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| Master programme in Economic Growth, Innovation and Spatial Dynamics |
| Innovation System in Hong Kong |
| Emergence and Policy Implementation |
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| Abstract: Innovation system as a holistic way to promote economic growth and enhance competitiveness has been observed worldwide. Hong Kong as a late comer among those regions, showed her distinctiveness during the emergence of innovation system and innovation policy implementation. The thesis starting with a sketch of historical trajectory, suggests that Hong Kong’s socio-economic factors and background is influential in the process. Both quasi-national and sectoral innovation system exist and function in Hong Kong with interacting relationships among the Triple Helix, i.e. the core participants including universities, industries, government, and certain extensions to this model. Implementation of innovation policy in Hong Kong as an institutional change is discussed in the thesis by applying general equilibrium mechanism for the comparison between cost and benefit during decision making. We suggest that public policy interventions at the start, as well as the response to incentives in private sector co-contribute and provide an explanation to the case of Hong Kong. |

Key words: Innovation system, innovation policy, Hong Kong



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# Introduction

## 1.1 Background and motivation

Innovation has been playing a crucial role in many economies around the globe recently. Its importance to economic and social development is not only recognized, but also being pursued as a goal in the level of institutional arrangement by governments. The policy makers chose to promote or even design and build an innovation system in order to make all the participants to be involved in the whole process including innovation generation, diffusion and utilization, and further to receive an aggregate outcome for the economy and society. However, innovation system was not acknowledged by all governments at the same time. Opinions vary and policies have been implemented in different rhythm within different economies.

Hong Kong is an interesting star actor in the international, and more importantly the regional stage, in terms of many features. The historical changes of political status, the context with business tradition and entrepreneurship, and even the bilingual environment all need to be mentioned for discovering reason why Hong Kong is distinctive. Just like Hong Kong’s advertising slogan “Asia’s World City”, she is equipped with and does enjoyed the benefits from the particular location as a hub. And the role as hub is vital to the significant status of Hong Kong in regional economy and global trade, and has earned a reputation of dynamic economy. But not limited to that, the hub role has also spread to political tradition, business atmosphere, and cultural environment as well and deeply made impacts upon the tiny Oriental Pearl.

The uniqueness and mixed feature of Hong Kong has a long history being a cultural focus of discussion in non-fictions and mass media. Does it have influence upon other factors of the society? How to evaluate effects of the uniqueness in social science without subjective assumption? Is there possibility to find a link between the background and some new focuses, for instance the innovation performance and innovation system building?

In Hong Kong, innovation had a relatively short history and was not a common factor for her business and industry, even though where an entrepreneurial spirit could be felt in the atmosphere and seen from official statistics. The contrast between those, prosper economy and relative low involvement in innovation activities, is impressive but again marks Hong Kong’s different characteristic.

Nevertheless, Hong Kong is stepping into a condition of more innovation involvement for economy and sectors like education and other social services. The interactions are intensified in many ways, and because of that, a holistic system-like environment was gradually appeared, with participation of actors belonging to the process of innovation.

If the previous paragraphs introduce the starting point of this thesis academically, then this is a personal starting point to do the research dealing with Hong Kong and innovation development.

Although apart from the main topic of the thesis, what I still feel worth mentioning and being added here is a personal trip I paid to Hong Kong in 2008. That was my first time to see the skylines in Victoria Harbour, and to feel an local atmosphere filled with business enthusiasm in Hong Kong, with a bit of emerging sensitivity of social scientist, I grasped and got interested in the local context and began trying to further explore the lovely Oriental Pearl by linking knowledge I received from Lund to the facts from Hong Kong.

During my short stay in Hong Kong, I even attended a lecture anonymously in Hong Kong Polytechnic University. The lecture to Actuarial Science student was given by a real manager from an insurance company, who had to take some teaching tasks routinely for higher education, usually a cooperating university, enabling himself to be on the internal promotion track within the company he serves. It is not difficult to imagine, the students sitting in that classroom I was temporarily seated will benefit from such real context knowledge transfer holding an education background more practical, and form a future reserve of talents of Hong Kong. In Hong Kong, it is a common picture one can find in which business and education are tied so closely. There are also a lot of interactions among other participants in Hong Kong’s emerging innovation system. That is just the field the thesis will further go into.

## 1.2 Aim and scope

Based on all the concerns of background and motivation stated before, the thesis aims to apply the recent development of innovation studies on the Hong Kong case, and to produce an informative picture of innovation activities in a systematic way.

As shown below, three research questions are chosen to link parts of the research and form a brief analytical framework.

1. Judging from the general criteria of an innovation system, including the variation of national, regional and sectoral innovation system, to tell if there is any innovation system existing and functioning in Hong Kong?
2. If innovation system could be investigated in Hong Kong, in what way are the participants in the system functioning and interacting?
3. How did the innovation policy as a change to institutional arrangement emerge and develop? Whether it was an imposed institutional change with top-down public policy intervention, or an induced change promoted by the private sectors from bottom up?

The thesis will focus on the most recent decade, when was also the period after the transfer of the sovereignty of Hong Kong and then majority of innovation and related policies were introduced. It is of course not saying material would be limited to this short time phase, together with necessary retrospect for background, the thesis intend to find answers and explanations for the research questions.

# Theoretical foundation

Since it is still arguable whether the theories applied to innovation studies of high science-wise standard or not, defining some relevant concepts would facilitate to set a foundation and lead the research onto the track at the very beginning. Although it seems to be hard to go beyond the limitation of lacking theory for the analysis of system and process, and the majority studies in this field naturally based on context, for this research, it is still a necessary and even more importantly to initiate with the clarifying conceptual issues.

## 2.1 Concept of Innovation

### 2.1.1 Early appearance of “innovation”

The early wording could be traced back to the Renaissance thinkers, who use “innovation” as similar as the term of economics used today. The introduction of this concept also marked the diffusion of the Renaissance economic thinking by Michelangelo, da Vinci and other artists and scientists (Reinert, 2007). Francis Bacon in his “An essay on innovations”, emphasized the role of science for goods production (Crowther, 1960). And the idea was further elaborated more recently as the statement that “[t]he greater the advance in scientific knowledge, the more numerous will be the new inventions which save labor and raw materials and lead to new products and processes” by Friedrich List (1904: 66-7).

Later, effects of innovation were discussed and connected to economic growth, national competitiveness and performance of firms in business sector. Knowledge and learning, as well as a modern term “capability building” were thought to be determinant elements for those. After the value of innovation was recognized, the relationships between the capability to innovate and the environment where learning takes place become another focus around the topic (UNDP 2005; UNIDO, 2009; World Bank 2008; Fagerberg, 2005).

### 2.1.2 Current use of innovation

Including both product innovation and process innovation, the concept usually indicates the application of new knowledge. It can take place either incrementally by consecutive improvements to existing processes and products; or radically by introducing a totally new process or product. Moreover, stated in the guiding document Oslo Manuel, marketing innovations and organizational innovations, along with technological innovation which normally receives more attention, are all regarded as main forms of innovation (OECD, 2005).

It is common to find terms of innovation or invention being used interchangeably in policy interpretation and other explanatory documents, however, they are actually different concept indicating distinctive things. Invention is a creation, but it is innovation that diffuses and promotes the growth of economy. While invention is largely related to technological sphere, its later application in production or processes is an economic and commercial matter. The factors of market and even socio-economic factors need to be taken into account. Practically, firms use their business wise to select and develop the initial inventions, putting in to market and using in their internal organization. Then the aggregate effect could be interpreted as that diffusion of innovation make changes to the world (Schumpeter, 1939).

Technological or experimental success does not necessarily lead to profitable outcome in market. A successful diffusion should respect the market, the factors of firm and wider setting as the socio-economic environment. It allows the further discussion into a systematic understanding of the whole process.

### 2.1.3 Innovation in Hong Kong statistics and publication

Hong Kong officially uses the concept of innovation in various reports. As in the series of *Annual Survey of Innovation Activities in the Business Sector* and *Hong Kong Innovation Activities Statistics*, “[i]nnovation is defined as the introduction of a technologically new or significantly improved product (goods or service) to the market or of a technologically new or significantly improved process within the surveyed firm. The innovation is based on the results of new technological developments, new combinations of existing technology or utilization of other knowledge acquired by the surveyed firm”. And in the general introductory document Hong Kong: The Facts by the Information Service Department of Hong Kong SAR government, innovation together with technology are regarded as value adding measures to enhance industrial competitiveness.

The phase innovation in Chinese is generally translated into “chuangxin”, which literally means create something new. As its focus is on novelty and newness, it covers a broad set of meanings beyond the origin meaning of progress of science and technology.

## 2.2 Innovation policy

Not much different from other kinds of public policies, innovation policy, or sometime called innovation stimulating policy, is a measure from the government consideration to make the innovation arena function. It needs to steer and promote the co-developing and interacting science and technology, production and entrepreneurship (Berkhout et al., 2006). As a popular concept and one important item in the basket of policy making tools, innovation policy is one of the institutional components within the system added by the government, because it is widely regarded as an economy promoting measure facilitating the achievement of policy goals. Innovation policy could be classified as a public good, opening to all in a certain region or cluster, although this feature is not naturally given and depended on the government.

Institutions are linked by flows of resources in the holistic system. And practical instruments of the innovation policy may include institutions, infrastructure, incentives, education and training, international trade, the labour market, the financial market, firms and etc.

## 2.3 Innovation system

Innovation is a complicate phenomenon, consisting intensive interactions between both public and private actors. Innovation is generated and diffused based on a systematic nature, with inevitable communication among the participants (Freeman, 1987; Lundvall, 1988 and 1992; Nelson, 1993; Edquist, 1997; Johnson, 1992). Innovation system often refer to an environment where “all important economic, social, political, organizational, institutional and other factors that influence the development, diffusion and use of innovations” (Edquist 1997: 14).

The innovation system approach emphasis the interactions among all the participants like firms, universities, research agencies, government and institutions. Theses interactions are thought to be more crucial for the innovation capacity building in national or regional level (Nelson and Winter, 1982; Freeman, 1988; Edquist, 1997).

This approach of innovation system is also regarded as an analytical tool, which offers a way to discuss “their character, their causes and how they affect economic growth and development – in the learning economy” (Johnson and Segura-Bonilla, 2001: 5). Systematic interpretation generally should be applied in order to give a useful picture of what going on or expected to be going on. A more extensive narrative will take place in next section.

### 2.3.1 Evolution as a scientific definition

With the firstly developed approach of national innovation system, innovation system as a scientific definition entered into academia around 1980s. Major early advocator of it includes Chris Freeman (1987), Giovanni Dosi et al. (1988), and three more influential contemporary pioneers following, Bengt Ake Lundvall (1992), Richard Nelson (1993) and Charles Edquist (1997). It replaced the conventional linear view on innovation; instead, the system thinking developed the understanding of innovation within in a holistic scope, where “various organizations and institutions interact with and influence one another in the carrying out of innovative activity” (Hanusch, 2004, p.196), and regards innovation as an interactive process (Lundvall 1985; Kline and Rosenberg, 1986).

More than a purely scientific concept, thanks to the new innovation system approach, linkages was able to be built between innovation and economic development at specific levels. Especially close connection between innovation system approach and policy making was formed. National innovation system approach, as the most naturally linked one, earned popularity as a development for policy makers, whose points of view were expanded by accepting the structurally new thinking. It was used for providing policy suggestions, illustrating and influencing the innovation process of a country or region (Groenewegen and van der Steen, 2006).

Nelson, Lundvall and Edquist all worked on defining systems of innovation. Both Nelson and Lundvall focus on the determinants of innovation processes, but Edquist develops a more general definition includes “all important economic, social, political, organizational, institutional and other factors that influence the development, diffusion and use of innovations”. Certainly it could be argued that excluding anything as potential determinates may cause trouble, but anyhow the system should has a boundary, especially when being used as analytical concept and development tool. Boundaries could be chosen in terms of spatial scale, sectors, or activities.

### 2.3.2 Perspectives of the innovation system study

During the development process of the concept into wider use, it has been differentiated for more precise analysis. There are various angles of study in the field of innovation system including but not being limited to national, regional and sectoral perspectives, varying with regard to the focus of them (Breschi and Malerba, 1997; Freeman, 1987; Lundvall, 1992; Nelson, 1993; Edquist, 1997).

Naturally the national approach is used when analyzing one or several countries’ innovation performance, policy framework and etc, namely “national innovation system”, because for a country or state, the boundary it has is also to be the boundary for system building and policy implementation. The components and interactions being discussed are based in a nation state. The national systems of innovation have a basic characteristic of the institutional set up contributing to innovation, and the functioning production systems within it.

Taxonomy of national innovation systems is applied according to size, income, industrialization level and etc. The dynamic of innovation activities has different levels of performance among nations, as well as regions, so another aspect focus on narrower geographic space, the regional level. The nation state still plays a role to the region(s), but comparative weaker than in the national system.

Regional innovation system requires a stronger establishment in terms of rich institutional infrastructure to link the industries in a closer space. For some large countries, regional innovation system approach is more useful since the interaction among firms and industries only play within a limited geographic area, sometimes defined by boundary of administration. It is an essential approach to analyze the system in regional level (Asheim and Isaksen, 2002; Braczyk. et al., 1998).

With a special or hybrid status from those points of view, Hong Kong has control of the economy and autonomy on political stage, but neither of both is totally independent. This specific political status also has an impact here, on the taxonomy of innovation systems. Say, if there is innovation system existing mainly within the boundary of Hong Kong, because of the administrative matter it seems to be politically incorrect to use the name of “national” innovation system, even though a high degree of autonomy applies in the economic field. “Quasi-national” innovation system may be a relatively more suitable definition indicating the partly independence and regional cooperation, to be used if an innovation system located in this region can be developed, or found in this economy entity.

Different from the previous two dimensions defined by space range, the sectoral innovation system is a definition based on the industrial feature. The sectoral innovation system in economy most emphasis on the activities of highlighted industries and sectors in terms of the innovative dynamic performance. This approach has a idea claiming that the variation of sector which firms embedded matters and is influential to understand innovation (Malerba, 2002; Malerba, 2004).

Apart from the geographic or sectoral dimension, there are another two perspectives to understand the innovation system, the narrow and the broad. For the narrow perspective, only science and technology agencies are seen as participants of the system. The broad one also includes other elements like financial sector, education, infrastructure, economic background and social rules (Gu and Lundvall, 2006). The more extensive systematic view gives more information to discuss the process of learning and competence building, and will be used in the thesis for analysis of innovation system.

Approach of the sectoral innovation system is a new way to view the sectors as multi-factorial integration, with products and other economic agents involved and spread in terms of interaction for innovative activities. It bases knowledge transfer and application, in- and output of other resources on a different basis that focus on industrial flows in certain sectors. Interactions are shaped by the institutions differing among countries, and sectors within in a country (Malerba, 2002).

### 2.3.3 Core participants and interacting mechanisms within the innovation system

If the concept of innovation system is followed, one may figure out that it is a very broad approach. To discuss innovative activities and performance in a certain region, it is necessary to narrow down and have an idea that which components being included in the system. Generally stated in literatures, the main components in innovation system are organizations and institutions, or to say players and rules of the game. The system has its function that is determined and delivered by activities develop, diffuse and use innovation with connections of the components. “… to some extent at least, a nation's innovation system is shaped by factors such as size and resource endowments that affect comparative advantage at a basic level. But it also is true that a nation's innovation system tends to reflect conscious decision to develop and sustain economic strength in certain areas, that is, it builds and shapes comparative advantage” (Nelson, 1993).

The participants in a system and their interactions are of major importance. The group of actors includes individuals, firms, producer groups, governments and etc. On the one hand, the core of the institution set up is those actors that produce, adapt and diffuse new knowledge; on the other hand, the interacting mechanisms are affected by the institutional setting up, and further influence the technical changing, firm and market development.

What is Triple Helix? “Triple Helix”, mainly focusing on the academia-Industry-Government relations, is a model to build a systematic picture, distinguishing the participants. Innovation cannot be created most efficiently when the innovative activities are limited in a single organization. Collaboration and cooperation are introduced to the process during which lateral relationships become more and more important. The Triple Helix model is a new way to investigate the "multiple reciprocal" relationships during transformation of technology and institution. It expands the view along with the expansion of bilateral relationships between academia and industry, government and industry, and government and universities. The three parties formed a new dynamic institutional environment to promote innovation with overlapping interactions (Etzkowitz, 2002).

How do the agents interact with each other? Hong Kong is often considered as a dynamic economy. One aspect of the consensus is focusing on the prosperous picture of flexible resources exploitation and mobility among various sectors in the business society, without doubt including all the three parties in the Triple Helix model as active actors.

# Data and methodology

## 3.1 The survey

As a remarkable action itself in the development of innovation system, and also a component of the system, the statistics on innovation activities and the influence upon economy began to take a place in Hong Kong a little bit more than one decade ago. Compare to the innovation development there, the early focusing on R&D activities, and then expanded range of innovation, is really an ambitious forward looking action.

The launch of Annual Survey of Innovation Activities in the Business Sector itself could be regarded as a major event in the development of HK innovation system. It officially began since 2002, focusing R&D activities and innovation activities in business sector. In the latest published 2008 report, innovation activities of higher education and government sectors are included in the statistics, coinciding with the broader view of overlapping components in the thesis. Some detailed information delivered could tell the resources used in innovation relevant fields, in the form of expenditure and personnel; intra- and inter-regional cooperation, etc.

The series of reports are upgraded from the initial observation of several statistical indicators by the same agency, Survey of Innovation Activities, in the general annual statistics of industrial and business sector. The early reports consist of less coverage on the innovation field, kept as a section of the Programme of Annual Economic Surveys within the business sector general statistics for the partial data relating to R&D activities collected.

Since 2002, a more comprehensive survey began to be conducted annually by the Science and Technology Section under Census and Statistics Department of Hong Kong government. This generated report is delivered annually as the most important and accessible document to receive an overview upon the innovation field of Hong Kong. Data provision in these reports is performed in categories including “Research and Development Activities”,” Technological Innovation Activities in the Business Sector” and “Non-technological Innovation Activities in the Business Sector”.

The findings generally concentrated on the following fields: Diffusion of research and development (R&D) activities in the business sector; Resources devoted to R&D activities; Diffusion of innovation activities in the business sector; Characteristics of innovation activities in the business sector and etc.

The most recent progress of the survey programme had come out in the year of 2008, with introduction of new data range. The new version expanded the fields they are doing the survey, to further comprise information about innovation performance of higher education sector and government sector. Not only the range of survey expanded, the number of firms and organizations those participate in the survey shows an increasing trend. From 4473 establishment joined the survey in 2001 and 99% overall response rate, to the 2007 survey contains examples of 5511 establishments with 98.7% overall response rate, the Hong Kong Annual Survey of Innovation Activities in the Business Sector keeps a reasonable quality in example data collection.

Based on their understanding of innovation activities both generally and specifically in Hong Kong, The producers of the annual survey focusing on innovation development had made contributions in delivering results including high quality observations and analysis.

## 3.2 Methodology

It is necessary to consider the research questions one thesis intends to answer when choosing whether to use a qualitative or quantitative approach. According to the demand of the content in this thesis, the research is mainly based on qualitative method, but with the help of a series of second hand survey data, certain issues are illustrated quantitatively. Both quantitative and qualitative methods applied together could produce complementary results, combining rich outcome of the qualitative way by deeper exploration. However, if there are possibilities to use standardized measures, quantitative research may be better selected. The people or issues could be investigated without limitation of number, and provide statistical values. But it definitely need the question and findings be well generalized. Some time the feature of studies, for example an explorative issue, will face difficulties to develop in the quantitative way.

Case study is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and the context are not clearly evident” (Yin, 1994: 13). The thesis uses the case study approach to deliver the study on the innovation system of Hong Kong. For a topic in focus like this one with the objective is to explain how and why, case study is a suitable approach (Yin, 1994). As an approach often applied to innovation relevant fields, where consist specific developments that took place, case studies were successfully delivered in these occasions. It is also suitable for the descriptive tasks, or to test theory (Eisenhardt, 1989).

Furthermore, case study research strategies are suitable when the research aims to offer a description, to test or generate theory. Consequently, case studies aim to develop a certain set of propositions which can be tested in related situations. To offer a description is part of the aim of this research. Furthermore, qualitative methods, such as the case study, are very suitable for studies where depth and detail of empirical material are needed.

# Hong Kong’s context

## 4.1 Historical trajectories

Many will agree with the idea that Hong Kong has a unique history, which to some extent has left a lot of tangible and intangible legacy to the society of Hong Kong in the following years. The political legacy certainly comes from the respective regimes and their change, with times of transfer of authorities and governing rules that Hong Kong has experienced. Since one of the main targets of this study is to find a understanding upon the reasons and driving forces in the background affecting innovation policy implementation and innovation system generation. The process is not only a micro behavior, but should be understood when putting in a wider setting (Lundvall, 2007). An introduction of historical trajectory should be carried out for this reason, and should be generalized into major influential factors linking to the core of innovation system’s mechanism.

Hong Kong, with 7 million population (end of 2008) and a land area of 1,104 km2 (See Figure 1 for the location of Hong Kong in Asia, in China and on China's south coast), has been a Special Administrative Region (HKSAR) of the People's Republic of China since the 1997 handover from the previous British sovereignty. As a role of colony, later territory of Britain and then the current HKSAR, Hong Kong had experienced an unusual way of economic development largely influenced by socio-political background and other relevant factors. According to those, several phases were divided to the trajectory of Hong Kong's economy.



Figure Map of Hong Kong

Source: Wikimedia Commons (2008)

Since her very first opening as a trading port to today, the uniqueness of Hong Kong history consists of a whole process, and can be roughly split in to several distinctive periods.

During the first half of the twentieth century, the colonized Hong Kong was mainly regarded as an "entrepôt" by the British Empire, to meet the interest of her dominating country. The trade purpose was imposed to Hong Kong as the primary aim, rather than manufacturing industry (Loh, 2002). Only a few of small manufacturers performed their business in a local network with channels linking China's market.

From Chinese Civil War to the eve of opening of China, this period between 1950s and 1970s first witnessed a large amount of migration from mainland China to Hong Kong for refuge due to regime change. The group of migrants, as well as many corporations shifting operations from Shanghai and Guangzhou to Hong Kong, established and developed the manufacturing industries represented by textiles. Hong Kong industrialized rapidly, and at the same time the business services and finance also started to take more share (Buckley, 1997).

In the last two decades of twentieth century, Hong Kong was influenced significantly and profoundly by two events: China's "reform and opening-up" programme since 1978 and the negotiations between Chinese and British governments over the future of Hong Kong that began in 1982. It was a time that economy was largely dominated by finance sector.

After return to Chinese sovereignty, Hong Kong had to defend her economy from the Asian financial crisis and then SARS epidemic. With the new political status, Hong Kong saw emerging opportunities to collaborate with mainland China. Continuing her function of hub, Hong Kong played an active role in providing sources of foreign direct investment, transferring production facilities to mainland, especially the adjacent Pearl River Delta. The business and financial services sectors benefited from the process and was together driving the whole economy.

## 4.2 Socio-economic factors

Politically, during the post-1997 period, the "one country, two systems" policy and Basic Law after transfer of sovereignty in 1997 keeps Hong Kong SAR an independent economy system with high degree of autonomy, making it is possible to consider her as an "national innovation system" for the study, despite it is certainly not a proper saying politically. In terms of population and land area, Hong Kong has an indeed small size and comparative scarce natural resources. However, based on her characteristic role of development route, Hong Kong enjoyed advantages of location gathering resources flow and human capital, and earned a reputation of one of the Asian Tigers. Generally speaking, the economic performance of Hong Kong was dynamic and created high level of GDP per capita and income (Edquist and Hommen, 2008).

Hong Kong herself recognized that basing on the limited resources, to build a competitive economy must require a focus on certain fields in which have advantage and international competitiveness. It was an inevitable choice. Consequently, the social and economic resources showed a trend of concentration on four key industries, financial services, trading and logistics, tourism, and producer and professional services, which "have been the driving force of Hong Kong's economic growth, providing impetus to growth of other sectors, and creating employment" (HKCSD, 2009). Examining the figure of percentage share to GDP of the four key industries in the Hong Kong economy, it tells the trading and logistics industry takes the most share among the big four. They totally reached almost 60 percentage of whole economy in terms of GDP (See Figure 2).

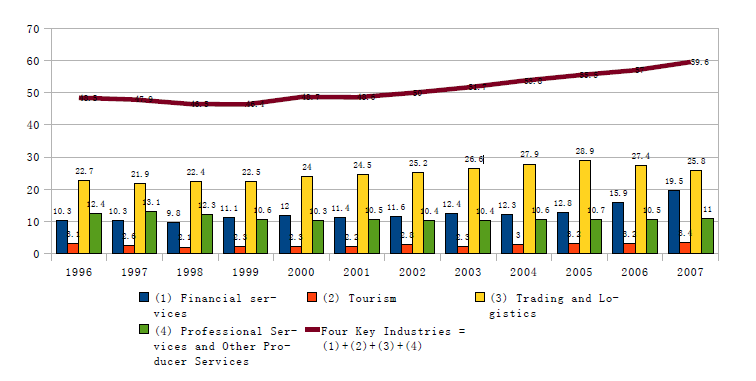


Figure The four key industries in Hong Kong, Percentage Share to GDP at Current Factor Cost

Source: HKCSD (2009), Feb

During the boom of the service sectors, firms in Hong Kong used their capabilities of imitation and followership, "emphasizing the development of organizational know-how rather than formal R&D for new products" (Sharif and Baark, 2008). It was the social capital and local embeddedness of the entrepreneurial society that contribute a lot. Hong Kong has a long and prosperous tradition of business. Many studies agreed that Hong Kong has an entrepreneurial society, in which a profit-seeking mentality and venture initiation can be easily observed. Hong Kong was listed the third place in the Ease of Doing Business Index ranked by World Bank. The people there are eager to start their own businesses and seize opportunities to make money. There are about 300,000 enterprises in Hong Kong, which include more than 90% proportion of SMEs who are critical to the development of the service sector dominated economy today. Most of them run in the industries of import and export trade, wholesale and retain, and restaurant and hotels.

# An overview of innovation in Hong Kong: early development, policy and system generation

Innovation could not be seen as a tradition embedded in the local context of Hong Kong. The development of innovation, among business and other sectors in Hong Kong, just happened when innovation stimulation and integration finally become an option for decision making in recent history.

## 5.1 General trend and focused fields

There are various ways to measure and comment on the innovation activities and performance. Some main indicators are used in the innovation survey and other general economic reports of Hong Kong. Within those, some “classical” indicators include the use of indication of expenditure and personnel involvement.

The year of 2001 was the first time that the R&D ratio to GDP beyond 0.5% and it reached as highest as 0.8%, even which is still a rather low level comparing to other fast growing economies. A deeper study of the innovation intensity of Hong Kong shows poor performance in product innovation, only except some firms in finance sector were comparable to European countries for the introducing new-to-the-market products. And probably because of her service sector led economy, Hong Kong performed better in introducing of new processes than those for new products (Sharif and Baark, 2008).

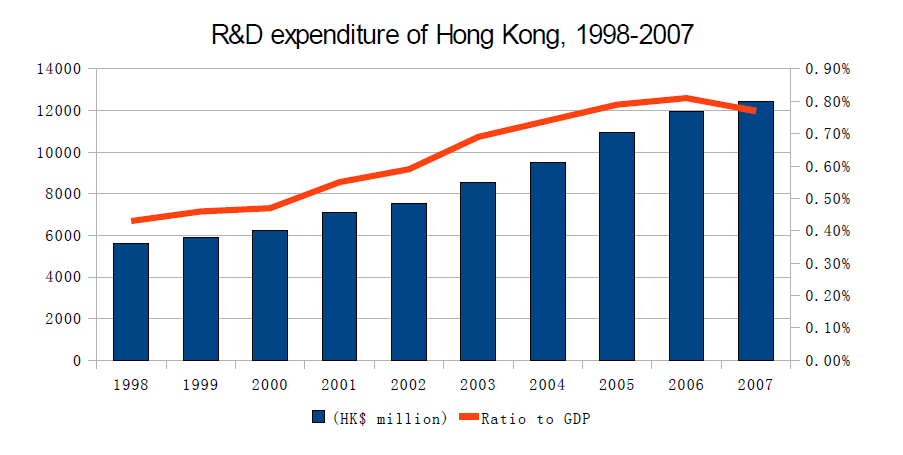


Figure R&D expenditure of Hong Kong

Source: HKCSD (2009) May

## 5.2 Brief history of the innovation policy implementation

After the handover happened in 1997, Hong Kong has gained a political status under the new system named “one-country, two-systems” as a Special Administrative Region of China (the HKSAR). The partnership with mainland China changed the previous role of Hong Kong as a dependent territory. The result of this transition did not make effect on economic performance immediately, but challenges including the 1997 Asian financial crisis and epidemics like SARS came in front of Hong Kong, who had to deal with and defend herself. The economic environment of Hong Kong in the decade following the transition was an extraordinary period, considering the challenges, and especially comparing with the robust economy in the British time. During the period of at least 40 years before 1997, Hong Kong grew to a strong figure in industries like trade, transportation, communication and finance, enforcing the role of an entrepôt between the Orient and the West. Only some short-term adjustments had interrupted growing in the long period. Nevertheless, the continuous opening of mainland China also made changes to the pattern. The balance alters to some extent, because of that the distribution of resource more likely favors mainland China, the importance of Hong Kong has been weaken inevitable.

Generally determined by Hong Kong’s status of a former colony, the economic robust situation of her was a result of the low cost-oriented provision of goods and service. The colonizer would rather like to keep the function of Hong Kong as a production base, and had litter incentive to change that, i.e. no incentive to build an innovation friendly environment, or directly promote innovation. The statement could found proof during the period between 1950s and 1970s, when resources including cheap immigrating labors, capital and land space was exploited by textile production industry. Reducing cost and leveraging by trade were always considered as the first choice as a dominating business strategy, instead of making progress in techniques. Under that condition, innovation was not a necessary measure to use or even not to consider.

Even though the cost of accessing to resources finally rose, the opening procedure of mainland China gave Hong Kong what the old economy mode need again, the cheap labor and use of land. Thus, strategy pursuing low cost was enforced by the accessible resources in Hong Kong’s neighboring regions. So prior to the handover, Hong Kong was still remaining the growth led by export by means of hub position, familiarity to mainland China and etc. The business in Hong Kong was able to overcome the rise of cost during that period without inputting in technological innovation. However, if the broad concept of innovation is applied here, process innovation in terms of adjustment to the past business mode could be investigated. The internal organization model of firms of Hong Kong, had altered to a strategy basing their manufacturing part in adjacent mainland China regions like Guangdong in the Pearl River Delta (PRD), but insists in using tradition imitation and following ways of development. For sake of business, the change in process and organizational model must have been compared with developing in research and innovation, and old fashion had beaten formal technological innovation in the comparison. Thus, question like that what could the result reveal remains a focus in the coming chapters.

Certainly, Hong Kong is not the least economy entity to realize the importance of innovation to the competitiveness. Hong Kong has found that the changing economic trend with a more urgent need for taking part in the wave of technological advancement. Taking innovation into the strategically was becoming part of the policy expectation and began to be initiated by some new institutional arrangements. .

When it came to the changing year, 1997 that witnessed change of political condition, as well as the Asian financial crisis challenged the economy of Hong Kong. It was also a remarkable year for the development of innovation in Hong Kong. This time, it was the government that actively takes a role as “visible hand”, implementing a series of policies to influence economy. New institutions related to building innovation system are established for the first time. Such new introduced institutions all targeted for an integrated environment where business, industries, government and the institutional arrangement could co-exist and interact, together accelerating the involvement in technological advancement and application.

As a milestone in the procedure, the Commission on Innovation and Technology (CIT) was established as a central advisory agency, with the support from Hong Kong SAR Chief Executive, Tung Chee-hwa. The new SAR government brought in the idea of an innovation system to the fresh self governing body just after her status of a dependent territory ceased, while a lot of analysts were holding a skeptical view to Hong Kong’s future.

The first batch of reports in innovation field was delivered by CIT in the following years (September, 1998 and June, 1999). The government definitely hopes to help the economy step in to a promising trajectory for the innovation system development by a series of effort, activities and resource input. However, later facts showed that at least in several years after 1997, there was still distance for Hong Kong from achieving a real innovation system come into play as expected. The agency CIT was later suspended and disbanded and other necessary institutional components for constructing a mature innovation friendly environment were postponed to put in place. Even the reports CIT produced were left without follow-up action.

Another notable event occurred to the innovation field around that period is the death of Professor Tien Chan-lin in 2002, the chair of Commission on Innovation and Technology, who was believed to be one of the most influential advocators at the beginning of introducing innovation policies. There was no short cut for proper policy making during the budding stage of fostering the environment to involve adequate institutional components. The leave of an important person would cause unforeseen reactions. Innovation and technology policymaking was left to the general civil service with little relevant experience. Until four years later, the government again convenes a policymaking agency with target towards an improved innovation system in Hong Kong.

Although a central coordinating agency fell vacant, some supporting policy and works were still being carried out during that time. Like the Innovation and Technology Fund (ITF) opening in the end of 1999, aiming to offer start-up capital and technological awards to the firms based in Hong Kong, containing a huge amount disposal of HK$ 5 billion (about 640 million USD). Generally speaking, Hong Kong’s efforts towards innovation system continue, in spite the loss of leading figure and organization. There were also other initiatives including the Applied Science and Technology Research Institute (ASTRI), the Hong Kong Science and Technology Parks Corporation (HKSTPC), and the Cyberport infrastructure project, all heading to contribute in promoting innovation activities by offering incentives.

Internal cooperation within the bureaucratic structure also had to make modification to be more compatible for pursuing of a knowledge-based economy. Until the year of 2004, an agency named Steering Committee on Innovation and Technology (SCIT) was founded with the similar target of “coordinate innovation policy” as the CIT had. The work in innovation policy field was re-started by this “high-level policy group” consisting members of the Council of Advisors on Innovation and Technology (CAIT), plus other academics and industrialists. Growth Enterprise Market (GEM) of the Hong Kong Stock Exchange was also been organized giving a place for smoother transaction and for the group of innovative, high-growth companies.

## 5.3 The emergence of innovation system in Hong Kong

Determined by the nature of innovation system studies, the systems in question could be regarded as existing entities promoting the development of economy with interaction of actors and resources, but also simply as view points for understanding the situation. So for example, the same agency involved in a certain innovation system, may also take an active role in another one, while changing the angle of analysis.

The unique political structure after the handover of sovereign remind people to consider that It’s important to apply both perspectives of spatial and sectoral system for the research of Hong Kong. Choosing the administrative boundary is natural and necessary. Public policies influencing Hong Kong’s own innovation processed are designed and implemented mostly within the definition of national or quasi-national innovation system. At the same time, system of innovation may also be sectoral, regardless of geographical demarcations, supra-, sub- or national ones. Economy of Hong Kong is highly influenced be several key sectors, using sectoral perspective may produce a clearer view of innovation activities. And the division of Hong Kong based R&D and mainland based manufacture makes the whole innovation processes have to be linked across border.

If jumping out of the geographical dimensions to look at the condition of sectoral specialization, Hong Kong’s economy is highly specialized, marked by strong and dominating service sector. “For fostering innovation and diffusion in a sector, technology and innovation policies may not be enough” (Malerba, 2006), beyond them, interregional collaboration with resources sharing and labor mobility play a crucial role, especially to the small sized economy like Hong Kong.

Comparing with the theory of innovation system, Hong Kong’s economy has an emerging complex of several innovation systems, where various modes of innovation processes and activities are generated or organized. In Hong Kong, the road from sporadic innovation activities to systematic interaction under one holistic network was not straight forward. There had experienced suspension like the disbandment of the CIT, but when looking back the changes happened around 1998, one can probably say it contains a series decisive and far-reaching events and actions, contributing to later trends towards their policy intention.

The period after 1998 had a pushing effect for the development of innovation system, remarked by the following most important characteristics.

(1) Funding mechanism: Direct effects would originate from the introduced incentives by the funding mechanism. Similar R&D supporting measure before 1998 was underdeveloped and unable to take the responsibility for provision of plentiful and stable backup force for firms’, and especially growth firms’ emerging need of support when stepping into innovation related investment. Differently and much better, when the Innovation Fund was launched to make it possible to meet those need, it is becoming an useful incubating policy and entity for not only direct financial support and stimulation, but also within the operating range, a space for coordination was gradually formed with increasing possibility to also hold information sharing together with capital input and output procedure(HKSAR, 2005; Sharif and Baark, 2008) .

(2) Increased participants and the interactions among them becoming stronger and as a whole occupying more technology flow, capital flow and other resources in the production and innovation process. And the role of this complex has grown to be decisive. Activities of the participants are more or less connected to the innovation generation, diffusion or application stage of business. More new actors, for instance the government and affiliating agencies, industry upstream and research institutions, education sector, are joining into the system acilitateing to share with existing members, majority from production. Thus, inter-sectoral communication and resources sharing are possible to perform (Lundvall, 1988; HKCSD, 2008).

(3) Government’s motivation and attitude towards innovation and knowledge based economy shows no sign to diminish. It could be recognized by new innovation policy being carried out, implemented and beginning take effects in 2005 by ITC.

During that period, Hong Kong SAR government’s motivation to create an innovative future was being driven far beyond discussing stratagems on paper only. Although the pioneering organization was out of place for a few years before the re-established follower, innovation policy still went on despite slight modification to enhance rationality.

And another good thing is that the networking in Hong Kong was built upon an already mature commercial environment and fostered by the culture involving business and entrepreneurship. It means that even if the government led policy was later freezed after initialization, if there is need, internal driving force will continue to operate replacing the previous power. As to the question innovation policy in Hong Kong was promoted firstly by whether government or firms and individuals involved in economy, I’d like to keep it for later discussion.

(4) The new institutional arrangement New Strategy held an idea of self learning process to be based among policy makers, who could learn from past mistakes, and thus brought down certain share of costs in policy implementation. It called a deeper degree integration and cooperation of administration, funding and consulting (HKCSD, 2005).

(5) The suggestion of closer integration with mainland China especially received attention. Along with Hong Kong’s neighbor, the Pearl River Delta region, and by means of already existing convenience of infrastructure, channels for knowledge transfer and human resource flow, ITC aimed at building a inter- governmental relations facilitating all kinds of resource sharing (Su, 2007).

# The interaction mechanism of actors: model of “Triple Helix” and its extensions

## 6.1 Universities/Higher education

Although the impacts of interactions between university and industry on innovation and the innovative performance of firms is not easy to sketch (Laursen and Salter, 2004; Fagerberg, 2004). But a basic idea is that university-industry linkages need to be strengthened in order to take some positive role for applying knowledge for innovations.

Universities are useful organizations those can supply crucial knowledge to the industry and transfer” human capital, specific skills, instruments, prototypes for new products and processes as well as network of scientific and technological capabilities” (Mowery and Sampat, 2005).

In the Hong Kong higher education sector, there are totally nine universities, of which one is private and eight are government-funded, including:

The University of Hong Kong, founded in 1910;

The Chinese University of Hong Kong, founded in 1963;

The Hong Kong University of Science and Technology, founded in 1991;

Hong Kong Baptist University, founded in 1956;

The Hong Kong Polytechnic University, founded in 1972;

City University of Hong Kong, founded in 1984;

The Open University of Hong Kong founded in 1989;

Lingnan University, founded in 1967.

Besides, The Hong Kong Institute of Education is a non-university institution and also government-funded.

The higher education system is granted by The University Grants Committee (UGC), along with The Research Grants Council (RGC). They set their role in "strategic planning and policy development to advise and steer the higher education sector in satisfying the diverse needs of stakeholders”. Not only the whole higher education sector is integrated as one force to achieve international competitiveness in an interlocking system, but also the committee endeavors to contribute to make Hong Kong a vibrant, economically powerful society by creating and responding to economic opportunity.

A series of role statements to define the responsibilities and development goals of universities was issued in 2004. In the statements, UGC frequently emphases on the Third Mission elaborated as "strong links with business, industry, professional sectors, employers as well as the community" (UGC, 2004). It also encouraged the institution’s general collaboration with government, business and industry and the participation of human capital with special expertise in public service, consultancy and collaborative work with the private sector. Further, some advanced goals of contributing to regional development and supporting "a knowledge-based society and economy" was assigned to the top universities according to their strengths.

However, with the interacting relationship between academia and industry are getting stronger in the innovation system, in terms of the risen enthusiasm for the “third task” of university. Some began to warn it may lead to a focus removal from the core field of doing research and training (Lundvall, 2002).

Through the government-funded part of Hong Kong higher education system, UGC on behalf of government harnesses and directs the creation and application of knowledge, making universities active in collaboration with both public and private sectors. The individual universities are also led to form sort of integration to deliver the common targets.



Figure Triple Helix in Hong Kong, highlighted on University

Own work

## 6.2 Industries

As mentioned before, undoubtedly service industries are the most important driving force of Hong Kong's economy nowadays. And perhaps because of that, innovation has not become a significant issue to the enterprises. The big enterprises, notwithstanding they were quite a few among all companies in Hong Kong, showed potential to participate in innovative activities, to some extent. Oppositely, there was a need to assist the SMEs in Hong Kong towards more innovative participants in the knowledge-based economy (Sharif and Baark, 2008). While the fact was that small enterprises undertook the least innovative activities, according to an official survey on innovation by HKSAR Census and Statistics Department in 2002.

In order to drive Hong Kong to become "a world-class, knowledge-based economy", government introduces a wide range of innovation and technology fund and gives infrastructural support. And a strategy suggests their resources focusing on the area where Hong Kong is competitive and has market relevance and industry participation. Hong Kong government is a strong advocator of regional and international (technological) cooperation. Under the framework of Mainland and Hong Kong Closer Economic Partnership Arrangement (CEPA) and other bi-/multi-lateral cooperation agreements, it takes the geographic position and good understanding of East and West as advantages. The entrepreneurs and SMEs owners have also benefited from help and advices offered by government agencies such as Trade Development Council and Support and Consultation Centre for SMEs and from intensive local contacts in Hong Kong SME Association and similar ones.

## 6.3 Government

A governmental agency, the Innovation and Technology Commission (ITC) was set up on July 1, 2000. Its mission targets Hong Kong’s drive into a world-class, knowledge-based economy. The main fields supported by ITC include applied research and development (R&D) and technology transfer and application; fostering an innovation and technology culture in the community; promoting technological entrepreneurship; providing technological infrastructure; facilitating the development of human capital to support innovation and technology; and promoting internationally accepted standards and conformity assessment services (HKSAR Government, 2005).

The ITC also works other government departments in the public sectors, the industries and business in the private sectors, educational institutions and other forms of industrial support organizations. To deliver its various missions, the ITC has links to a number of strategic partners within a radial network, shown as the figure below.



Figure Strategic Partner of ITC

Source: ITC website, Nov. 2007 http://www.itc.gov.hk/en/about/strategic.htm

Several projects mentioned before show that the interaction between government and firm has more paths than dot A to dot B input. Government has the ability to design and apply different policy instruments catering with the need from different levels and stages of industry. For example, these projects in question were implemented by Hong Kong government to continue their efforts in innovation stimulation after the disbandment of CIT. Except that the ITF funding mechanism was targeting to provide start-up capital and technological awards to ordinary business actors, the other three and specifically oriented. Among them, ASTRI attempts to deliver ‘mid-stream’ R&D and transfers it to industry sector. Cyberport project was designed exclusively for building infrastructure and fostering cluster in industries as information technology (IT), telecommunications and digital media facilities. And t he HKSTPC provides service supporting industrial production at various stages as early as the start-up stage for applied R&D activities.

Both NIS perspective and Triple Helix perspective have a deficiency of insight of external factors. To elaborate the Hong Kong story with the wider setting, another tip is rooting all the findings in its uniqueness with a particular emphasis on the bilateral relationships between Hong Kong and mainland China, who gives her the autonomous status to keep a relatively independent economic system but also regulation. China as well, is the most important trade partner of Hong Kong in the contemporary market of globalization. Both economies have a crucial conjunction including competition and cooperation. The integration of Hong Kong's economy towards mainland accelerated her steps to globalization. Thus, the government policies are also oriented towards sort of global linkages of economy, encouraging innovative firms to establish R&D in the prepared location.



Figure Triple Helix in Hong Kong, extended.

Own work

# Implementation of innovation policies in Hong Kong: an imposed of induced process?

## 7.1 Discussion about decision making

It will be interesting to analyze the change of government’s attitude towards the degree that it takes part in the economy and business. There was always discussion and debate about the role and responsibilities of governments. These “countermeasures”, if believe that the Asian financial crisis was acting as an existing threat, were often afterwards acknowledged to be a must-do measure. However it played against Hong Kong’s laissez-faire policy of “positive non-intervention”, which many Hong Kong locals value highly and used to live within. The philosophy, expressed as “small government, big market” was discarded to some extent, government interfere into the economy with an unprecedented depth and breadth. New institutional arrangements designed for providing market opportunities were implemented including the innovation promotion policy. Because of the relative more urgent need to better off when facing the crisis, industry and its up- and downstream need fundamentally to be improved by upgrading with more efficient technologies and/or better organizing methods.

Standing at that time point, the importance of innovation had reached a quite high level, and was receiving more and more attention from the policy makers and the government. The case of Hong Kong is especially complex and tricky, because of the political tradition that inevitable taken into consideration.

For firms, making a judgment of efficiency of a particular product or process innovation has to deal with various factors. And this comparison they carry out is a natural reaction of firms through their operation in the market since firms need to be profitable and continue.

How did the decision making perform, for both firms and government? How did the specific option of institution come into consideration? What are the resources before and afterwards to exploit for introducing and enforcing those institutions arrangements?

## 7.2 From the approach of institutional change

The short trajectory of innovation development with discontinuous policy implementation recently in Hong Kong has shown a unique picture coming with several questions. What is the role of innovation to the economy and society of Hong Kong, from the perspective of both government and firms? What are the incentives and barriers they are facing when making choice to join or avoid innovation activities?

The process of evaluating and choosing an institutional arrangement could be put into a simple framework with demand and supply, where the cost and the benefit after change are compared.

Market is the place within that demand and supply are carried out. And market also provides opportunity enabling the producers and consumers meet and interact. Theoretically, market is considered to be the most efficient mechanism for resource allocation. Based on this assumption, government hardly has any necessity to act policy provision and enforcement, it only and only need to introduce intervention to the market when market failures happen.

However, this statement is not incompatible with the fact investigated from real world, where consists a lot of policies in fields like economy and social order. And the firms, as well as other participants in one economy, are the objects ruled and moderated by these institutional arrangements. At least in the market, government has duty to carry out some fundamental roles like protecting the property rights by issuing laws and order.

If just regard institutions as given market mechanism, many real economic issues will unable to further discuss. During the previous historical period, especially the time under the British administration, Hong Kong seem to be proud of the loose political and economic control. The general policy named “positive non-interventionism” was the most distinctive example. But later facts around the development of innovation system in Hong Kong just provide an example of policy introduced into the context. Hong Kong has recently attempted and made effort with stimulation by preferential policy and resource allocation.

The approach of institutional change mainly focuses on the mechanism of institutional change and explains the choices of social institutions. For understanding the information from the brief historical sketch discussed before this section, the thesis chooses an approach of institutional change to illustrate its dynamic, and try to explain within in the general equilibrium mechanism.

The same to other kinds of public policy, innovation policy in Hong Kong belongs to the general framework of public policies. Such classification enables the research to start with special attention on institutional arrangements and their changes.

Assuming either government or individuals and firms in the market have more or less a similar idea to pursue a profitable result to fulfill own responsibility, need and development. And the institutional change in the way they take for achieving this common principle, but appear in forms of imposed and induced changes. The questions asking why they differ in types and what the driving force behind is, could probably be explained by involving the general equilibrium mechanism. The question then could be altered to a comparison between costs and benefits during the decision making procedure, as emphasized in previous section of this chapter.

## 7.3 Two types of institutional change

The institution changes being discussed generally have two types and are grouped into categories as imposed and induced institutional change. The first one, imposed institutional change, is created and implemented by the government only. It may include forced process to introduce what coping with government’s policy intention to market, depending on the standpoint of the policy makers and their intended aim. Moreover, the level of acceptance and fitness of it in the market varies with different design and institutional measures. Saying economic-wise, the imposed institutional change may not be targeting a profitable future as individuals do while bringing in induced change. However, what is a profitable result need to be clarified when talking about the institutional issues from the position of government.

And the second one, induced institutional change indicates a change to some existing institutional arrangements either by modification or replacing them, or the process that new institutional arrangement is emerged. Induced institutional change means that the introduction of a new or modified institutional change is driven by internal forces of individual or firms that consist of a group of individuals. It is a voluntary response to obtain profitable possibility, coming out of dissatisfaction with existing institutions in position, which may prevent them from improving their conditions. Try to say it as simply as possible, there is a need to change, so the people make change.

This dissatisfaction to existing institutional arrangement mentioned above, could be regarded as a kind of expression of an institutional disequilibrium. The need for changes occurs after there are disturbances of equilibrium. When other alternative institutional arrangements become more efficient to take down production cost or transaction cost or both, and at the same time, when circumstance allows, induced institutional change will occur without interferences from imposing powers.

Institutional arrangements play the role of them co-effecting with the structure, other socio-economic factors, regions and time periods. Since it does not solely exist, it requires dealing with the surrounding circumstances for discussion.

## 7.4 Making the comparison of costs and benefits

First of all, it is relatively easier to see that the institutions are useful measures provided, usually by the government. As one of the research questions posted before, whether the innovation policy implementation as an institutional change to Hong Kong’s context is an imposed or induced consequence, need to be discussed. An approach focusing the mechanism of institutional change is applied here to understand the choice of social institutions and incentives of changing. Developed by Justin Yifu Lin, and used in the literature investigating the issue of land reform.

The comparison between costs and benefits used for institutional issue contains more factor than the comparison for production. Here, transaction costs must be considered as well, including “the costs of organizing, maintain, and enforcing the rules of an institutional arrangement” (Lin, 1989).

When making decision, fulfilling a certain target is not bound to a solo option. There may be other alternatives to select from the policy basket for providing this institutional service. Solutions are normally evaluated beforehand involving the comparison between costs and benefits supposing the institutional changes are being taken and taken into effect.

Any institutional arrangement is impossible to be separated from the environment, i.e. the institutional structure, to exist and perform. Thus, the efficiency in question is heavily relying on the performance of other institutional arrangements in the same embeddedness. The earlier point of view stated as that “the analysis of any concrete institutional pattern has to start from the existence of institutional arrangement as inherent in the very nature of human society” (Eisenstaedt, 1968, p.412) has been reaffirmed by the economists of institutional school.

Neither the decision making process, nor the coming implementation of the policies is free of cost. Government and other agencies in relevance need to perform the policies by means of administration, resource allocation and etc.

For the case of Hong Kong’s innovation promoting intuitions, the circumstances before introducing such changes may be generalized from previous chapters. The most crucial and direct influential factors are the economic challenge and opportunities both exist. There was the most urgent need to upgrade the industry structure and build a knowledge based economy in Hong Kong’s history. Continuing the old mode of production, trade, or even lately concentrating in service industry would no longer keep economy of Hong Kong as competitive and profitable to doing business as before.

There were also a large number of firms and other participants having demand to involve in the innovation process. Principally, as previous stated, being profitable is one the most important goal for the firms in industry. So, for the decision making of a firm, whether or whether not to take part in innovation, the pre-stage investment and etc, is largely depending on again the cost and benefit to do that. According to the data from Hong Kong Annual Survey of Innovation Activities in the Business Sector, the firm being interviewed generally considered economic factors as the major barriers to technological innovation. The Top 3 barriers preventing them taking part in innovation they vote were respectively “innovation costs too high”, “lack of appropriate sources of finance” and “excessive perceived economic risks”.

For the supply side of firms, innovation policies drive the development of innovation system and provide incentives to the participants. A good institutional change for innovation system advancement, for example, may involve financial support or environment fostering to remove those obstacles in front of the firms and other agencies within business sector.

And the supply side of government, however for Hong Kong, the idea of making a decision by the government to influence the economy is not common. Hong Kong had a long history when the tradition inherited from British authorities “minimum government” philosophy was dominating upon the social life. The responsibility and power of the Hong Kong authority was carefully defined and limited. The action towards innovation system Hong Kong took, or intervention someone would like to call, is more important than the detailed decision it made. Voices differentiate when the relationship between government and free economy seems changed.

The transfer of sovereignty from Britain back to mainland China was commonly considered to be the most far-reaching change to Hong Kong, but we can’t see political customs and traditions were overturned at that moment. By central government in Beijing, the statement that Political and economic freedom were guaranteed for 50 years in Hong Kong, gave the new Hong Kong SAR confidence to keep the political legacy to some extent. Nevertheless, there must be some differences in the post-handover period, for example, the change of electoral regime had altered to use indirect election, which would reduce the cost if government insists on imposing a policy by its public power. In addition, the roles of personality and ideology became more important, and could be found in this trajectory of innovation development.

Promoting innovation may be only one option when making the decision. If government has selected it as a policy measure, it means that the decision makers believe positive effect to fit with their initial expectation. Although innovation has been widely proven to be an effective measure to enhance competitiveness of a country or region, it is not necessarily the only one can do this job. Just look back in Hong Kong’s history, it may be the best example to illustrate how to develop one's strong points, avoid the weaknesses, and win a favorable result and status. With the dynamic and flexible economy, Hong Kong was always pursuing the best developing route for herself. There could be using advantages by way of developing textiles, ICTs, finance, or services; and this time, innovation is their option.

Institutional change in market, especially in the market tagged with free and non-interventionism usually will be seen as an inevitable solution after identifying current market failure or foreseeing such in the near future. As shown in the brief history of the development of innovation activities and policies, the progress to an innovation system in Hong Kong was not a straight forward action, rather than that, it took a long procedure with back and forth movement after the beginning implementation of the policy intention.

Standing on the side of the government, who is based on the political environment, simply considering the opposing voices as extra costs, may found taking the step is still controversial, since every participant in this game take risk, including the government during policy making.

# Conclusion and further discussion

Organized as several responses to the research questions, the chapters of empirical analysis mainly discussed about the emergence of innovation system in Hong Kong, its actors and functioning mechanism, and attempted to put the decision making process into the general equilibrium framework.

Viewing from three perspectives of innovation system, Hong Kong already had the elements enough for constructing an integrated innovation system, no matter seen from quasi- or sub-national, regional or sectoral level. Regional cooperation between Hong Kong and Pearl River Delta in mainland China is becoming stronger and contributing to the development of innovation system seen from spatial context. Meanwhile, with a background inherited from the focuses of economic field, the innovation system in Hong Kong also shows a particular stress on the sectors covering competitive industries.

The late emergence of a systematic picture in the innovation field is being remedied by effective policy implementation and various types of support. Facing challenges and opportunities, the innovation system in Hong Kong fostered by new organizations and institutional arrangements, has grown from just a not essential policy instrument to a vital economic driving power.

Many active participants take part in the system. To show the dynamic actors and their interactions within Hong Kong’s innovation system, the model of Triple Helix provides a way not only to identify, but also to emphasis the overlapping relationships among participants. Academia, mainly the universities, industries and government in Hong Kong have formed a well interacting structure.

The agglomeration of necessary elements, together with government’s efforts to stimulate the innovation system development takes effect. At the first step, it is most likely to be a government-led, or to say imposed institutional change. But the need from firms and other agencies for being competitive during the past Asian financial crisis is a paring prerequisite for the emergence and growing of the innovation system. And it is not contradictory to the free market there, since economy can hardly go on without institutional arrangements. The comparison of costs and benefits before a decision making process under general equilibrium could explain most of the behavior of different agents including government and the firms. A wider setting should also be taking into consideration since it influences the cost and benefit. To the Hong Kong case, the wider background includes the political tradition of positive non-intervention, and the fact that Hong Kong economy takes advantages historically and nowadays to be competitive. Today, the option turns to technology, knowledge and innovation. However, the thesis did not go deep into the discussion whether learning by doing or “learning by imitating” was crucial and more needed in Hong Kong historically.

For future development, the innovation system emerged in Hong Kong are facing some crucial challenges, including the need to be internally effective for the system improvement with more clear policy intention, experienced policy makers and more investment. Also the integration with mainland China need to be strengthen, coming up with knowledge transfer, human capital flow and other kinds of cooperation and resources sharing. Again internally, various intuitional measures need to be coordinated on the existing platform.

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