

New Role of Local Government for Industry Innovation Through R&D Alliance Strategy: A Case Study of STTRA

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Abstract--The R&D alliance approach is the key strategy for government policy to promote industry innovation not only at the national level but also locally. However, due to some known conflicts, needed factors, and specific climate that cause unexpected complexity in the process of R&D alliance, the failure rate of alliance strategy remains high. This study assumes that if the governmental sector is capable of playing a supporting role and does timely intermediation in the practice of technology alliance it is likely that there can be new public service innovation for industry development. Particularly, we focus on observing how the local government can perform new and needed services to encourage and support local firms to successfully initiate alliances and enhance their mutual trust to extend their collaborative activities. We use a case study, the Southern Taiwan Textile Research Alliance (STTRA), and we examine its alliance process and performance. Based on our research model, the study finds that the active initiation and strategic intermediation from local government can be one kind of valuable and expected public service innovation, even though this activity is not well understood yet. Our study also illustrates that the local government not only might be able to provide relevant resources with needed actions through active participation but also could become a critical success factor to enhance industry innovation in practicing R&D alliances. Such a new role and a new scope of public service innovation for industry development is worth studying to explore and evaluate its value and effects.

Index Terms-- Local government, public service innovation, R&D alliances, regional innovation system.

I. INTRODUCTION

The National Innovation System (NIS) of Taiwan claims that the national system is the key source of firm competitiveness. The complete business and technology environment and the right government R&D policy can stimulate and enhance industry innovation [1]. Moreover, the network partnership between firms, government, and academia is the key success factor [2]. As result, it is necessary to consider how to use government's statutory power and public services for driving the collaborative network to extend more innovation opportunity for industry development. Herewith, R&D alliance is the major approach to encourage and perform more and better innovation. Today, the R&D alliance approach is the key governmental strategy to promote industry innovation not only at the national level but also locally. However, due to some known conflicts, needed factors, and specific climate that cause unexpected complexity in the process of R&D alliance, the failure rate of alliance strategy remains high [3]. Therefore, to successfully manage collaborative networking for industry innovation it is necessary to take a comprehensive viewpoint with a systematical methodology to understand and learn about the practice, problems, and solutions of R&D alliances.

To do so, this research assumes that if government is capable of playing as a smart trigger and creating a trustful environment, such effort and service from government should be a critical factor to reduce the failure rate. This is because the willingness and consensus of individual firms toward organizing R&D alliances for industrial innovation is significantly influenced by government policy and its incentive strategy [4-6]. In particular, local government stands at the front line, with more information and understanding of problems, difficulties, and demands in the local industrial environment as well as the capabilities of the local firms. Even with limited statutory power and resources, if local government plays the traditional, passive role and provides only responsive behavior with regard to supporting regional R&D alliance development, there might be some interesting effects and new impacts that could contribute to

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R&D transformation and its performance. Thus, we target local government in our research and explore the characteristics and impacts while the government becomes actively involved in R&D alliance practice.

In the meantime, we argue for a new public service theory in which the government performs services for industry development instead of just steering [7], and that it should be expected as an important public service innovation [8]. In addition, the new public service framework should be based in a collaborative structure between the three components—the public, nonprofit organizations, and the private sector—to meet their mutual demands [7]. It means that government must be capable of coordinating with multiple parties and integrating their resources and interests to carry out this new type of public service innovation [9]. However, most studies on service innovation thus far have only focused on single-party service to meet individual demands. This research emphasizes how public service innovation can serve to meet local firms' needs for their innovation through collaborating with government to extend their external resources and partnership for their competitiveness. To do so, this study formulates a theoretical model to interpret the characteristics of government's service innovation and chooses a well-organized and ongoing case, the Southern Taiwan Textile Research Alliance (STTRA), to discover its development process and performance. In the meantime, those impacts due to the new thought and innovative performance by the local government, the Tainan County government, toward STTRA are observed and evaluated.

II. LITERATURE REVIEW

A. Policy of R&D Alliance

Many research studies indicate that the clustering effect of industrial firms and coalition organization for co-development are critical factors for regional innovation [10, 11]. Further, the number of R&D consortia is one indicator to measure the capability of industrial innovation [12]. As a result, there is a growing research trend in exploring R&D alliance management issues as well as in discussing how to find critical success factors and evaluate performance during the alliance practice.

Many R&D consortia studies originate from the perspective of strategic management and institutional economics. They observe and discuss such subjects as the following:

- (1) How enterprise strategic objectives are fulfilled by the R&D consortia [13-15];
- (2) How enterprises integrate and increase their resource bases [16];
- (3) How values and relational advantages are created through correlations between organizations [17-20];
- (4) How the complicated procedure is constructed, managed, and coordinated between enterprises [21-25];
- (5) How research and development is diffusively promoted to create the social externality [26-29];

- (6) How R&D participants' benefits and R&D expenditures are clearly established [30, 31];
- (7) How one enterprise decides the process and factors for selection of partners and considers commercial models and technical resources, etc., and how it identifies potential competitiveness for creation of beneficial products [32, 33].

According to previous research findings, we recognize that R&D alliance for enhancing partnership networking is a critical strategy for regional innovation. However, collaborative networking for industry innovation interacts with multiplicity and complexity issues and thus should be researched from a comprehensive and systematical perspective [34].

B. Development Issue of R&D Alliance

The literature review shows that R&D consortia can create obvious advantages. However, it is quite difficult to sustain mutual cooperation over the long term [35-38]. As a result, a good procedure to construct effective consortia by sustaining mutual cooperation is a critical issue [24, 26]. Thus, we intend to investigate whether the government's active involvement is helpful in constructing a more effective mechanism to minimize cooperation barriers during development of the consortia.

Many research studies have discussed multiple factors for successful R&D alliance, such as cooperation motives, industrial environment, organizational characteristics, resource independence, and social network structure, among others [39-43]. In contrast to success factor analysis, Doz et al. [24] did a study concerning the dynamic procedure for development of the consortia. This study includes the dynamic route made by two types of consortia. (1) It is good timing to make industrial members more willing to cooperate with each other and use the consortia to accumulate R&D achievement while they find their common interests in a dynamic and competitive environment. (2) A procedure of coordinated cooperation based on actual requirements is created by means of design. On the other hand, the government is one factor to prompt the R&D network according to the research of Doz et al. [24], and the government's subsidies to the R&D consortia are the principal motive for technology sharing rather than cost sharing with reference to arguments of Sakakibara [23]. Accordingly, it is an important finding that the government should play a critical role in triggering the development of R&D consortia.

C. Taiwan's Strategy of R&D Alliance

Most Taiwanese industrial firms are small to medium scale. This industrial structure proactively establishes R&D consortia to achieve the following functions:

- (1) Counteract disadvantages due to scale inefficiency [44, 45],
- (2) Reinforce their absorptive capability for extensively contacting technical options or opportunities [46],

- (3) Acquire complementary technical resources for creation of new commercial opportunities in addition to technical capabilities [13, 15].

Furthermore, most R&D consortia in Taiwan are referred to as Cooperative R&D Agreements (CRADAs) [26], and the technical transfers of the R&D consortia based on CRADAs have been investigated in the past [47-51]. The R&D consortia are cooperatively developed by firms, research units, and the technical transfer center. They are operated according to a specific project with a self-organized team, and the project team is dissolved when the objectives have been completed within a certain period of time [52].

The above research studies have provided adequate prerequisites in dealing with small- and medium-sized firms' R&D consortia in Taiwan. Major issues include understanding the meaning of resource sharing and exchange, emphasizing the meaning of collectively absorptive capabilities, and promoting mutual benefit and potential opportunities. Therefore, it is meaningful to investigate how a local government can understand the development problems and play an active and supportive role in the development of R&D consortia.

D. Government's Role and Public Service Innovation for Promoting R&D Alliance

Government makes the scientific, technology, and innovation (STI) policy to promote regional industry innovation. This section will review government's role and how public service innovation might have a meaningful effect in promoting R&D alliances. Thus, we define the means of public service innovation first and then search for its key factors to construct an appropriate analysis framework for observing the relationship between R&D performance and public service innovation.

E. The Critical Role of Government Through R&D Alliance for Industry Innovation

Government plays one of the important roles in the national innovation system [2]. For example, the central government makes general economic and industrial policies to promote technological progress and innovation in industry, which involves identifying industry areas for attracting more business to form industrial clusters and offering R&D subsidies to support scientific and technology research in business. These policies can be categorized as follows: tax incentives, R&D project promotion, education and training, management consulting, and capital grants. [22, 53-56].

Successful strategies for industrial innovation policies are likely to be those that (1) include consistent policy objectives and various integration plans, (2) have a careful target plan to control the costs and benefits effectively, and (3) develop economically diverse industry/technology/employment bases that are different from indigenous bases [57]. One of these industrial innovation policies is R&D alliance promotion [4-6]. In particular, the central government subsidies of R&D alliances are helpful to increase incentives and reduce

uncertainty and risk [40, 58, 59].

However, such policy options are general economic and environmental policy, and they require business to respond with initiative. The role of government is passive in its response to industry demands. Because local governments have limited authority and resources in comparison with the central government, they need timely support to sustain their industrial competitiveness to create better job opportunities and a high-quality standard of living. The local government policy options and involvement should be different from those of the central government and might need to include a new type of public service innovation to strengthen local competitive advantage.

F. Public Service Innovation for Local Industry Development

A new public service perspective has emerged in the public administration field in the past decade. Government services not only are considered to be passive acceptance of people's requests for assistance but also serve initiatively the people who did not look for assistance, and they focus on the trust relationship with citizens and collaborative structures [7, 60, 61]. There are many innovations in public service management now [62], and the public service innovation issues are important for local government [8]. The adoption model of technological innovation contains a community environment, needs, organizational characteristics, and the organizational environment, which will affect local government's adoption of innovation [63]. In addition, there are three important leadership roles, which are political, administrative, and community leadership in public service innovation, and public service innovation lies in the area covered by the three types of leadership [8]. The covered area not only has the collaborative structures with leadership shared internally and externally but also builds coalitions of public, nonprofit, and private agencies to meet mutually agreed-upon needs [7].

Service innovation involves a new service concept and novel service delivery processes that delivery value-added to the customer in new ways [64-68]. Den Hertog [69] presented a four-dimensional model of services innovation that pointed to new service concepts, client interfaces, the service delivery system, and technological options. Following Den Hertog (2000), Jong & Vermeulen [9] mentioned that it is difficult in the presence of one of the four dimensions. Most new services will involve a combination of changes in various dimensions.

G. New Issue of Public Service Innovation from Local Government

Most government service innovation can be divided into two categories that (1) improve the service environment and facilities, and (2) simplify service procedures, which includes the removal or merging of outdated operations, forms, and service processes (e.g., E-government) [70-73]. However, there is one dimension of service innovation, and

government passively met the needs. There did not have collaboration and coalition structure with external institution and the service target was people not industry.

There has been little research on public service innovation from local government for industry, and little on practices by local governments that actively participate in and provide consulting services for industry integration. Moreover, this study finds the Tainan County government's industry policies are different from those of other local governments. The Tainan County government proactively promotes the industrial R&D alliances that have significant achievements and outputs; this is worth research on public service innovation for industry from local government.

III. RESEARCH DESIGN

A. Theoretical Modeling for Case Analysis

In order to know the relationship between government service innovation and the performance of R&D alliances, we design a theoretical model based upon our literature review to characterize the context and meaning of public service innovation. This modeling of public service innovation is shown in the Figure 1 and we also explained the differences between Den Hertog's conceptual model of service innovation and a four-dimensional model of government service innovation as shown in Table 1.

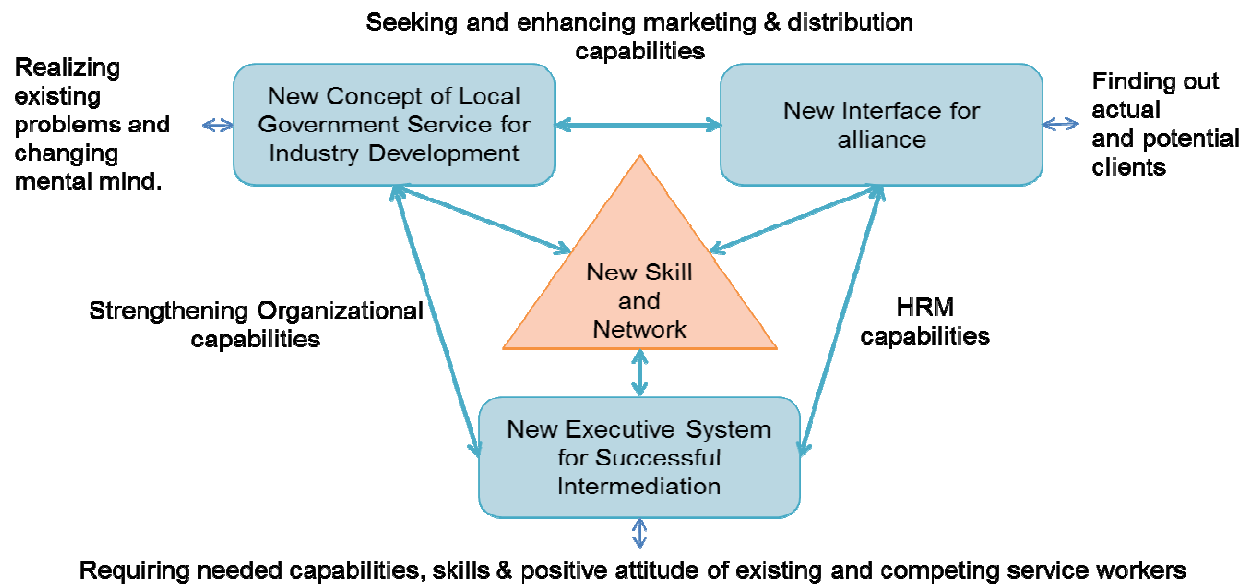


Figure 1: A four-dimensional model of government service innovation.
Adapted from Den Hertog's conceptual model, [69].

This modeling adopts Den Hertog's (2000) four-dimensional model of business services innovation and the transformation of the behavior and purpose of the government sector to perform public service innovation. The first dimension is a new concept of local government service for industry development. In this dimension, local government makes service policies different from the past, which obviously have new service processes and facilities (e.g., E-government) or abstract concepts (e.g., new industry service policy options, a bridge between industry and research institutions) that cannot be measured. Moreover, the political leadership that develops a new service concept is the necessary trigger for local government service for industry development[8].

The second dimension is a new interface for alliance, which focuses on the interactive interface between local government and industry. Local government provides a complete communication interface and utilizes environmental resources to cooperate in order to meet the

industry demands that drive new public service. Therefore, industry demand is a key factor of new interface for alliance. The community leader who integrates the diversity of demand and delivery to local government plays a key role in this dimension [8].

The third dimension is a new executive system for successful intermediation, which is the service-delivery function. Local government uses its own strengths and environmental resources to deliver new service through the executive system, which has collaborative structures with internal and external organizations [7]. The service executive who understands the new concept must have the communication and intermediation skills to fill an important role in this dimension [8].

The fourth dimension is new skill and networking. Public service innovation from local government doesn't need the fourth dimension necessarily. There are perfect service innovations without new skills and networking. However, public service process innovation tightly relates to new

technology adoption, which can improve service quality, decrease the wasting of time, and increase efficiency (e.g., an information system for communication).

The four-dimensions of the model of government service innovation are interlocked by marketing and distribution capabilities, organizational capabilities, and HRM capabilities. First, marketing and distribution capabilities represent the ability to promote the new service concept, quickly understand the industry demand, and deliver the appropriate service for industry. Organizational capability concerns whether the local government has sufficient

capacity to provide new services to industry; also, local government is sometimes faced with organizational inertia, so it must consider the formation of an organization dedicated to policy implementation. Public service innovation from local government should have four dimensions of service innovation through these interlocked links: the characteristics of active service, collaborative structures with internal and external organizations, collaborative structures with leadership shared internally and externally, and coalitions of public, nonprofit, and private agencies to meet mutually agreed-upon needs.

Table 1: The differences between Den Hertog's conceptual model of service innovation and a four-dimensional model of government service innovation

Dimension	Den Hertog's conceptual model of service innovation	A four-dimensional model of government service innovation	Description
1	New Service Concept	New Concept of Local Government Service for Industry Development	local government makes service policies different from the past, which obviously have new service processes and facilities (e.g., E-government) or abstract concepts (e.g., new industry service policy options, a bridge between industry and research institutions) that cannot be measured
2	New Client Interface	New Interface for alliance	Local government provides a complete communication interface and utilizes environmental resources to cooperate in order to meet the industry demands that drive new public service.
3	New Service Delivery System	New Executive System for Successful Intermediation	Local government uses its own strengths and environmental resources to deliver new service through the executive system, which has collaborative structures with internal and external organizations
4	Technological Options	New Skill and Network	Public service process innovation tightly relates to new technology adoption, which can improve service quality, decrease the wasting of time, and increase efficiency

B. Research Scope and Case Study

Through the four-dimensional theoretical model of government service innovation for the case study, this study investigates the public service innovation for industry from Tainan County government. We summarize and suggest a public service innovation model for local government. The following will describe the research methods, including the research subject and data collection.

Little literature has been published on public service innovation from local government. Because the Tainan County government implements this unique public service for industry, our study uses a case-study approach to explore the public service innovation model from local government. The case study subject is the Southern Taiwan Textile Research Alliance (STTRA) that represents the paradigm of R&D alliance that was promoted by the Tainan County government. Data were collected using interviews, direct observation, and secondary data.

IV. R&D ALLIANCE IN THE CASE OF STTRA

A. Background of STTRA

Taiwan's textile industry was once the nation's largest foreign exchange earner, and it was positively associated with Taiwanese economic development. However, the global social and economic pattern experienced an enormous

“oversupply” in the 21st century, which resulted in a price war between rivals. A series of events affected the Taiwan textile industry, such as the World Trade Organization (WTO) canceling the textile quota to cause open competition in the global market in 2005, foreign antidumping measures, the Japanese 21st Century Center of Excellence (COE) Program, etc. In response to this series of shocks, entrepreneurs shifted their production lines to emerging markets—e.g., China, India, and Vietnam. Parts of Taiwanese companies quickly followed the “low-cost” trend to set up factories overseas, but plant closings and mass layoffs were few due to the fact that most of the firms in Taiwan's textile industry were small- to medium-sized enterprises (SMEs). In the small-scale internal business environment, it is difficult to fight global competition through supply chain collaboration.

After financial crisis of 2008, the textile industry in Taiwan encountered the upheaval of the world economy, the development of the FTA the United States and South Korea signed, and the competitive pressures of newly industrialized countries. Therefore, the textile industry of Taiwan is strengthened to research and develop the dominant product such as functional or eco-friendly textiles, and they also attend to the development of the differential and high value-added products. By the government integrating the efforts of the community, the academia, and the research institutions are co-researched and co-developed. By this way, the market

development of industrial textiles will turn into high value-added products from general clothing textiles.

Tainan has been the most important strategic place for textiles for a long time. According to the Taiwan textile industry development report in 2001, the gross export and import values of this area's textile production were ranked 3rd in 2002. There are more than 300 companies (22% of Taiwan's textile industry), and a few of them are stock market-listed companies. Many entrepreneurs who have an interest in textiles have gathered here, and they expect to make the textile industry recover and to restore the reputation of Taiwan's textile industry.

The SMEs of Taiwan are oriented toward the way of the Cooperation Systems and Enterprise Cooperation Network with regard to lowering the risk of developing R&D and sharing complementary resources and results to create knowledge flow and a new approach to the circulation of technology. Although Tainan has the geographic advantage that there is a cluster of entrepreneurs engaged in textile manufacturing, it is difficult to improve the inherent ability of R&D and marketing, especially in the absence of resources. If the entrepreneurs seek external cooperation with others, there are no textile research units in Tainan. Since 2005, the mayor of Tainan County has convened the representative leaders of the textile industry repeatedly to promote innovation and growth in the local industry by matching up the policies of "R&D and innovation" and "leave the roots in Taiwan."

Besides seeking volunteers to join the alliance by way of open solicitation to expand its soft capability, the representatives also choose the leader of the textile industry as the convener. Under the premise that the members of the alliance possess domain consensus, they implement a strategy of vertical and horizontal integration. Because the government helps to build the channel of research cooperation between industry and academia, it will improve the level of technology, joint product development, marketing, and common brands.

B. STTRA's Development and Performance

The STTRA has been in operation since May 2005, and it is well known as a paradigm of making a successful transition from Taiwan's traditional industry to R&D alliances. STTRA provides an institutional structure through continued cooperation to increase the energy of R&D and accelerate new-product development. Major projects have been conducted using a strategic alliance setup offering seminars, joint exhibitions, cross-industry observations, training, joint R&D, and brand marketing, among other things. These processes not only enhance STTRA's overall performance but also let the members learn from one another. So far, there are 123 enterprises in the alliance, with 5 businesses visited, 34 seminars offered, 5 joint exhibitions presented, 30 cases of technical cooperation and integration, and 8 cases of firms obtaining R&D funding totaling \$7,780,000 from the government. The advantages are the

integrating of all of the members' resources to help with the transformation and the upgrading of traditional industries. As the alliance continues to strengthen, it will represent a steady escalation of commitment and improvement in satisfaction. A powerful virtuous circle of STTRA's performance will ultimately link this approach to sustainable management.

C. Organizational Mechanism and Activities

Because of the initiation that the mayor of Tainan County proposed, his subordinates started to do preparatory work and convinced the representative leader of the textile industry, who became the STTRA's convener. All of them planned a series of strategic alliance-formation activities. For example, they invited ITRI, TTF, and other research institutes to join STTRA. Partnerships were built between official organizations, nonprofit organizations, and private-sector businesses. The process is clear to verify the concept of "Regional Innovation" [8]. During the operation stage, the Tainan County government holds four operational meetings, and during the establishment phase, which is the second stage, the county government holds instructional and orientation sessions. At this time, three preparatory meetings have been held. STTRA held two inaugural meetings in April 2006.

In May 2006, the Ministry of Internal approved the application for review. STTRA is classified as a "legally organized nonprofit institution" or "part of a nonprofit organization." The Organization Charter provides a basis for Guiding Principles, which are intended to promote diversity for sustainable development. Three specific types of STTRA's members are identified—individuals, groups, and supporting members. The General Assembly is the highest authority and the decision-making body of the STTRA Council, and the Supervisory Board oversees the work in the departments. The Implementation Secretariat is responsible for implementing all of STTRA's transactions, such as carrying out the diverse day-to-day work of the organization, member contact, financial & administrative affairs, data compilation, project management, and Website maintenance. The Activities Committee is responsible for planning and implementing all important activities involving the General Assembly, the Supervisory Board, TITAS exhibitions, and member get-togethers. The Training Committee focuses on conference promotion, academic exchange activities, and speeches for the textile industry. The Science and Technology Committee is devoted to management and support services for R&D activities and the national government-industry R&D subsidy program. Finally, the Academic Committee is responsible for academic cooperation and Website planning, and the Brand Committee is set up for "STTRATEX" certification.

Since STTRA was established, regular Supervisory Board meetings have been held 12 times. The purposes include reducing costs and time, facilitating access to technology and knowledge, driving industrial upgrading, enhancing R&D capability, promoting the exchange of information and

sharing of experience between members, holding domestic and international seminars, participating in domestic and international product launches and observation-study tours, applying R&D incentive programs to STTRA’s members, and providing legal advice and services.

D. Successful Factors of STTRA Development

Over the last five years, STTRA has successfully rescued the Tainan textile industry following the impact of the global economic and financial crisis. So far, STTRA still continues to grow. We explore the three critical success factors of STTRA, which are described as follows. In this study, we explained the differences of practices between STTRA and the other R&D alliances in Taiwan as shown in Table 2.

- (1) Using external resources to promote enterprise core competitiveness

Private SMEs typically account for more than 95% of all firms in Taiwan. They mainly consist of traditional industries, which generally lack R&D energy, personnel, and funding. Reforming and reconstructing the traditional industry with new technology is the development trend, and this is both the key to industrial structure optimization and upgrading and an effective measure to reinforce the competitive ability of traditional industry. Therefore, using external resources for

SMEs is a fast and effective approach, instead of relying on insufficient internal resources.

However, external resources are difficult to obtain for SMEs, including technology, funding, personnel, etc. First, the entrepreneurs do not know what technology they need. Second, obtaining the technology is also a challenge. Finally, they lack funding. Because local government is involved in STTRA’s development, these firms can overcome many problems by gaining government funding for research and academic partnerships.

- (2) Increasing mutual trust between members when the local government gets involved

More and more companies rely on the development of cooperation in global economic development, but data storage on the corporate network is also at risk because it is more accessible than ever. The traditional ways are not suitable for preventing internal information leakage, and so “trust development” in relationships becomes an important issue in the specific context and helps firms create new futures that are mutually beneficial to all partners. Before beginning to establish a partnership, the R&D alliance members must trust each other.

Table 2: The differences of practices between STTRA and the other R&D alliances in Taiwan

Property	The other R&D alliances in Taiwan	STTRA
Motivation	Technological learning	Competitive pressures
The leading role	The central government, the nonprofit R&D organization (Industrial Technology Research Institute, ITRI)	The local government
Members of the alliance	Large-scale enterprises	Small and medium enterprises
The number of alliance member	Two or three companies	More than three companies
The types of alliance member	The alliance across upstream, midstream, and downstream, Cross-industry alliance, Cartel, and the alliance of R&D and industrial service.	The alliance across upstream, midstream, and downstream, and Cartel.

If an R&D alliance is going to operate effectively, seeking external resources, a sense of crisis, and mutual trust among members need to be considered. In particular, who led the R&D alliance in the situation which members of different corporate cultures are in the absence of such trust? However, forming an alliance and carrying out technical exchange and cooperation are difficult, not to mention the long-term operation of the R&D alliance. The local government, a neutral leader involved in STTRA, overcomes these problems and helps to improve mutual trust between members. In conclusion, the Tainan County government fosters harmonious cooperation among STTRA’s members.

- (3) Promoting a diversification strategy by a real partnership

The basis of the collaboration is a real partnership reflected in joint selection of and decision on projects. The strategic alliance must develop a collaboration platform to communicate with others and share external resources. Building an integration platform through the government will effectively strengthen resource integration and technical cooperation. Although the early stage alliance is devoted to technology development, the sustainability of the alliance

still relies on a diversification of business strategy, including brand marketing, co-marketing, and the long-term business model of innovation.

E. New Role for Local Government and New Dimension of Public Service Innovation

In the past, the central government promoted industrial policies by providing support from the enterprise external environment, but it was seldom seen that local governments launched initiatives such as the “Industrial Upgrading Programme,” which local companies were invited to implement together. The Tainan County government being involved in STTRA is a key factor. In particular, with the aim of revitalization of local industry, the county

government set up an R&D office to focus on promoting the exchange of knowledge and experience, guiding EMEs to take advantage of local features and academic resources, encouraging R&D innovation, obtaining R&D subsidies and academic technologies for enterprises to make industry upgrades, and so on. In short, the purpose of the program is to foster an innovation-oriented strategic alliance and promote industrial upgrading and restructuring.

This study is based on R&D networks of formation activities [24], and we will observe the effective factor of operation in the alliance based on whether the local government is involved. The findings are listed in the following table.

Table 3: The Effectiveness Without and With Local Government Involvement

Major Factors	Local Government Does Not Get Involved	Local Government Gets Involved	Benefit
Environmental Interdependence	Because of the threat presented by the external environment to the organization and industry competition, R&D networking is less sensitive to the interdependence between the participants. It is easy to overlook the driving factors of cooperation.	Facing the competition in the industry and seeing the advantages of the local industrial cluster reduce competition in the industry and integrate Supporting Research Integration to overcome the threat presented by the external environment to the organization.	The government looks for a key person to serve as the convener to form the strong driving factor and accelerate the generation the of STTRA.
Similar Interests	Partners or stakeholders focus on different cultural identities and interests, so they take a longer time to reach a mutual commitment. It takes a long time to form R&D alliances, and they dissolve when the members are unable to reach a consensus on action.	The Tainan County government set up an R&D office. Through persuading the manufacturers and holding academic seminars to match industry-university-institute collaboration, it only spent one year from preparation to establishment.	Shortens the time to look for suitable partners and enhance mutual understanding in order to find out the common niche and the feasibility of cooperation.
Triggering Entity	The reason members join R&D alliances often is to get something from public goods in order to increase the self-value, but they rarely want to become contributors. Therefore, the level of knowledge sharing in R&D alliances is poor.	The Tainan County government got involved in STTRA, provided members with necessary knowledge by experts or gave them advice on appropriate solutions through exchange seminars, and guided them in obtaining R&D subsidies from the government in order to solve the uneven distribution of resources.	The local government plays a legitimate intermediary role and helps in the fair development of resource sharing to increase a credible trigger for mutual cooperation.
Seeking Consensus	Domain Because of the different niches of members, the difficulties of consensus decision making will increase in the consultation process.	Because members trust local government, which plays a role as a coordinator and a supervisor in the consultation process, it will contribute the opinions combined to consensus.	If members can trust one another, the levels of commitment will be strengthened, and it will also accelerate the formation of consensus.
Open Solicitation	Although R&D alliances expand, the availability of resources will follow the increase. The distribution of benefits is a new threat for original members, and it is another problem to add new members because they will spend extra time seeking domain consensus. In short, members tend to maintain the status quo.	Invite many volunteers to join the alliance by way of holding conferences and seminars, initiating cooperative projects, and co-marketing.	Under assistance from the government, members seek more cooperative partners to create and share mutual interests.
Continuity of Expectation	It spends much time on the experience of cooperation accumulated and mutual trust built. If there are bad relationships, members have a low level of desire for sustainable development.	Members have certain capacity, and they overcome the problem of distrust and uneven distribution of resources under this assistance, which is supervised and controlled by government. The R&D alliance will continue operations towards a normal organization.	Many alliances break up due to uneven distribution of resources or regulations that cannot be implemented, but STTRA still continues to expand.

Formal Structure	When members have a low tendency toward a normal organization, the level of becoming a structured organization is high.	Not only government itself but also STTRA are structured organizations. STTRA has a memorandum of association and articles of association, specific duties recorded in written job descriptions, and adequate authority to carry out its responsibilities.	There are good control mechanisms for cooperation in alliances, and they can make sure that members get resources efficiently. For example, the Academic Committee is responsible for academic cooperation.
Learning	When the members of the research alliance incline to use public goods (only gain without pain), knowledge among individual firms would not be shared. For this reason, it would lead to the bad effect of learning with a lack of dissemination of knowledge.	The South Taiwan textile alliance for research and development has held seminars and explanation meetings continuously for more than five years. It makes recessive knowledge more dominant, and external knowledge turns into internalization. The change leads to a type of studying and organize.	It promotes interchanges of knowledge and innovation among the members of the alliance.
Escalation of Commitment and Satisfaction	It produces too many disagreements in the course of consulting between members of the organization. Its members will leave one after another, based on weak trust in each other. Finally, the alliance will disintegrate.	Enterprises establish long-term attention and commitment relations through the alliance's partnership. Also, the alliance will grow up in a stable state with participation of the government.	The satisfaction in commitment of the alliance goes up gradually according to the increasing number of participating firms (in this case, from about 60 at first to 123 now).

V. RESEARCH FINDINGS

A. Contributions to successful practice of STTRA from local public service

The creative actions and services from the Tainan government to promote STTRA include, among other things, searching for potential clients (small- and medium-sized textile companies around the Tainan area); figuring out the clients' real demands; proposing new concepts for goal setting; promoting opportunities that are available to combine with multiple resources from industry, government, academia, and research institutes; setting up a platform for efficient communication; and encouraging enterprise R&D investment. Such a new strategic execution system from local government helps local firms to set up a good communication platform and promote actual partnership relationships. On the other hand, if there is no government intervention during the formation of STTRA, the trust and confidence problem between alliance members would exist and become an organizational barrier causing more unmotivated participation, difficulty in integrating resources effectively, and less cooperation. Thus, due to the intervention from the Tainan government, there are the following contributions to the successful practice of STTRA.

- (1) Enhancing member's reliability to increase the level of trust and confidence for broader cooperation and long-term partnership. Members must trust each other in order to maintain their cooperation and exchange.
- (2) Arousing participation motivation and participants' enthusiasm through hosting various seminars, conferences, and technological forums and offering customized local-level research planning and funding assistance.
- (3) Increasing the sustainability of alliance operation because government intervention smooths the process of promoting the alliance, encourages the transformation of the alliance organization from the

association to a foundation-based institution, and extends the scope of cooperation and partnership.

- (4) Broadening internal and external resource integration from industry, governments, academia, and relevant research institutes. Herewith, the relative resources include business know-how, technological knowledge, and the exchange of financial investment, human resource, and market information.
- (5) Promoting the diversification of cooperation and co-development partnership. This means STTRA cooperation and partnership processing has expanded the scope from new technology learning and product innovation to include enterprise strategic marketing and business model adjustment.

In addition, using our theoretical modeling with four dimensions to characterize public service innovation, we identify the following special features for those local governments to learn from the STTRA experience in dealing with the issue of industrial competitiveness through the alliance approach.

B. Having New Concept to Serve Local Industry

Facing the difficult position of the local textile industry, even though the Tainan local government is restricted by limited resources and authorities, it turned its strategy from traditional responsive behavior to a learned new perspective to support local industry. For instance, the county magistrate of Tainan proposed that local government should be proactively involved in the STTRA formulation and transformation process to coordinate resource integration. Meanwhile, unlike other government organizations, the Tainan government provides innovative e-service, which is centered on the viewpoint of enterprise management. Thus, the Tainan government has transferred its service pattern from simply providing citizens and industries with administrative service into an organization with diverse services for a targeted industry.

C. Connecting with a New Interface for Alliance Coordination

The service target of the Tainan government focuses not only on the citizens but also, and more actively, on enterprises and firms that influence local industrial development. Therefore, government seeks as targeted clients those that have the same vision and concern to establish a new communication interface for reaching an alliance consensus. Through the new interface for alliances, the government provides more resources to local industry, creates scale economies, disperses the risk toward co-development, and stimulates broader opportunities for open innovation.

D. Establishing a New Executive System for Successful Intermediation

The Tainan government actively intends to match the demands of the industry community through contributions to the formation and transformation of STTRA. It used internal resources to establish an R&D promotion office, which specifically helps the operation of STTRA, and also, to avoid inside the inertia of the organization, it authorized the technical-based foundations and the Industrial Technology Research Institute (ITRI) with projects to participate in the service platform for incubating technology transfer and product innovation. More importantly, the executive manager is required to have the ability to communicate and negotiate with the internal and external organizations to construct a good co-development environment. The Tainan government actively matches the needed knowledge, human resources, finance flow, and logistics to benefit the sharing and exchange of the know-how and R&D resources within STTRA.

E. Learning for New Skill and Networking to Serve

The first significant success factors of operating an enterprise are attracting customers, lowering costs, and increasing profits. Under this point of view, the Tainan government applies the strength of information technology by integrating Internet platforms. This information network and integration improves the interactions between local firms and government, reduces the transaction cost, shortens the needed time for communication, and accelerates the cooperation in alliances.

F. Gaining a New Perspective on Local Government Service Innovation

The four dimensions of the Tainan City government's innovative service for local industries combine with the competencies of service promotions, organizations, and human resources. It is an interlocked system to perform government's innovative service and to avoid organizational inertia.

VI. CONCLUSION

No doubt, the role of central government is a critical success factor for the national innovation system. Interestingly, however, very little research has been concerned about whether the role of local government and its active participation can also be an expected service innovation to enhance the implementation of R&D alliance strategy. Herewith, we begin to discuss this issue through our case study.

Using our research model, which has four dimensions to interpret the characteristics of public service innovation, we find that active initiation and strategic intermediation from local government—even though they have not yet been recognized as valuable public service innovations—have positive influences upon the success of R&D alliances.

This means that the role of local government not only might be able to provide the needed actions and resources due to its active participation but also could become a critical success factor to enhance industry innovation through R&D alliance. This is because such a public service innovation allows local government to play multiple roles, acting as a teacher, initiator, broker, and intermediary to strengthen the learning, confidence, and capabilities of major participants in the process of alliance for co-development. As a result, we can argue that there is a new special role and a creative perspective to redefine the scope of public service innovation that local government can learn and perform to support industry development. This new role and active involvement of local government can provide appropriate and needed services for R&D alliance practice. Even though local government cannot act like the central government as a major resource provider and policy maker, the case of STTRA shows that public service innovation by the Tainan County government not only contributed to increasing mutual trust, information flow, and rational decision making but also helped to integrate possible external and internal resources, sustain the long-term co-development opportunities, and further extend multi-functions of collaborative activities.

In the end, we conclude that the active initiation and strategic intermediation from local government can be one kind of valuable and expected public service innovation, even if this has not been fully recognized yet. This is so because the role of local government not only might be able to provide needed actions and relevant resources through its active participation but also could become a critical success factor to enhance industry innovation in practicing R&D alliance. Such a new role and scope of public service innovation for industry development are worthy of additional research to explore and evaluate their value and effects.

VII. REFERENCES

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