

# Chapter 1

## Overall Picture and Approach of This Study

### ABSTRACT

*Using the medical technology industry as an example, in the “Preface,” the author explains that cross-sectoral collaboration is indispensable for promoting competitive new regional industries. This study explores the effective promotion of the industries through cross-sectoral collaboration by focusing on the regional system, management to facilitate the collaboration, and the management body to implement the management. This chapter discusses the subject, approach, and methods. First, the author clarifies cross-sectoral collaboration being self-organized among organizations with complementary functions to benefit the participants through new business opportunities. Second, the main concepts and theories are introduced regarding the regional system to support industrial promotion through collaboration, the management to facilitate a self-organizing process toward forming collaboration, and the management body facilitating the process. Finally, the significance and necessity of the case study, methodology, and target are discussed.*

### INTRODUCTION

The research theme of this study is to develop a comprehensive theoretical framework on how to manage to facilitate the process toward the establishment of cross-sectoral collaboration for promoting new regional industries by focusing on a regional system to support the promotion, a management approach for the facilitation, and a management body to implement the management. This study adopted a case study

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approach. The author focuses on the cases in which advanced initiatives are made to commercialize medical technology through cross-sectoral collaboration in several regions of Germany.

This chapter first describes the subject of this study. Then, after explaining the viewpoint and approach, the main concepts and theoretical framework are discussed. Finally, the need to conduct a case study, its methodology, and the case study's target are explained.

## **SUBJECT, APPROACH, AND CONCEPT/ THEORY OF THIS STUDY**

To explore the research theme, it is necessary to clarify the theories and concepts by reviewing previous studies, conducting case studies, and constructing a theoretical framework based on the findings obtained from the analysis.

The following sections describe the case study's subject, approach, concepts, and theories.

### **The Subject of This Study**

This study explores establishing cross-sectoral collaboration with the medium- to long-term objectives of promoting new competitive regional industries that will become the bearers of the regional economy. The case study will focus on collaboration in the medical technology industry in Germany. Therefore, the entities participating in cross-sectoral collaboration include companies in various industries (especially SMEs), universities, research institutes, medical institutions, insurance companies, etc. This part considers the features of cross-sectoral collaboration this study focuses on and the efforts that promote its formation.

### **Cross-Sectoral Collaboration**

Although "collaboration" is a term that can be used without limitation, the types of collaboration targeted in this study will be clarified using previous research.

First, Bryson et al. (2015) show that the term "collaborations" is interchangeable with "partnerships" (p.648). Additionally, Roberts and Bradley (1991) define "collaboration" as "a temporary social arrangement in which two or more social actors work together toward a singular common end requiring the transmutation of materials, ideas, and/or social relations to achieve that end" (p.212). Here, the

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collaboration includes the following elements: 1. a transmutational purpose and participants' activities toward that purpose; 2. an explicit and voluntary membership; 3. an organization consisting of planned, coordinated, and task-specialized activities; 4. a sustained reflexive interaction among participants; and 5. a temporary property of formation (Roberts & Bradley, 1991). Bryson et al. (2006) define cross-sectoral collaboration as “the linking or sharing of information, resources, activities, and capabilities by organizations in two or more sectors to achieve jointly an outcome that could not be achieved by organizations in one sector separately” (p.44). This implies that cross-sectoral collaboration is characterized by diversity, wherein a number of actors interact in their formation. Based on these discussions, cross-sectoral collaboration, developed between actors in different fields to promote commercialization under a relationship as an equal partnership, will be the subject of consideration in this study.

Next, there are prior studies on partnerships and alliances for inter-firm relationships.<sup>1</sup> More conceptually, Sheth and Parvatiyar (1992) classify forms of inter-firm alliances into four axes, one of which is strategic and operational objectives, the other being competitors and non-competitors.<sup>2</sup> Here, strategic objectives in the former axis are alliances that seek growth opportunities under strategic intent, while operational objectives are alliances aimed at asset utilization and resource efficiency. Since this study targets efforts to pursue growth opportunities in medical technology-related businesses through collaborations between different fields that are complementary for business creation, the collaborations formed for strategic purposes between non-competitive organizations are considered the target of this study.

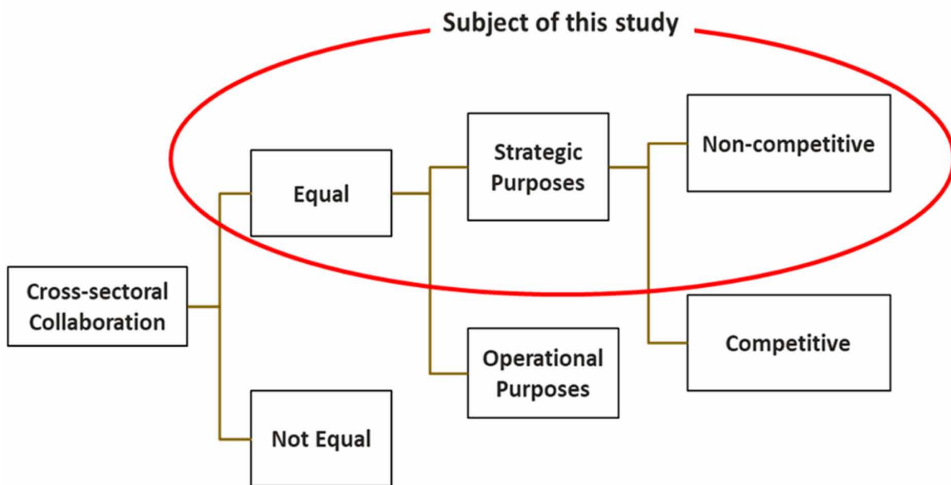
Based on the above, cross-sectoral collaboration, formed between actors in different fields, has the following characteristics (Figure 1).

- Entry and exit of entities in various fields, on an equal footing with each other, determined by the will of each organization.
- Having strategic purposes to capture growth opportunities and create value through new business.
- Forming non-competitive relationships that can complement each other.

By satisfying the above conditions, it is assumed that collaboration is established between organizations with different fields that are equal and complementary to each other, with the objective of both parties benefiting from the new business opportunity.

Figure 1. Cross-sectoral collaboration targeted in this study

Source: Drawn up by the author.



## Efforts to Facilitate Cross-Sectoral Collaboration

In various efforts for business creation, when it is difficult for the organization to meet its needs alone, forming collaborations with members outside the organization, including those in different fields, is becoming increasingly important. For example, in the case of business creation aimed at promoting new industries in the region, collaboration among different fields, including small and medium-sized enterprises (SMEs), is indispensable.

Currently, in many regions of the world, efforts are being made to facilitate cross-sectoral collaboration through the support of local governments and other organizations with the medium- to long-term objective of encouraging new industries. An overview of these efforts is listed below.

- A regional system is built through the local government's initiative or at the request of industry and academia. Under the system, industries to be promoted are selected, and support for promoting cross-sectoral collaborations is provided for promoting new competitive industries in the region.
- Under the regional system, a management body is built to provide related services to facilitate the establishment of cross-sectoral collaboration for business creation in each of the selected industries, and its structure is developed as required.

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- The people involved in building the management body study the initial conditions of the economy, industry, companies, research institutions, etc., in the region and facilitates the establishment of cross-sectoral collaboration by involving parties concerned to discuss and share policies for facilitating the collaboration.
- Based on the study mentioned above, the management body invites or approaches members to participate in cross-sectoral collaboration, sets up meetings and events to promote interaction among members and external parties for the business creation, and provides matching opportunities and other services to facilitate the formation of the collaboration. In other words, the management body will play an intervening role in promoting new businesses in the industry by facilitating the formation of collaboration realized through new combinations of entities from different fields.

### **Perspectives, Approaches, and Theories/ Concepts of This Study**

The approach of this study is clarified based on previous studies related to inter-organizational collaboration to examine how to facilitate cross-sectoral collaboration to encourage business creation for the promotion of new regional industries.

#### **Perspectives of This Study on Cross-Sectoral Collaboration**

In previous studies, inter-organizational collaboration has been discussed in the context of strategic alliances; its purpose is to increase competitiveness through access to partners' management resources to enhance innovation and product development capabilities (Keley & Rice, 2002), to reduce cost (George et al., 2002), and to enhance management capabilities (Jiang & Li, 2008). In addition, Thomson and Perry (2006) indicate that reforms, rapid technological change, scarcity of resources, and increased organizational interdependence are the factors that promote collaboration.

However, regarding previous research on collaboration, Huxham and Vangen (2005) state that "we are not concerned with collaborations between individuals...Our concern is with collaborative relationships between organizations" (p.4). Further, the process of interaction leading to the formation of inter-organizational collaboration has not been fully elucidated (Thompson & Perry, 2006). In addition, there needs to be research based on experience about how the process is facilitated.

As described above, conventional analysis of inter-organizational relations has been opaque in terms of the promotion of interrelationships among parties who play a central role in organizational activities and the process of establishing collaborations. Therefore, clarification of this requires an analysis focusing on the process of mutual

activities of the entities involved in the collaboration. A noteworthy perspective here is that inter-organizational collaboration is viewed as a network organization, which is argued to be established through interactions among actors of different organizations regarded as a complex self-organizing process (Ferraro & Iovanella, 2015; Hibbert et al., 2010; Zhao et al., 2012). In this self-organization process, people belonging to different organizations and fields find common goals and develop interactions for cooperation across organizations. Research on cooperation among people includes Morrison and O’Hearne’s (1977) transactional analysis study on improving the efficiency of working people by focusing on human interaction and Kanter’s (1994) study that describes the collaboration with a picture of marriage between man and woman and explains cooperation between individuals as a cooperative effort to create new value. Kanter (1994) shows the advantages of establishing and maintaining collaboration in business-to-business relationships as a source of competitive advantage and points out that successful relationships depend on establishing and maintaining good personal relationships between key executives. She proposes the importance of building relationships between individuals in building competitive advantage through collaboration. Child et al. (2005) further indicate that trust grows through personal relationships and develops into inter-organizational relationships.

Therefore, based on the literature, this study defines inter-organizational collaboration as “the formation of an organization for cooperation among people belonging to different organizations.” Furthermore, Barnard (1968) describes, “Cooperation is a social aspect of the total situation...the process of interaction must be discovered or invented” (p.60). Moreover, he points out, “Social processes are those in which the action is a part of the system of actions of two or more men. Its most common form is verbal communication” (Ibid., p. 20). Regarding the importance of communication, Kaz and Kahn (1966) asserted that communication is the essence of a social system or organization. Bavelas and Barrett (1951) also stated that communication is the essence of organizational activities. However, concerning the formation of cooperative organizations through collaborations, Monge and Contractor (2001) indicate that previous studies have not sufficiently provided a theoretical mechanism for the formation, maintenance, and dissolution of organizations (through communication).

Based on the above discussion, this study examines the self-organization process among people from different organizations and how to facilitate the establishment of cross-sectoral collaboration by focusing on the interaction among the parties involved in the process through communication.

## Approach to Consider Facilitating Cross-Sectoral Collaboration

This study aims to explore the research theme; “How to implement the management for facilitating the establishment of cross-sectoral collaborations for the purpose of promoting new competitive regional industries through business creation, and with what kind of regional system and competence of the management body to facilitate it?”. As discussed in the “Preface,” there are many practices concerning this research theme; however, these efforts have not always been successful. Despite this, empirical studies that comprehensively examine the factors contributing to effective promotion have been scarce. In other words, further studies for comprehensive theory building are required on this research theme, and more effective promotion practices should be pursued by utilizing the study outcome that provides systematic knowledge. Therefore, a system at a regional level, management to facilitate collaboration, and an organization that implements the management are taken into consideration to elucidate the research theme. These issues are described as the following research questions;

- R.Q.1:** How to build and operate a regional system for facilitating the self-organization process of cross-sectoral collaborations to promote new competitive regional industries?
- R.Q.2:** How is the management to be implemented for facilitating the self-organization process toward cross-sectoral collaborations?
- R.Q.3:** How to build and rebuild a management body to display the organizational competence for facilitating the self-organization process toward cross-sectoral collaborations?

The specific target of this study is a case in which a region-wide cross-sectoral collaboration to promote business creation was facilitated through the participation of local government, industry, and academia, with the medium- to long-term objective of promoting new regional industries.

Here, it is assumed that each entity independently makes decisions on establishing collaboration wherein all entities have equal relationships and linkages. Therefore, the subject of this study is the establishment process of collaboration through self-organization that is featured by the voluntary formation of relationships and connections toward cooperation (Imai & Kaneko, 1988). However, as discussed in detail in later chapters, the process of self-organization is characterized by complexity and does not always move in a certain direction. In contrast, Imai and Kaneko (1988) note that generating order in a self-organizing manner does not mean leaving individual behaviors completely alone but rather works to connect individuals and create new relationships to form a new context in society. Imada (2008) also refers

to self-organization as “a genetic term which means the characteristics of systems to change their structure by themselves while performing interaction with the environment” (p.1). Furthermore, he points out that it is essential to consider the control that induces fluctuations caused by the activities of the creative individual to lead to the formation of a new order and consider incorporating self-reflection into control and fluctuation (Imada, 2008). Based on the view that intervention is necessary to facilitate the self-organization process of collaboration, this study will examine management for the facilitation of cross-sectoral collaboration as a subject of R.Q.2.

Moreover, since this study aims to gain comprehensive knowledge on promoting cross-sectoral collaboration for advancing new regional industries, the following topics are also explored.

Regarding the regional system that is the subject of R.Q. 1, the author focuses on the region as a locus for shaping innovation processes and patterns and improving competitiveness (Fiore et al., 2011) and considers the management approach to building and operating a regional system to promote new competitive regional industries through the collaboration. Here, the local public sector will play the role of facilitator and catalyst, involving local stakeholders, mainly industry and academia, in promoting new regional industries and providing direction for promotion based on learning and understanding the initial conditions of the region. The key points are to build and improve platforms for developing interactions between entities in different fields and to support a management body’s foundation and activities that facilitate collaboration.

Concerning the management body that is the subject of R.Q.3, first, the organizational competence required for facilitating the cross-sectoral collaboration is summarized based on the findings from the study on R.Q.2. Further, how to build/rebuild the management body to demonstrate the competence is explored by focusing on the factors to be considered in the initial phase, the building phase, and the rebuilding phase.

## **Theories and Key Concepts of This Study**

Although the details are given in later chapters, the theories and concepts for each research question are outlined below.

First, with regard to R.Q.1, which explores how to build and operate the regional system, Cooke et al. (2006) presented the constructing regional advantage approach, which proposes to create institutional and governance capacity with the engagement of diverse elements (actors) in the region on identifying initial conditions, pursuing and finding unique solutions, innovative activities of businesses, the dynamic role of the public sector, and public-private partnerships toward increasing the



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competitiveness of the region. As a measure to achieve this, Asheim et al. (2011) and others advocate a platform policy, a strategy based on related variety, which would allow for more flexibility in scope and strengthen territorial competence. To achieve this, the Triple (Quadruple)-Helix model is proposed by Etzkowitz and Leydesdorff (1997) and Yawson (2009) to promote systematic, research- and technology-oriented (user-oriented) innovation by industry, academia, and government (public such as civil society), with the public sector playing a catalytic role (Koschatzky & Kroll, 2009) involving industry and academia to build and operate the regional system.

Next, concerning R.Q.2, management to facilitate cross-sectoral collaboration has been discussed from the perspective of inter-organizational collaboration as a network organization formed through a complex self-organization process (Fuchs, 2003; Heylighen, 2013; Plowman et al., 2007). Therefore, the management is not based on the assumption of a hierarchical organization but is oriented toward facilitating a self-organizing process of network organization characterized by complexity. On this point, Imada (2008) describes the concept of “goal-directionality” and explains the intentional self-organization by the intervention of the management layer in terms of facilitating the process. These arguments suggest that the intervention of an entity equivalent to the management layer can also direct the complex self-organization process of collaboration. Burnes (2004a) shows that the complexity theory and planned approach to change advocated by Kurt Levin share common ground. On this basis, the latter approach can be applied to facilitate complex self-organization processes (Burns, 2004b). In light of the above, this paper explores a systematic approach to the targets of intervention and how it should be implemented. Additionally, the effectiveness of an action research-based intervention by the management layer is proposed based on the discussion of leadership under complexity (Baker et al., 2011; Plowman et al., 2007). Furthermore, based on discussions by Burnes (2004b), Gray (2008), Imada (2008), Itami (1999), and others, the author derives “fostering felt-need by learning initial conditions,” “establishment and refinement of field,” and “emerging interaction toward collaboration” as targets of intervention, and show that management of the self-organization process by intervention is effective in promoting cross-sectoral collaboration.

Finally, regarding the organizational competence of the management body and how to build/rebuild it, which are explored in R.Q.3, first, the author focuses on the concept of network governance. Based on the discussion by Provan and Kenis (2008) and others, governance by a distinctly separate administrative entity is optimal from the viewpoint of network effectiveness in facilitating cross-sectoral collaboration among the diverse, many, and independent entities that are interdependent on each other. Then, based on Henderson and Cockburn (1994) and Kawabata (2020), the author clarifies the organizational competence required for a management body to facilitate cross-sectoral collaboration. Last, based on the arguments by Franks and

Bory (2017), Taatila (2004), and others, it is considered how to build and rebuild the management body by focusing on (1) factors to be considered in the initial phase, (2) attributing factors of organizational competence in the building phase, and (3) approach in the rebuilding phase to adapt to the change in environment.

## **NEED FOR CASE STUDY**

### **Significance of Case Studies: Lessons From Practice by Facilitators of Cross-Sectoral Collaboration**

Toward the medium- to long-term goal of promoting new regional industries as the bearers of the local economy, many regions of the world have selected industrial sectors for promotion after examining regional conditions and resources. Moreover, they are working to facilitate the establishment of cross-sectoral collaboration to encourage new businesses.

In this trend, local governments are promoting the business creation of the medical technology field because of the high growth potential of this industry. However, since it is difficult for companies alone to promote, these efforts often involve the establishment of research groups for mutual exchange and learning, holding exchange meetings for different sectors, and implementing support measures to match each other for facilitating cross-sectoral collaborations between companies, research institutions (universities), and medical institutions.

However, these efforts have not always been successful. Even in regions that have achieved a certain level of success, how they have facilitated cross-sectoral collaboration has remained a matter of individual experience and has not been clarified as systematic knowledge. In response, this study focuses on regional systems, management for facilitating cross-sectoral collaboration, and the management body (cluster organizations in the case studies), aiming to draw on the knowledge gained from the experiences of those involved in similar efforts. Based on relevant previous studies, the author will explore mechanisms for facilitating cross-sectoral collaboration to promote new regional industries. This is a useful approach in pursuing the academic value of developing a body of knowledge by building a theory on the above research questions and the practical value of the implications for promoting similar efforts.

### **How to Proceed With the Case Study**

While the details of the research method and design will be discussed in Chapter 3, how to conduct the case studies is briefly described here.

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Eisenhardt (1989) states that theory building through case studies is a research strategy for theory building from empirical evidence. Eisenhardt and Graebner (2007) also argue that empirical research based on relevant previous studies should identify the research gap and derive research questions to fill the gap, where qualitative data can answer the how and why questions about these complex social processes.

This study aims to gain systematic knowledge on how to facilitate cross-sectoral collaboration for business creation toward the promotion of new regional industries and practical knowledge on how to implement the measures for that purpose. Therefore, the author will present a conceptual model by comprehensively examining the previous studies regarding the concepts and theories introduced above concerning each research question, collect qualitative data through interviews and other means in case studies, examine the validity of the conceptual model through comparative analysis among the cases, and then develop a theoretical and practical knowledge base. Therefore, the study will employ a qualitative comparative analysis of multiple cases to explore how cross-sectoral collaboration has been facilitated with support by each region's local government and management body. The author will trace the events over time to the present to elucidate the causal relationships.

### **Cross-Sectoral Collaboration in Medical Technology Fields as a Target of Case Study**

This study will conduct case studies of efforts to facilitate cross-sectoral collaboration for business creation in the medical technology field, with the medium- to long-term objective of promoting new regional industries. The case studies will focus on the three regions (North Rhine-Westphalia, Bavaria, and Baden-Württemberg) which have achieved relatively high performances among their efforts in the various regions of Germany.

Local governments and others in each region are embarking on support activities to expand business opportunities through involving industry, research institutions (including universities), medical institutions, etc., intending to promote entry, especially of SMEs with accumulated technologies in the medical technology field that has high growth potential. In addition, the management bodies facilitate collaboration by implementing various interventions to stimulate interaction among parties from different sectors. Under such support, independent and voluntary entities with complementary capabilities spontaneously develop interactions and try to establish cross-sectoral collaborations with a strategic intention to create new businesses.

Looking at the medical technology industry, the most distinctive feature is that the industry's products are used on humans, therefore, are subject to meet special demand and are tightly regulated to ensure safety (Mejtoft et al., 2022; MedTech

Europe, 2021). They also have to apply and be approved for reimbursement. Additionally, the products use interdisciplinary technologies such as materials science, engineering, electronics, software, ICT, plastics technology, etc. (Lee et al., 2019; MedTech Europe, n.d.). R&D for new products and innovations in the industry is based on these technologies. Moreover, the products are continuously upgraded and improved through feedback from users (i.e., hospitals, patients). Furthermore, the products of the medical technology field range from simple devices to complex instruments (Mejtoft et al., 2022); therefore, there are many niche markets and opportunities for SMEs to enter the markets (Japan Agency for Medical Research and Development, 2020). For instance, in the German medical technology industry, approximately 93% are companies with fewer than 250 employees (Germany Trade & Invest (GTAI), 2022).

These are the characteristics of medical technology; however, the study on this industry contributes to the following points that can be applied to the promotion of other industries. First, from an initial idea to a product on the market, multifaceted collaborations deployed cross-sectionally are required between industries (including SMEs, various experts, and insurance companies), research institutions and universities, medical institutions, patient organizations, etc. As is discussed in the argument on open innovation, this is the facilitation of cross-technological and sectoral cooperation between partners toward innovations; therefore, the implications withdrawn from the study are beneficial for the efforts in other industries. Moreover, the study result also provides an essential implication for promoting regional industries wherein SMEs are the backbone of the economy.

Lastly, this study focuses on several regions in Germany where the conventional structure of economies and industries shows the limitation of growth. As a countermeasure, they promote new regional industries by facilitating new combinations (therefore, collaborations) of various sectors and technologies. Therefore, the cases in which efforts are being made to facilitate cross-sectoral collaboration to promote medical technology fields as a new regional industry meet the conditions to explore the research theme of this study. Moreover, considering the characteristics of the medical technology industry and the regions' experience above, the lessons obtained from the study contribute significantly to providing implications applicable to a wide range of sectors and regions in the world wherein they have the challenge to promote innovative and competitive regional industries.

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### **Overall Picture and Approach of This Study**

Zhao, K., Yen, J., Ngamassi, L. M., Maitland, C., & Tapia, A. H. (2012). Simulating inter-organizational collaboration network: A multi-relational and event-based approach. *Simulation*, 88(5), 617–633. doi:10.1177/0037549711421942

### **ENDNOTES**

- <sup>1</sup> For example, Huxham and Vangen (2005) examine partnerships, alliances, joint ventures, etc., to study inter-organizational collaborations.
- <sup>2</sup> The four categories indicate that competitive alliances fall under strategic/competitors, cartels under operational/competitors, cooperative ventures under strategic/non-competitors, and inter-firm agreements such as facility use under operational/non-competitors.