiving 3D prototype orders, and accumulated experience of making prototype. Bushu Kogyo Corporation became the core member of *ba*, and it contributed to shortening the time to make 3D prototypes.

Ichimura Oxygen, which was a core member and supplied several gases used for manufacturing machines, provided the knowledge and knowhow of combining gases to members. Ichimura Oxygen also tried to find the best combination of gases to improve the performance of each manufacturing machine with the members of *ba*, because some types of manufacturing machines work by a combination of gases and users had to find the best combination for their needs. One of TOSEI EB businesses is a consulting business of usability and providing improvements of first-made processing machinery, introduced by TOSEI EB as a monitor to find how to improve and accurate processing and usability, then provide feedback to the machinery maker. Ichimura Oxygen has an important and indispensable role in this business of TOSEI EB.

Dream Plan was established by a retired engineer of a listed company. The reason why starting a business as a venture company was that TOSEI EB requested it to provide the design and construction system for processing by laser. Dream Plan is one of the important roles of projects in *ba*.

Uchino Factory and Tamaki Factory were core members of *ba* and both processing tool makers. However, their specialty and advantages were different, as were their core technologies. Ueno, president of TOSEI EB, insists that they are also important member of consisting the *ba*.

In these cases, each core member of *ba* has sophisticated and indispensable technology. Furthermore, the core members improve the technology and seek the possibility of expanding the utility of proprietary technology to other business fields through their daily duties and experience in *ba*.

The third procedure of generating *ba* in the early stage was to take responsibility and leadership of managing project by TOSEI EB as the core SME. However, the selected members of project had to meet at least at once, which is chance to discuss the requirements for implementing operations such as time schedule, preparations, procedure, processing orders, materials, tools, and so on. Once the selected members of project meet and decide on the details of the project, members meet and contact each other as necessary⁽¹⁴⁾.

In this way, members of the project became proactive. When members of the project need to implement discreet operations such as accurate processing, interested parties have several meeting and contacts, and attend the operations when processing to avoid risk of processing failure. For

example, the processing by alumina-base ceramic, which is mainly treated by TOSEI EB, have to combine with processing of laser scribe which is operated by Ito Manufacturing Laboratory, so that it is necessary for TOSEI EB to succeed in this processing project. There were complicated circumstances⁽¹⁵⁾. As a result, the machinery owned by Ito Manufacturing Laboratory was settled in the site of TOSEI EB's factory⁽¹⁶⁾, solidifying relationship between the two.

Furthermore, this third procedure makes members accomplish rapid, accurate, and cheap processing costs generate strong connections among core member companies, which could not be generated by top down procedure, but improve the flexibility among core member companies. Thus, managing *ba* by TOSEI EB in *designing ba* made *ba* caused a change mechanism and evolution. Furthermore, the role of core and leading SME in *ba* would change.

4-5. New mechanism of inside *ba* in the developing stage

Ba began to change as a result of generating and continuing reciprocal operations and connections with autonomous members and promoting technological skill for each member.

The first change is about coordination skill and capability. Although only TOSEI EB as the core SME of *ba* had coordination skill and capability in early stage, the other core members of *ba* began to generate coordination skill and capability gradually. Some operations of project are implemented and judged by the core member without core SME of *ba* based on its own technological information and knowledge of core member.

However, the chances of implementing and handling project by a core member is a lot less than TOSEI EB as the core SME⁽¹⁷⁾. In this situation, this is important because the core members are independent entities and generate capability of coordination, generate capability of accumulating and judging knowledge of technologies through experience of duties and operations to understand other members' technology deeply and construct multilateral relations with other members, to add a new function that core members can solve the complicate technological issue by coordinating project without core and leading SME, and so on.

The second change is related to the first change, on the variety and diversity of orders. The core members improve their technological skill and specificity through operations and can receive orders from clients, take leadership and command into the details of the order. This means that the core member could not only receive order which implemented and finished processing operation by their own company, but also expand the range of the order, which had to cooperate with the core SME and other members of *ba* for implementing operations. For example, Yoneyama Factory, which is one of the core member, the received order of processing by water-jet, which was its sophisticated technology and heightened its technology. Then, it tried to exploit new technology with the university, which bent the processing of square tubes without crumpled, warp, and fragile, was impossible to exploit among competitors. This developed technology made *ba* expand the range of order. This is also one of example of recognizing the core member's technology and its autonomy by outside entities.

The third change is the existence and standpoint of the core SME of *ba*. Even though the core members heightened their capability, were independent and implemented reciprocal informational function each other, it does not deny the importance and role of the core SME. The core SME still has a role of designing, managing, and supervising the grand design of *ba* for accomplishing flexible manufacturing and processing. Specifically, the roles of the core SME are to cultivate new business based on the direction of *ba* in the future, to expand the business field not yet handled by the leading SME⁽¹⁸⁾, to make contracts and take ultimate responsibility for implementing operations⁽¹⁹⁾, and to help and give advice to members to handle and expand the new technologies. Hence, the roles of TOSEI EB changed from direct participation and instruction to indirect roles.

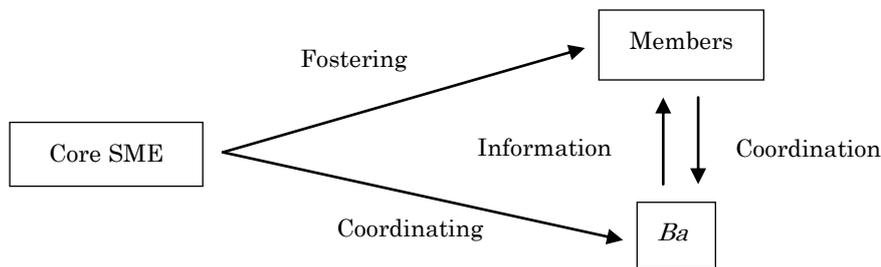
5. UNDERSTANDING THE CASE STUDY

In this section, we analyze the case study from the framework and the description of the case study.

5-1. Two principal roles of the core SME of *ba*

Figure 2 shows the reciprocal interaction of *ba* from *constructing ba* based on the business strategy of the core SME to developing into *blooming ba*, which grew through the members' own initiative.

Figure 2 Reciprocal interaction inside *ba*



Source: Author

Although Figure 2 is not considered on the time axis, it shows that the core SME that is the designer of *ba* assumes the roles of fostering the member company and developing *ba*. The arrow shows the direction of influence—directly or indirectly, especially, the reciprocal interaction between *ba* and the members. This effect emerged because of achieving dynamism of *ba*. For example, the core SME that provides growth opportunities to members is called “fostering” path in Figure 2. This fostering path affects members directly and affects the *ba* indirectly.

Figure 2 also implies that for generating *ba*, fostering members or the core SME’s coordination of *ba* are not enough. On the one hand, when the core SME focuses only on fostering members, it strengthens the ties and relationship among them. However, the informational reciprocal function inside *ba* is limited, and cannot be worked upon and functioned, or emerge as a new mechanism. On the other hand, when the core SME focuses only on coordinating operations that exclude other members, it bears the burden of coordination cost in the long term and retains the important roles of *ba*, and thus, members have to depend on the core SME.

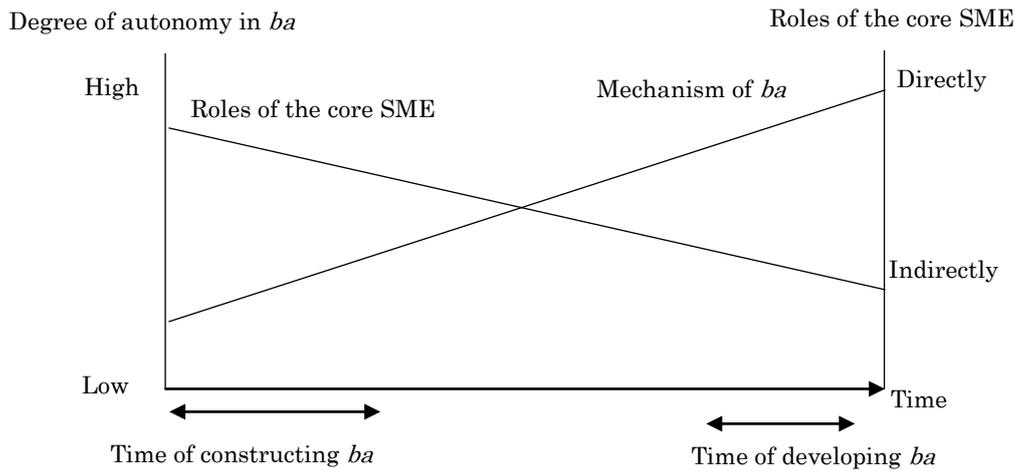
The aim of generating *ba*, similar to the case study, is to expand the range of technologies to receive orders from various types of business fields, which a single SME cannot achieve because of limited management resources. When the core SME only tries to expand the range of technologies and coordinate operations, it means that the core SME has to impose a serious burden on operations, which TOSEI EB was faced with and has experienced before. In this case, *ba* may face functional disorder and decline, and finally collapse.

Hence, the activities that each member tries to generate autonomously and creatively for operations and that heighten the coordination capability are good for both the core SME and the members. Based on these points, it is necessary to make the functional *ba* generates two functions, which are “fostering” a path for the members and “coordination” a path for generating *ba* (in Figure 2) by the core SME.

5-2. Changing roles of the core SME corresponding to the developing stage of *ba*

Figure 3 shows two principal roles of the core SME of *ba*. They are presented in chronological order and schematizes the changing *ba* and its internal mechanism, which includes constructing *ba* as an implementing business strategy of the core SME from an early stage to the developing stage in the context of the movement of *ba*. By comparing to Figures 2 and 3, we try to understand the core SME and the function of $ba^{(20)}$.

Figure 3 Changing the mechanism of *ba* and the roles of the core SME



Source: Author

At the time of constructing and modifying *ba*, the roles of the core SME heavily emphasized fostering the member companies of *ba*. For example, the core SME let the members learn the technological utility of the machinery and material specificity to allow them to participate in processing the operations of the machinery in front of clients and to recognize the great responsibility of operations, promote technological skills and make an effort to improve technology by themselves. At the same time, we have to pay attention to the aspect that the core SME has a role of promoting in order to develop *ba* in this stage at the same time (see Figure 2). We can confirm it through the relationship between the core SME and the members, which divide operations inside *ba* and emerge in technological information transfer needed for implementing operations and coordination. Exchange of reciprocal information, implementation of operations, and relationships are accumulating in *ba*, and lead to a change in the mechanism of *ba*.

Even though the roles of the core SME have different importance between fostering a path and coordinating a path (see Figure 2), the core SME takes up responsibility of two roles at the same time and it provides two important suggestions. The first suggestion is that the principal role of the core SME is to directly affect towards both members and *ba* at the time of constructing *ba* (see Figure 3). The facts that the core SME takes great initiative in designing and managing *ba* and that the rate of the autonomy of members is low suggest that the structure of authority of the core SME is very strong.

The second suggestion is that direct coordination by the core SME not only affects *ba* but also flows to members via coordinating activities in *ba* (see Figure 2). This means that direct coordination in *ba*, which the core SME implemented, was connected to strengthening ties among members in *ba* as the container of informational reciprocal function, and that the barriers among members was reducing, and thus, members improved their own technologies as a result. These activities are

connected to evolve *ba*.

At the time of developing *ba*, the role of the core SME is focused on evolving *ba* because the members of *ba* had changed from being fostered and were authorized by the core SME to being active autonomous entities and generating coordination capability as a result. The degree of autonomy of members in *ba* is heightened, so the role of the core SME also has changed from direct coordination to indirect influence on members (see Figure 3). Indirect influence involves, for example, managing *ba*, dispatching information outside *ba*, and seeking the direction of *ba* in the future. These activities are one of the roles of the designer of *ba*. The more important thing is that the owner of the leadership of *ba* is still the core SME, even though there are no changes in the relationships inside *ba* among the core SME and the members, and the way of implementing operations and the role of the core SME changes flexibly. This means that the core SME changes its role as the designer of *ba* in each developing stage, and the members begin to add the function of generating and managing *ba*. There is no doubt that this *ba* become *blooming ba* at this developing stage.

5-3. The principal factors changing the internal mechanism of *ba*

Finally, we identify the required factors that lead to the new mechanism compared to the early stage of *ba*. First, even though the core SME has designed and constructed *ba* as a means of implementing its business strategy, which is called *designing ba*, did not command and control the activities of the members with the rigid structure similar to vertical integration⁽²¹⁾. This relationship between the core SME and the members is denied the conditions of rigidity, and the selected members of the project are fixed and depending on the core SME's initiative in *ba*.

The second important factor is that the core SME allows spontaneous actions. This stance of the core SME leads members to improve the proprietary technology of members, connects them to the improved capability of *ba* as a whole, and generates coordination skills and capability among them. By seeking spontaneous actions from the members of *ba*, the mechanism of *ba* has changed as a result.

The third important factor, which is the most important factor and is related to the second factor, is that the core SME allows members to be positively spontaneous, expand, and make their own technology sophisticated for activating and prospering *ba*. The facts that the core SME eliminates the inhibiting factor of activating and prospering *ba* itself, and that the core SME provides the opportunity to be creative for implementing operations and technologies, are analyzed. Thus, the core SME does not prohibit members from being active and prospering *ba*, and changes its own roles of *ba* as a core and leading SME at the same time. It is possible for *ba* to change from *designing ba* to *blooming ba*.

Hence, it is no exaggeration to say that the degree of the managing capability of *ba* by the core and leading SME is decided to function spontaneously and change the mechanism of *ba*. This means that it is an indispensable factor for the core SME to generate the capability of organizing and managing tasks and the capability of accumulating and judging knowledge of technologies before constructing and managing *ba*.

6. CONCLUSION

This study has two important implications. The first implication is the fundamental factors of constructing *ba* and the relationship among members. Existing studies of network were mainly focused on analyzing the ex-post facto network structure under the given conditions that were already generated. However, this study considered the fundamental factors of constructing *ba*, which

were designed by the core and leading SME based on the established theory of *ba*. It is indispensable for the core SME to generate the capability of organizing and managing tasks and the capability of accumulating and judging knowledge of technologies before constructing and managing *ba*, and these capabilities are critical for settling and modifying *ba*.

The second implication is that there is a possibility for *ba* to be changed its mechanism. The case study in this paper is a successful case of conversion and change in the mechanism of *ba*, and shows that the core SME of *ba* implements leadership and direct coordination of *ba* in the early stage. However, this *ba* begins to change in the developing stage. The members became autonomous and spontaneously play the key role in coordination among members, and implement creativity in *ba* gradually. This is possible because the core SME, which takes initiative in *ba*, generates two capabilities—that of organizing and managing tasks, and of accumulating and judging knowledge of technologies before constructing and managing *ba*, and promotes growth as a constructing member of *ba*, and plays the important role allowing members to be creative and be spontaneous. This changes the mechanism of *ba*.

Three important factors create this dynamism. The first factor is that the core SME does not command and control the activities of members in a rigid structure similar to vertical integration. The second factor is that the core SME not only imparts technological information or knowledge and formulates the guidelines of operations, but also lets members take spontaneous actions, such as improving proprietary technology, connecting to the improved capability of *ba* as a whole, and generating coordination skills and capabilities. The third factor is that the core SME as designer of *ba* positively allows members to be spontaneous, expand, and make their own technology sophisticated for being active and prospering *ba*.

- (1) For definitions and the concept of *ba*, refer to Itami (2000: 4-6).
- (2) Yamazaki (2002) defined a local milieu as a collective structure that is an implicit organization of functioning actors and reciprocal information, reducing the degree of dynamic uncertainty.
- (3) Itami et al. (2000) noted that each author of the book had a different definition of *ba*. However, the fundamental elements of *ba* were shared. These fundamental elements are: 1) the definition of *ba* contains a shared space for members, which is a critical element of *ba*; 2) *Ba* is contained the process that space affects entities, and entities comprise members, thus, when a something happens to a member, it happens in *ba* as a whole; and 3) *ba* is regarded as a reciprocal relationship among members.
- (4) Yamashita (2000) discussed the study of *ba* by means of a case study of a price formation process in Akihabara from the standpoint of informational reciprocal functions. Nukada (2000) expressed the mechanism of *ba* as an intangible and system flowing through an industrial cluster.
- (5) There are some comments for this model from academicians. Generally, a cell is established on the horizontal axis once. However, cells emerge continuously. If the generation of *ba* on the horizontal axis is continuous, subcategories of generation, namely cell establishment, happen once. Thus, the model is contradictory. When the model is understood chronologically and discussed as a time series, the comment is adequate. However, the reason for the model is not to identify chronological order, but to identify types and features of each type of *ba*. To identify the types and features of *ba*, we have to understand what forms members choose, and what factors are critical to those choices. The model offers an influential classification grouping to achieve these aims.
- (6) IVAM is an acronym for the Interessengemeinschaft zur Verbreitung von Anwendungen der Mikrostrukturtechniken NRW e.V (Interest Group for the Application of Microstructure Technologies in English).
- (7) Itami (1999) pointed out that the discussion of *ba* and the phenomenon of *ba* is difficult to understand in general, because the combination of germination and generation, and establishment and emergence in Figure 1 are so nested and complicated.
- (8) We interviewed 13 companies from 1998 to 2003. The total interview time is 17 hours and 45 minutes. These were semi-structured interviews, with same prepared questions and subsequent questions depending on the

- interviewee's answers. The questioners' survey implemented in September, 2003. Five companies of 12 members answered the questions on paper and one member answered it in a face-to-face interview.
- (9) This state was pointed out by reviewers. We appreciated the critical review comments from reviewers, which greatly improved an earlier draft of this manuscript.
 - (10) Knowledge of technologies includes knowhow of manufacturing technologies, but also features of technology, technological interpretation, and experiences.
 - (11) Tamotsu Ueno, founder of TOSEI EB, is an engineer who worked for a listed car manufacturer over 15 years. At that time, he was a member of the board. After he retired from the company, he started TOSEI EB with his few subordinates.
 - (12) Ito Manufacturing Laboratory used to be a subcontractor of a listed company producing large quantities of processing parts located in near TOSEI EB's factory. Ito Manufacturing Laboratory did not know and no trade with TOSEI EB in the past, but the president of Ito Manufacturing Laboratory contacted to TOSEI EB because of being well-known in the area to get advice on Ito's strategy and business in the future.
 - (13) Yoneyama Factory used to make molds for printing circuit boards. The president of Yoneyama factory perceived the crisis of transferring factories of large companies to go overseas after the Plaza agreement. Yoneyama Factory bought water-jet machinery by seeking a new niche business area at that time for changing business to grasp new target. Once introduced water-jet machinery, it was not easy to run. Thus, Yoneyama Factory visited Tokyo Metropolitan Small and Medium Enterprise Support Center to get advice, and the center advised Yoneyama Factory to go to TOSEI EB.
 - (14) According to our questionnaire survey implemented in September 2003 and answered by five companies out of 12 core member companies, respondents who were in charge of projects and almost all were president of the member companies. They stated that they were contacted more often by e-mail and meetings directly than by telephone and FAX, based on their cognitive criterion.
 - (15) By our field notes in July 31, 2001. At that time, Ito Manufacturing Laboratory had to prevent noise problems during operations for neighbors for introducing and buying new processing machinery of laser scribe.
 - (16) This factory is located in Hamura which is different from the factory of the headquarters and is about 30km away.
 - (17) By our field notes on September 30, 2001. Ueno told us that the rate of projects implemented by core members is about 10 percent, based on his cognitive criterion.
 - (18) A recent example is a car manufacturing business in developing process which commits the whole developing stage such as proposal, prototype, analysis and evaluation (Source is by Nikkan Kogyo Shinbun in Spring 3, 2003).
 - (19) The core SME does not try to take all profits and merits from receiving the order, but: 1) concentrates members' operations and duties, and releases and reduces complexities of contracts and procedures for the members; 2) negotiates with clients; 3) makes full use of information, coordination skill, and connections of the core SME to make contracts. This system of making contracts is not the intention of TOSEI EB as the core SME, but is requested from the members (from our field notes, August 29, 2001).
 - (20) Figure 3 does not imply a clear boundary from constructing *ba* to developing *ba*. It is because the changing mechanism of *ba* is a phenomenon of continuous movement rather than drastic changeover.
 - (21) In the aspect of inside relationship, the core SME takes grate leadership and implements huge presence to other members. However, the core SME does not have physical asset specificity and dedicated asset specificity (Williamson, 1985) of members. This is one of the reasons of being independent and avoid commands and controls by the core SME for members.

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