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ACHIEVING REGIONAL INNOVATION DEVELOPMENT AND UIG LINKAGE IN JAPAN: A CASE STUDY IN TOYOHASHI REGION

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Achieving Regional Innovation Development and UIG linkage in Japan: A Case Study in Toyohashi Region[1]

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Abstract

In this paper, we investigate a case of regional innovation development in Toyohashi region and Aichi prefecture in Japan. Moreover, we describe lessons learned from regional development experiences in Aichi prefecture and Toyohashi city.

The Toyohashi's experiences we would refer to in this paper would include; Backgrounds of the regional development in Toyohashi area, the roles of national government and regional (i.e., prefectural and municipal) governments to support regional initiatives toward innovation, and the regional entities initiatives there. We will also describe how the local government can achieve regional innovation by establishing a knowledge cluster. The usages of governmental funds and participation of university and banks at the region will also be described. In this paper, we discuss different players' roles and their interaction in achieving regional innovation in Toyohashi city based on a conceptual model.

The case of Toyohashi has indicated us that in developing new STPs, we need to understand existing cases with various viewpoints, including the roles of core (supporting) organization, a regional manager, and so on. Though with this one example we cannot obtain an absolute and universal answer to these viewpoints, we have understood we have obtained new points to consider in regional innovation development. As a final discussion in this paper, we want to discuss the differences and advantages of a STP acting as a core entity of regional innovation eco-system, acting as a single window for a regional new business development, and so on.

Keywords

Regional innovation eco-system, STP's roles in a region, Cluster development, University-Industry-Government linkage,

1. Introduction

Regional Innovation Development (RID) is an important issue in socio-economic development of each country. In Toyohashi city of Japan and surrounded area, a knowledge cluster has been shaped for an effective collaboration among local government, university and academia. This region is almost located in the center of country and mostly focused on agriculture industry.

One of the important elements in developing innovation eco-system in Toyohashi city is establishing a corporation called Science Create, to act as a bridge between university and industry. The main activity of Science Create is to act as a supporting organization for regional cluster development. This company is partly funded by Aichi prefecture government, Toyohashi city, and Development

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bank of Japan. But the main shareholders are private sector. It has a flexible action as a private company responding to business issues. Its main activities includes; Supporting business development in the area, including not only industrial players but also agricultural ones; Entrepreneurship and human resource development for the regional management of regional cooperative projects, and management of a facility for entrepreneurs and startups.

The second element of the conceptual model is local government, such as city government. Local governments are responsible for implementing autonomous measures that reflect distinctive features of the relevant local areas by appropriately sharing roles with national government. In this paper, we will discuss how local government in Aichi prefecture and Toyohashi area collaborate with other stakeholders in the region dealing with a global IP policy and localize it to reach a "Local IP Program".

Universities are the third main element of the conceptual model. In Toyohashi, Toyohashi University of Technology (TUT) has been located there in Toyohashi for more than 30 years, and it is acting as one of the core entities of Toyohashi's innovation eco-system. The role of universities in regional innovation is mainly human resource development and dissemination of researches. And to do these roles, there are a variety of activities and combinations of those activities [1]. For example, besides to education and research, the Social Contribution is becoming the third mission for them these days. Also, to manage university's IPs most of them have established Technology Licensing Office (TLO) or IP Offices. Now there are 41 TLOs and 43 University IP offices all over Japan. Based on Bayh-Dole Act that has been adopted by Japan in 1999, the universities can hold patent rights as a result of the research funded by government. In Toyohashi, with those activities TUT is one of the key players to make the regional eco-system there a success.

Besides all mentioned elements, intellectual property rights and IP policy is an essential infrastructure for regional development in Japan's prefectures. The Intellectual property policy framework in Japan has a strong structure, and is one of the important issues affect high economic growth of the country. There has been a rapid progress in IP policy in Japan in recent years to reach a global IP system based on IP Basic Law. The regulatory authorities of intellectual property rights in Japan include Ministry of Education, Culture, Sports, Science and Technology (MEXT) and Ministry of Economy, Trade and Industry (METI). In some cases the Ministry of Agriculture is also involved to protect innovations in food and agriculture industry. There is also IP support for SMEs in IP laws in Japan. Besides the above mentioned programs, we will describe the impact of "IP basic law" for the past ten years in whole Japan.

The paper is organized as follows; in the second section we will describe background and issues. Objectives and scopes are explained in section three. The regional innovation development in Toyohashi will be explained in detail in section four. Discussions on STP's roles and functions will be described in section five. Conclusions and acknowledgements will be discussed in the last two sections.

2. Backgrounds and Issues

In today's world we need to be competitive globally. And to be competitive in a global sense, nations and regions need to consider how they position themselves strategically by managing their resources, including natural, industrial, human, and intellectual ones. Science & Technology Parks (STPs) has been recognized as a means of stimulating start-up and growth of technologically intensive, knowledge-based businesses, and of facilitating the links between the research and industrial communities [2]. In a sense, STP is a very popular approach to these effective resource managements in regional development worldwide, either in developing or developed countries.

In Japan, in 1980's new policy to develop knowledge-intensive industry hubs in local areas, so called Technopolises and Brain Locations, had started through 1990's. And since 1990's independence of local areas had been promoted, reflecting production shifts to overseas and movement toward decentralization of government. Then in 2001, Industrial cluster policy was enacted. Based on this policy, Ministry of Economics, Trade, and Industry (METI) had implemented supporting measures in 18 projects nationwide, for the creation of networks among industry, academia and the government, etc. till 2009. Change of ruling party in Japanese government has halted the cluster policy for a while, then after another change of ruling party METI restarts its New Industrial Cluster Plan based

on Japan Revitalization Strategy which was approved by the Cabinet in 2013. Also there are several "cluster" activities in Japan which were not recognized as an above-mentioned METI's industrial cluster. We are describing two clusters in this paper as regional innovation development cases in Japan, Hamamatsu and Toyohashi. The former is a METI-recognized one, and the latter is not.

As another case, Iran is in a sense now amidst of various economic changes, with governmental actions on more autonomous Central Bank, the tax system reform, and reinstating of the Management and Planning Organization which was in charge of drafting the government budget and the country's five year development plans [3]. Regional innovation development in Iran is mainly the role of Science and Technology Parks in each province. They act as a cluster manager in the region. The main policies in this regard is dictated by Ministry of Science, Research and Technology (MSRT), while the Vice president in Science and Technology affairs is responsible for leveraging Knowledge based SMEs (KbSMEs) in the whole country. It is also provide budgets and grants for promoting innovation and entrepreneurship in the country. Another important role of this organization is technology segmentation; which means to focus on some limited number of more important technologies that are proved to be more effective for economic growth.

These are just two examples from authors' nations, and there are a lot of other RID activities. For example, in Europe, building on the experience gained from regional, national and EU cluster policy efforts, the European Cluster Memorandum launched in January 2008 marked an important step towards further encouraging cluster development [4], and now in EU countries there are regional clusters as well as several European Strategic Cluster Partnerships and European international cluster consortia [5]. In Asia, Taiwanese industrial developments surrounding Science Park as a core entity, such as Hsinchu, Taichu, and Tainan are successful and well-known, with histories of 15 to 30-years.

However, when the authors discussed how regional innovation development have been and should be achieved by a knowledge cluster in Japan, we found that some cases of regional innovation development has been accomplished by a Science and Technology Park in the Region only as a cluster manager, without contributing to the regional development as a physical land. In other words, we found that building up a STP as a land is not a common approach to regional innovation development (RID) in Japan.

Starting from this discussion, in this paper, we are reporting a RID case at Toyohashi City, Japan. Our purpose is to look at STP's meanings and roles further, by studying a case without a park land but with a core organization. We believe that further understandings of STP's roles and meanings from practical cases should make us conducts new RID projects more effectively and strategically.

Another important issue that affects the Innovation eco-system in Japan is Intellectual Property Rights (IPR) [6]. In recent years Japan has strengthened the protection of IPRs, focusing on the expansion of the patentable subject matter, the restriction of compulsory licensing, and stronger deterrence against infringement [7]. In 1990s, stronger protection of intellectual property rights looks to have increased the incidence of high-royalty contracts in the Japanese industries.

3. Objectives and Scopes

Objectives of this paper are to learn more insights about the value and meanings of STP in regional innovation development (RID), by understanding one successful RID case. We will put focus especially on the role of "supporting organization", "regional (cluster) manager", and "geographical distances among major players", etc. These focusing points are identified with several reasons below.

First, because we are talking of a system of fostering innovation, we need to deal with a variety of players (stakeholders) and a process of innovation. And from our experiences in developing regional innovation strategy or in building a new regional collaboration, we have found that the presence and role of organization and regional manager, both are to support innovation fostering activities such as collaborations among players as an organization or as a human, is very important there. So we have looked at the role of STPs from these perspectives.

In this paper when we are talking about Regional Innovation Development, our main focus is on regional "industrial" development. That is, social development such as welfare and education in a

region is not focused in this paper. Also, in our definition RID would include developing activities not only of innovative outcomes such as products and services, but also of fostering and cultivating system and mindset of innovative activities beneficial for the region.

4. Regional Innovation Development at Toyohashi City

In this section, we will describe Regional Innovation development case of Toyohashi in detail.

A. Background situation of Toyohashi region

Historically, in the region surrounding Toyohashi City, manufacturing industries have been flourished backing up Pacific Belt Industrial Zone. However, in 1980' to 1990', facing changes of global business environments such as shift of production to overseas, it became necessary to widen their business opportunities. Also other resources such as rich agricultural production and concentration of food processing industry should be more strategically developed by the region, to get along with decentralization of regional administration from the central government.

B. Key role players

In Toyohashi region, there are several key players collaborate to reach Regional Innovation development, as below;

Toyohashi City Government:

This city, with population of about 370 thousands, has concentration of manufacturing companies, especially automotive-related equipment and parts who have served Toyota in the west of the city and Honda and Yamaha in the east. Also the city's agriculture has special characteristics; top-level production size in Japan (e.g., cabbage, tomato, Japanese basil), and many of highly value-added products (e.g., edible flowers, high-quality fruits for gifts). It is located at the center of Japan, at the midst of industrial concentration along Pacific coast, and with good proximity to transportation networks such as highways and bullet trains. The city also has a number of food processing companies.

Regional industrialist group

Several industrial people, such as an owner/executive of regional gas distribution company and some bigger manufacturers, have established a think-tank specifically for the regional prosperity called HRRC (detailed below), and also organized regional monthly lecture meetings since 1984's, In this sense, the common mindsets toward regional development have been nurtured over decades.

Higashi-Mikawa Regional Research Center (HRRC)

Regional think-tank specifically established for Toyohashi city and surrounding area (Higashi-Mikawa area) by the regional industrialist group mentioned above. This HRRC has worked in developing a basic regional plan, by understanding the regional situation, talking to key stakeholders there, and taking general economic and social situation in consideration.

Toyohashi University of Technology (TUT)

This national (i.e., state-funded) university was established in 1976, to serve the society with education and research in science and technology, especially focusing on high-level but practical and society-oriented education at graduate schools. The faculties have been participated in regional activities such as the regional monthly lecture meetings, and especially since late 1990's they have been concerned with regional collaboration, doing R&D projects with companies, announcing new research topics to the public, and so on. These days the university have initiated several region-oriented big projects of new developments such as intelligence green house and of specialist training courses, using central government funds and regional banks' supports.

Science Create

Science Create is a private company, but not in a proper sense. Rather, this company should be called a joint public-private venture, because the investors were a mixture of governmental and private entities, consisting of the Development Bank of Japan, Aichi prefectural

government, Toyohashi City, and several regional private companies. This Science Create was established in 1990, to contribute to new business development in Toyohashi area as a knowledge-intensive industry hub and a regional industrial supporting entity. This Company bridges governments, industries, and community for regional development.

Around this time a number of similar public-private ventures were established around Japan, but many of them have been gone because of little business management caused by their neither-private-nor-public positions. Science Create has had hard times as well, but it overcomes them. Now it works proactively in assisting the region with its services related to regional development, such as coordination of regional collaboration; management of governmentally awarded collaborative projects conducted by regional companies and universities; education of business management and some other special knowledge such as intellectual property or global standards; space rental management for entrepreneurs, etc.

The incomes of Science Create consist of; City government budgets for those region-supporting services, secretariat service fees for governmentally-awarded projects; rents from the “Science Core” building, which were several years ago ceded by Toyohashi City, the original founder and owner.

Regional (cluster) manager

In Toyohashi, as already mentioned in the above, when the region started proactively considering their RID in 1980's, there were some key industrialists who led the movement. In late 1990's Science Create (led by an ex-president of TUT then) together with the City and other people, in an effort to manage this supporting organization sustainably, tried to find good person as a key person in the RID. Then in early 2000's, they found a very active manager who came back to his home region after working in a global company. This manager had been working as a very good regional manager since then, coordination new projects with governmental funds and at last establishing the Food-Agri Industry Cluster (detailed later) in 2007. As a CEO of Science Create he had talked to and coordinated with local companies and governments for the regional benefits, recruited and managed several project managers suitable for various projects, and lobbied Toyohashi area in the central government. His presence, especially in the time when Toyohashi needed to take very innovative actions among other regions in Japan (because in early 2000's "how to manage RIDs" were very new concept for everyone, was an advantage of Toyohashi area.

Central government and its ministries

In Japan, the regional development has been mainly administered by Ministry of Economics, Trade, and Industry (METI), and policies and related subsidies and grants are made available for regions. In addition, in case of Toyohashi where the presence of TUT should be proactively regarded as an advantage, subsidies and grants of Ministry of Education, Culture, Sports, Science and Technology (MEXT) are also available. To some extent Ministry of Agriculture, Forestry and Fisheries (MAFF) has contributed to the region in several projects, because of Toyohashi's rather unique characteristics in agriculture. The subsidies and grants by these ministries are available generally on a competitive basis.

METI, in 1980's through 1990's, had started new policy to develop knowledge-intensive industry hubs in local areas, so called Techno-polis and Brain Location. And since 1990's, independence of local areas had been promoted, to getting along with production shifts to overseas and movement toward decentralization of government. Then in 2001, Industrial cluster policy was enacted. Based on this policy, Ministry of Economics, Trade, and Industry (METI) had implemented supporting measures in 18 projects nationwide, for the creation of networks among industry, academia and the government, etc. till 2009. Change of ruling party in Japanese government has halted the cluster policy for a while. Then after another change of ruling party in 2012, METI restarts its New Industrial Cluster Plan based on Japan Revitalization Strategy which was approved by the Cabinet in 2013. Also there are several "cluster" activities in Japan which were not recognized as an above-mentioned METI's industrial cluster.

MEXT had started some activities late 1990's to foster intelligent bases in regions, along with the 1st science and technology basic plan (1996-2000), and with the 2nd basic plan (2001-2005) it enacted "intelligent cluster policy" in 2002. Intelligent Cluster was supposed to be a system where new R&Ds and technological innovations are fostered under regional initiatives led by

regional public research institutes and universities. Since then, in growing collaboration with METI, MEXT has promoted regional cluster activities (though sometimes it is called "a regional innovation system" instead of a regional cluster).

MAFF have been also contributed regional development with subsidies and grants for new agriculture-related development, such as machine, equipment, and technology for field work, breeding, and usage of agricultural products.

C. Brief history of activities by the role players

In Toyohashi's case, it can be said that industrial leaders in the area initiated the development, together mainly with the City. First initiative, "Higashi-Mikawa 2015 Initiative" was developed and proposed by HRRC in 1988.Then the City government along with this initiative announced a new development plan named "Science Create 21 Plan", also considering central government's policy to develop knowledge-intensive industry hubs. Within this plan, Science Create was established in 1990, and started working on connecting University, Industry, and Government (UIG) as the situation required. TUT and two other private universities of humanity sciences in the region have participated these regional activities, first rather diligently and more actively later. Those key movements are shown in Fig.1.

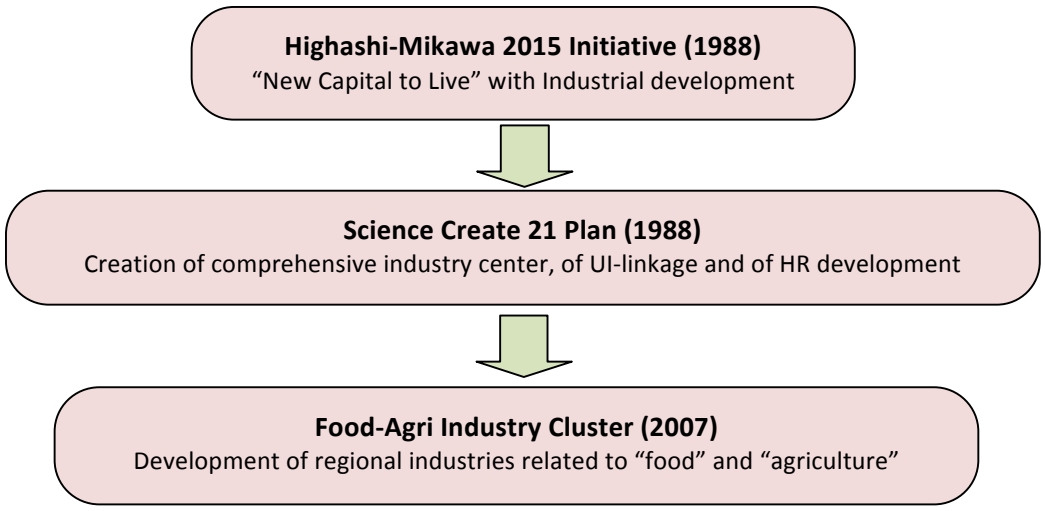

Figure 1: History of regional key movements in Toyohashi

In 1990's and first half of 2000's, many open seminars and exhibitions on business, technology, and other topics have been conducted, and also a number of projects for feasibility study of new topics and for new R&Ds and business developments had been arranged and operated mainly in collaboration of companies and universities. Subsidies and funds by central governments through METI, MEXT, and so on, as well as Toyohashi City's subsidies had been used for these activities.

D. Food-Agri Industry Cluster

In 2007, after accumulating various activities of R&Ds and business developments, a Food-Agri Industry Cluster (the Cluster hereinafter) was kicked off. This cluster is a kind of consortium with those who are concerned with development of regional agriculture and food-related industries, including (of course) their own businesses. This Cluster is operated on a membership basis, and with subsidies by Toyohashi City and (though projects) by METI, MEXT, and MAFF. The secretariat works are conducted by Science Create as a part of Toyohashi City's industrial promotion. About 130 members, including companies, financial institutes, regional governments in surrounding areas, universities, public research institutes and soon, have participated, and in five years several achievements have been realized, such as development of several new food products with Japanese basil (in collaboration of local food processing companies, farmers and universities), identification of new business direction toward greenhouse horticulture industry (TUT, local agri-equipment

companies, and local plant breeding companies), and development of agricultural equipment (local agri-equipment company, farmers, and TUT). The brief history of activities in Toyohashi, from 1980's to Food-Agri Industry Cluster, is shown in Figure 2.

This Cluster has no specific property to be called any parks. Science Create, a company, provides administrative supports including negotiations with governments; regional banks provide business funds when appropriate in some cases; equipment and places are arranged using project budgets awarded by METI, MEXT, and/or MAFF, depending on each project's situation.

E. Specific mentioning on STP in the development

In earlier plans an area was allocated and named Toyohashi Research Park, and some IT- and electronics-oriented companies have located there. Also, a building with spaces for start-ups, meetings, and for supporting activities on UIG and regional collaborations has been established there, financed by the City. This building, named "Science Core", houses the above-mentioned Science Create, and Science Create has managed the facilities. But the knowledge cluster is managed by science create, and there is not considered a special role for cluster management to the park

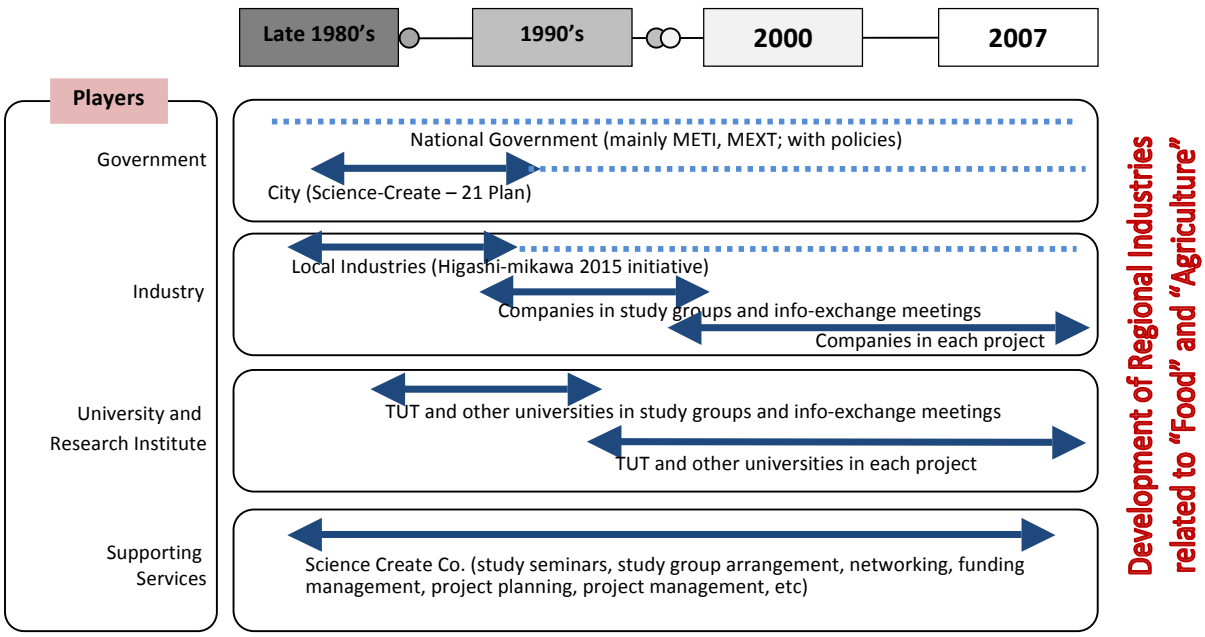

Figure 2: History of key players' activities in Toyohashi

Other than Science Core, Toyohashi Research Park does function just as an industrial park, not as a proper STP. The companies located here have been involved in those regional activities such as Food-Agri Industrial Cluster. However, there are only seven companies located in Science Core, including Science Create itself, and other than Science Create few of them are main players in collaborative projects in Toyohashi so far. In a sense, the "Science Core" building, with services offered by Science Create, has functioned as the whole STP in Toyohashi area, with no other land properties. Players in the area, to the authors, seem to feel that the proximity among them do not require any specific "STP land" in the region.

Since 2012, an intelligent greenhouse project, funded by METI, has started using a land slot in Toyohashi Research Park, and this location is good for the project members including TUT and other local companies. So the situation may be changing from now, though so far no land of STP (other than the Science Core building) has become necessitated.

5. Discussions on STP's Roles and Functions

We can find many core functions of a STP which provide similar services with Science Create. Those may consist of;

- Provision of information relevant to regional business and development; of governmental policies and available funds, business trends, related regulations, etc.
- Supports and coordination in project development; being involved in idea generation; stimulating idea generation; introducing to potential partners, negotiating with governments; proposal preparations; etc.
- Hosting the high-tech private companies
- Provision of expertise (or introduction to experts) such as intellectual properties, technologies, and so on.
- Brand sharing with private companies in the region

When we look at cases of regional innovation development with proper STP, most of core organization also provides; Tenant acquisition and Tenant management. However, we haven't seen any big differences between Toyohashi's Science Create and core organizations with proper STPs in terms of the services other than these tenant services.

The proximity of core organization and members is also of great importance in the region. Both cluster manager candidates; i.e. Science Create and Toyohashi STP have this competency of proximity.

Moreover, in recent years, there was a migration from time-based competition toward time-based innovation in Japan [8]. Giving the role of a cluster manger to a science park can help the industries in the region to reduce risk and achieve lower time to reach innovative products.

6. The role of Intellectual property Rights

Intellectual property rights have a great impact on national and regional innovation development. The high economic growth of Japan during the second half of the 20th century was mainly based on IPR. Japanese patent law was enacted in 1959, and was revised several times, mainly for the purpose of international harmonization. Recently, the Japanese government emphasizes the importance of pro-patent policies, i.e., empowering IPR in order to stimulate business innovation and to regain international competitiveness [9], [10]. After the policy statement by prime minister in 2002, a rapid progress in IP policy was began in Japan.

There are the three categories of main acts for IPR policies in Japan.

A. Acts for Creation, Protection and Utilization of IP

- The science and technology basic law (1995): The science and technology basic law put the innovation in science and technology as one of the most important national policies in Japan. Its main role is to transfer the products of R&D to Japanese society.
- Act on industrial revitalization (1999): It is also called as Japan’s Bayh-Dole act, and its objectives to enhance R&D activities and also utilization of R&D outcomes in industry. It says that IP produced by national funded research belongs to university and companies.
- IP basic law (2002): The main objective of this law is to realize sustainable active society through the creation, Protection and Utilization of IP. In this law, some responsibilities are defined for government, local government, university, and enterprises. Moreover, collaboration among all of the mentioned parties is clearly specified. There are also some encouragements for IP transfer from university to enterprises [11].
- National university corporation law (2003)

B. Acts on technology utilization and technology transfer including

- Act on TLO (1998): The purpose of the Act on TLO is to promote transfer of research achievements to industry in order to upgrade industrial technology and creation of new industries. There are some public assistance to TLO including; Grants for the technology transfer activities, cost for filing IPR applications, and personnel cost for technology transfer specialists.

- Establishment of University IP head quarter (2003)

C. Laws related to SMEs' support

- Law for creation of new business (1999): Based on this act, Government gives financial support to SME from R&D to commercialization. It supports the commercialization of R&D outcomes of SME produced by government specific grant of money. It is also called as Japan's SBIR program. The definition of SME in this act is a company with total capital less that 300 million yen and employees less than 300

The role of local government in IP basic law is very important. According to article 6 of this law" Local governments shall have the responsibility for formulating and implementing autonomous measures that reflect distinctive features of the areas of the relevant local governments with regard to IP cycle by appropriately sharing roles with national government" [11].

7. Conclusion

In this paper, we investigated the main elements of a knowledge cluster for regional innovation development in Toyoashi city and Higashi-Mikawa region in Japan. Besides to this approach, some features and main elements of a cluster that has been managed by Science Create, the regional supporting organization, were described. Studies show that a knowledge cluster can acts pretty well for development of innovation and entrepreneurship in the region.

In the next stage and for further studies, we want to focus on key success factors of the knowledge cluster in Toyohashi and try to characterize these factors as the activities of a Science and Technology Park in Toyohashi region. Although in some countries, the Science and Technology Parks are the key role players for regional innovation development, but it seems that some of the successful experiences in Toyohashi knowledge cluster can also be deployed by giving the role of a knowledge cluster to STPs. To do so, we need to conduct more comparative analysis. The experiences of other regions in Japan like Hamamtsu and Gifu can also be described in future studies.

One of the most important issues we addressed in this paper is that, in building a new STP for regional innovation development, we need to understand existing successful and unsuccessful cases with various viewpoints, including "the STP really requires land or not", "roles of core (supporting) organization", "existence and roles of a regional manager", and so on. Though what we have shown here is only an example, it can be said that we should not start our RID discussion with an assumption that "we need a STP land!". As an example of what we mention as STP without land, we can refer to a district based one like Hsinchu Science and Technology Park in Taiwan.

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9. References

[1] Martin, Ben, and Henry Etzkowitz. "The origin and evolution of the university species" Organisation of Mode (2000).

[2] United Nations, 2002, “Proposal for the establishment of a Science and Technology Park network mechanism designed to foster international partnerships for sustainable development”, United Nations Forum on New and Emerging Technologies for Sustainable Development, Beijing, China, 2002

[3] World Bank, 2013, "Iran Overview - strategy",www.worldbank.org/en/country/iran/overview#2, Visited May, 4, 2014.

[4] Commission of The European Communities , 2008, "Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the regions -- Towards world-class clusters in the European Union {SEC(2008) 2637}", http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0652:REV1:EN:PDF, Visited May, 4, 2014

[5] Lugar, Michael. 1994. “Science and technology in regional economic development: the role of policy in Europe, Japan and the United States.” Technology in Society, 16: 9-33.

[6] Mowery, D.C., Nelson, R.R., Sampat, B.N. and Ziedonis, A.A. (1999), “The effects of the Bayh-dole act on US university research and technology transfer”, in Branscomb, L.M., Kodama, F. and Florida, R.L. (Eds), Industrialising Knowledge: University-industry linkages in Japan and the United States, Harvard College, Cambridge, MA.

[7] Nagaoka, Sadao. "Determinants of high-royalty contracts and the impact of stronger protection of intellectual property rights in Japan" *Journal of the Japanese and International Economies* 19.2 (2005): 233-254.

[8] Harryson, S. (2005), “The Japanese know-who based model of innovation management – reducing risk at high speed”, in Herstatt, C., Tschirky, H., Nagahira, A. and Stockstrom, C. (Eds.), Management of Technology and Innovation in Japan, Springer, New York, NY.

[9] Motohashi, Kazuyuki. "Japan’s patent system and business innovation: reassessing pro-patent policies." Patents, Innovation and Economic Performance, OECD Conference Proceedings. 2004.

[10] Arai, Koki. "Patent Quality and Pro-patent Policy" Journal of technology management & innovation 5.4 (2010): 1-9.

[11] Intellectual Property Basic Act (Act No. 122 of December 4,2002)
http://www.japaneselawtranslation.go.jp/law/detail/?id=129&vm=&re=02, Visited May 4, 2014.