

**WEARING FOUR HATS: THE ROLE OF LOCAL GOVERNMENT IN THE  
MAKING OF PLANNED INNOVATION PARKS IN CHINA**

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## **Abstract**

Building innovation parks has been adopted by many governments to promote regional innovation capability and economic growth. Due to the decisive role of Chinese government and the special innovation park governing system, it is the local government has the practical power over the development of planned innovation parks. In order to explore how the local government leads the development of planned innovation parks, this thesis adopted three research routes to guide through the research: 1) use a life cycle perspective to explore the evolving roles of local governments; 2) use a method of classifying government policies and strategies into “hard” and “soft” to describe the actions of local governments; 3) use a demand-and-supply perspective to illustrate and evaluate the function of local governments. The local government acts as a developer, an enticer, a facilitator, and a regulator in the park development process.

## **Preface**

This thesis is original, unpublished and independent work by the author, Qianhui Bai. The fieldwork conducted for this study was approved by Office of Research Ethics, University of Lethbridge [protocol #2016-038; project title: Wearing four hats: the role of local government in the making of planned innovation parks in China].

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## List of acronyms

AURP	Association of University Research Park
BOC	Bank of China
CHIDZ	Chengdu High-tech Industrial Development Zone
CMBC	China Merchants Bank of China
FIP	Future Innovation Park
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HSIP	Hsinchu Science-based Industrial Park
HEI	Higher Education Institution
HR	Human Resource
IASP	International Association of Science Park
ITRI	Industrial Technology Research Institution
IT	Information Technology
ICT	Information and Communication Technology
IPIF	Internet Plus Industrial Fund
IPVCF	Internet Plus Venture Capital Fund
IP	Intellectual Property
LIS	Local Innovation System
MOST	Ministry of Science and Technology
NSP	New Software Park
NSPII	The Second Project of New Software Park
OVSP	Optics Valley Software Park
OECD	Organization for Economic Cooperation and Development

OVRRP	Optics Valley Returnee Recruitment Program
OPAC	Optics Valley Administrative Committee
R&D	Research and Development
SMEs	Small- and Medium-sized Enterprises
S&T	Science and Technology
SASAC	State-owned Assets Supervision and Administration Commission
TFP	Tianfu Software Park
WWII	World War II
WELHDZ	Wuhan East Lake High-tech Development Zone
YIPDC	Yida Industrial Park Development Company
ZSP	Zhongguancun Science Park
ZHP	Zhangjiang High-tech Park

# **1 Introduction**

## **1.1 Background**

For industrial latecomers such as East Asia countries, innovation is often deemed as the key for economic catching-up. Policy makers in China are eager to promote the role of innovation in the country's economic development so that the Chinese labor-intensive economy will eventually be transformed into a knowledge-intensive one that is less dependent on external markets (Wu, 2011).

There is a long history of developing innovative clusters. In recent times, the well-known clusters of high-tech firms, such as Silicon Valley in California, Route 128 Technology Corridor in Boston, and Sophia Antipolis in France, have become greatly reputed worldwide, and they are routinely referred as the role models for promoting innovation, commercialisation of research findings, and economic growth. Governments and community leaders at every level have long been fascinated by the question of how to grow a successful innovation-based cluster.

In the western literature on the genesis, growth, and driving force of innovation-based cluster, the consensus is that their initiatives and dynamics depend primarily on the factors such as entrepreneurship, informal business relationships and universities, while government policy and intervention are of secondary importance (Felsenstein, 1994; Saxenian, 1978, 1996; Sturgeon, 2000; Sutherland, 2005). However, Chinese innovation parks are quite different from the innovative clusters typically found in the West due to their unique features (Miao, 2013). First, the development of innovation parks in China have all adopted a top-down genesis mode. The parks are cultivated by levels of governments. This feature makes Chinese innovation parks lacking spontaneity and dynamics observed in the West. Second, China is an emerging economy undergoing a

profound economic and institutional transformation that affects the power adjustment and resource reallocation in different places. As a result, the characteristics of innovation parks might vary across different localities. Considering particularities of China's innovation parks, it is imperative to study government policies and interventions in their development.

Since the 1990s, a number of exemplary high-tech industrial zones have been developed by the governments, leading to the springing up of planned innovation parks in China (Zhao, Watanabe, & Griffy-Brown, 2009). From proposing an innovation park plan to the eventual operation of the park, levels of governments in China are deeply involved in almost every stage of innovation park development. At the national level, the state council initiates the projects of national-level innovation parks. At the local level, state-owned development companies take charge of the park construction. Innovation park administrative committees are organized at the local level and are responsible for daily park management. Due to the heavy involvement of governments, planned innovation parks in China are often questioned about their true innovation capability and economic efficiency (Fan & Scott, 2003).

Selecting a favourable geographic location close to a university or building abundant office space to accommodate companies might be a common approach to build an innovation park. However, is there an "innovation park formula" that Chinese government is following or can follow? Although different local governments in China could use strong incentives to attract private sectors and create geographical proximity of the innovation contributors in innovation parks, whether these government interventions can foster the needed synergies (Löfsten & Lindelöf, 2003) is a question for debate.

## **1.2 Research Objectives**

The purpose of this study is to explore how do local governments in China develop innovation parks from scratch. Towards this end, two objectives are identified:

- 1) To document the innovation policies, strategies and government program apparatus and explain how these institutional resources have been deployed in facilitating the growth of innovation parks;
- 2) To explore the actions taken by local government and the reflection of innovative firms towards these government actions in the planning and development of innovation parks.

In achieving the two objectives, three case studies, Tianfu Software Park (TSP) in Chengdu, Optics Valley Software Park (OVSP) and Future Innovation Park (FIP) in Wuhan are selected to examine the development modes and growth trajectories of innovation parks in China from the standpoint of the roles of local government using a qualitative research method.

### **1.3 Organization of thesis**

This thesis consists of five chapters. This introduction summarizes the topic, background, research objectives as well as the organization of the thesis. This is followed by a literature review chapter that identifies concepts, theories, and empirical studies of innovation parks around the world. Chapter three describes the research methodology that introduces the study area, data sampling, data collection and research approaches of this study. Chapter four consists of the results from empirical case studies which demonstrate the roles of local government in innovation park development. A discussion on implication, limitations, and future research directions concludes this thesis.

## **2 Development of innovation parks**

### **2.1 Defining innovation parks**

The development of science parks is a worldwide phenomenon. However, the definition of science parks is hard to reach a global consensus. That is because their institutional and spatial forms and growth trajectories vary significantly across nations and regions (Castell & Hall, 1994; Braunerhjelm & Feldman, 2006). For example, the term, “science park”, is commonly used in the UK, but “technopole” is used in France, “technology park” in Germany, and “research park” in the USA. In China, innovation park (*chuangxin yuanqu*) is the terminology to describe an innovation-based industrial cluster that is different from traditional manufacturing clusters. The distinctions among these terms are not always made and they are often used in an interchangeable way in the literature (European Commission, 2007). To avoid ambiguity and confusion, innovation park is the term adopted in this research.

Innovation parks are not isolated from regional economic development processes. It is argued that they are closely interlinked to the development of regional research-intensive clusters (European Commission, 2007). Innovation parks often consist of local frameworks and supporting infrastructures (Mytelka, 2001). Rosenfeld (2002) said innovation parks are active networks of synergistic organizations that engage with various businesses within particular industries (Rosenfeld, 2002). Cook et al. (2004) argued that innovation parks are embedded in localized innovation systems (LIS) consisting of territorial webs of interconnected political, economic and social relations. Thus, innovation parks in different places have diverse but strong local peculiarity.

In general, there are two types of innovation parks. One is the planned innovation parks that are purposefully designed and developed by governments; the other is the innovation

clusters that are spontaneously emerged. In order to distinguish these two types of innovation park, International Association of Science Park (IASP) emphasized the “managed” character of planned innovation parks when defining them as “organizations managed by specialized professionals, whose main aim is to increase the wealth of its community through promoting the culture of innovation and competitiveness of its associated businesses and knowledge-based institutions” (IASP, 2001). The Association of University Research Parks (AURP) defined planned innovation parks as “property-based ventures with master-planned property and buildings that accommodate private/public research and development facilities, high technology and science-based companies, and support services”. When defining planned innovation parks in China, J.L. Cao, the Deputy Secretary of Ministry of Science and Technology (MOST) in China, added that “the parks should not only be specialised in innovation-based economic activities, they should also serve as a community that is incorporated with socio-cultural context and sufficient numbers of innovative firms” (Cao, 2007). Therefore, in addition to the expected roles of innovation parks, such as being a major base for transforming scientific results, incubating start-ups, and accelerating economic growth by cultivating innovation industry and attracting foreign direct investments (FDI), the innovation park in China is designed also to advance “new communities” of a new era, featuring both material and cultural prosperity. Accordingly, in this research, planned innovation parks are the professionally planned and managed regional research-intensive clusters that consist of spatially concentrated networks while severing as communities for business, innovation and cultural advancement.



## **2.2 Typology and lifecycle of innovation parks**

### **2.2.1 A typology of innovation parks**

According to the literature (for example, United Nation, 2009; Miao, 2013; European Commission, 2007; Matthias, 1986; Zou & Zhao, 2014), four types of innovation park development modes can be identified: they are market-led innovation parks, university-led innovation parks, government-led innovation parks, and hybrid innovation parks.

The market-led innovation parks are associated with a bottom-up development process. They often start from a few regional stakeholders who wish to address business need or opportunity through sharing knowledge and experiences in informal networks of innovation contributors. In this mode, instead of governments, leading individuals, leading firms, technology exchange among firms and higher education institutions play important roles in the emergence and growth of innovation parks. The “ancestor” of the “park phenomenon”—Silicon Valley is an example of market-led mode. The predecessor of Silicon Valley was Stanford Industrial Park which took shape mainly through the endeavor of entrepreneurs and endogenous companies (see Casteel & Hall, 1994; Leslie & Kargon, 1996; Saxenian, 1994, 2000). In the research of Luger and Golstein (1991), they concluded that the main incentive to promote the growth of the valley is the demand from the private sector instead of being led by a plan or by governments. The role of federal government in promoting the valley’s development was to increase the market demand by providing large amount of federal funding and federal procurement on aircraft and electronic technologies during WWII when the United State was badly in need of the development of aerospace and semiconductor industries (Castells & Hall, 1994).

The university-led innovation parks are the planned development of high-technology companies in an attractive physical environment with close links to a university (Matthias,

1986). Universities anticipate expanding their funding resources through enhancing collaboration with companies, while companies seek technical supports from universities to increase their innovation capacity. As the linkages among universities and industries become stronger, universities start to establish university-based science parks to host university-affiliated companies, commercialize R&D findings, and incubate start-ups (Zou & Zhao, 2014). Cornell Business & Technology Park and Research Triangle Park are examples of university-led mode (Link & Scott, 2003, 2006, 2007).

The government-led innovation parks are the regional research-intensive clusters that are initiated, planned and managed by governments. The function of governments is to bring innovation contributors together by choosing preferential locations to establish the parks, offering attractive policies, implementing strategies to enhance the cooperation between research and industries, and providing well-equipped infrastructures. Hsinchu Science-based Industrial Park (HSIP) in Taiwan is considered as an example of government-led mode. The National Science Council provided the original impetus for planning and constructing the park to managing park operation. Levels of governments played a significant role in the development of HSIP by offering financial preferential policies and establishing the Industrial Technology Research Institute (ITRI) in the park (Shih & Wang, 2010; Tung, 2001).

The hybrid innovation parks follow the development mode focusing on a horizontal interaction between market, universities, and governments. In this mode, in order to generate a functioning LIS, the public sector has to accept and assume the role of organizing innovation parks, managing institutional framework, contributing to the marketing and branding, and showing willingness to invest to meet other stakeholders' needs. The private sector needs to act as a driving force for the market expansion by introducing new

innovative products or services into a wider range of markets while maintaining positive cooperation and competition relationships in the park. Other stakeholders, such as intermediaries and universities, need to become enablers who provide facilities and added-value services required by private and public sectors. The development of Cambridge Science Park is an example of hybrid mode. The government intervention occurred in the late 19<sup>th</sup> century. The efforts of government, Cambridge University, and local entrepreneurial culture collectively resulted in the slow take-off of the Cambridge Science Park (see Segal Quince Wicksteed, 1985, Castell & Hall, 1994; Keopp, 2002).

### **2.2.2 A life cycle perspective towards planned innovation parks**

It can be argued that innovation parks experience a series of development stages that resemble industrial cluster life cycles. Typically, a cluster's life cycle is believed to consist of five main stages—emergence or birth, growth, maturity and decline or even “death” (for example, Rosenfeld, 2002; Martin & Sunley, 2011). The start of a spontaneously emerged innovation park can be slow and less noticeable in the early stage. However, planned innovation parks in China are primarily parts of government-planned urban development projects, which make the life cycle of China's innovation parks distinct from spontaneously emerged innovation parks. According to the literature (for example, Luo & Song, 2007; Andersson et al., 2004; United Nation, 2009), the life cycle of planned innovation parks in this research are divided into four stages: 1) plan and construction stage or “pre-development” stage; 2) start-up stage; 3) growth stage; and 4) maturity stage.

The pre-development stage encompasses the initial planning and agreement from different stakeholders, and the acquisition of sufficient funds to commencing the construction of innovation parks. These components can be termed as *soft* requirements and *hard* requirements (Qian, 2014). The levels of governments are responsible for multiple

planning, land supply and development, financial supply chain and infrastructure construction.

When the lifecycle of planned innovation parks enters the start-up stage, the parks are in urgent need of a large number of companies to locate in the park so that the parks can start to operate and generate revenue. However, newly opened planned innovation parks in China are usually located in the peripheral areas of cities which poses an obstacle to investment attraction. Under these circumstances, governments are required to put substantial efforts into attracting companies, investment capital and skilled talent. To do so they use a range of promotional policies which are usually related to financial incentives. These investment attraction policies can be categorized as *hard* supports provided by the governments (Brenner & Schlump, 2011).

In the growth stage, planned innovation parks enter a dynamic but stable phase (Luo & Song, 2007). This stage can be viewed as a turning point for planned innovation parks as it will lay a solid foundation for the parks' further development. Innovative companies at this stage start to require a *soft* environment, such as institutional thickness, a vibrant entrepreneurial environment and innovation milieu within their parks (Brenner & Schlump, 2011). Therefore, facilitating the *soft* environment becomes a responsibility of government agencies.

Although planned innovation parks are the fruit of government planning, their success is very much subject to market competition. In the maturity stage, tenant companies long for competitive, fair and impartial business environments, which can be collectively referred to as *soft* environment (Li, 2004). Therefore, in order to maintain the *soft* environment, the role of governments in promoting the parks evolve again

It is worth noting that there is no clear-cut boundary between the growth stage and the maturity stage. Government agencies often provide the supports required by planned innovation parks in both stages at the same time as parks mature.

The above discussion indicates that the primary demands of innovation parks and tenant companies evolve from requiring *hard* supports in the beginning to requiring *soft* supports in the later lifecycle stages. The first proposition is that the role of Chinese local governments in building and cultivating planned innovation parks is constantly evolving along the growth process of the parks due to the changing requirements from the parks.

### **2.3 Theorizing innovative park development**

Building innovation parks is a way to put together the elements that promote the growth of innovative firms in a designated location. The hope being that the geographical proximity of the innovation contributors could spark interactive learnings in the parks, facilitate the growth of regional economy and build innovation capacity over time. The success of innovation parks is, however, shaped by numerous factors beyond geographical proximity.

#### **2.3.1 Financing innovation parks**

Strong financial value chain is essential to cluster development (European Commission, 2007). The development of planned innovation parks requires support from a variety of financial institutions including angel investors, equity investment firms, venture capital firms, military or other public procurement and government funding programs (Auerswald & Branscomb, 2003). Innovation industries are often associated with high risk. The financial resources from public sources could be significant in nurturing the initial growth of innovation. For example, the initial success of Silicon Valley area began with a large amount of federal funding that was devoted to the area for research and development on aircraft and electronic technologies during WWII when the United State was in badly need

of the development of aerospace and semiconductor industries (Castells & Hall, 1994). In the development of Ottawa Innovation Park, the federal government also acted as a demanding procurement customer to encourage multinationals to establish R&D and manufacture facilities in the area (Singh, 2003).

Venture capital represents another significant source to finance high-risk innovation activities. The proximity of venture capital firms to innovation parks is important in two ways. First, venture capital plays a critical role in promoting technological and business innovation by providing fund, resources, as well as helping organize start-ups and innovative SMEs (Florida & Kenney, 1988; Firdsteel, 2013). Second, venture capital networks are personalized, informal and localized (Florida & Kenney, 1988). Companies located in close proximity to the sources of venture capital have a higher probability of taking the initiative to contact those investors than do companies in distant regions (Fritsch & Schilder, 2008). Therefore, the presence of venture capital firms can help other companies to cluster in innovation parks. For example, venture capital firms serve as a key ingredient of Silicon Valley's development. The reinvestment made by the first wave of entrepreneurs into the next generation of entrepreneurs triggered the formation of self-support system of finance in Silicon Valley (Castells & Hall, 1994).

Based on above discussion, the second proposition is that the success of planned innovation park depends on whether local governments could build and cultivate a financial supply chain in the park by contributing to the formation of private investment chain, in addition to providing direct funding by governments.

### **2.3.2 Anchor companies and entrepreneurs**

Anchor companies are usually the first and the leading tenants in an innovation park whose prestige and name recognition attracts other tenants, and thus they play a key role in the

growth of an innovation park (Wasim, 2014). For example, the substantial growth of the number of tenant companies in Research Triangle in North Carolina in 1965 was because of the launch of a new IBM R&D facility and the vast investment from the government to National Environmental Health Science Center in the park (Link & Scott, 2003). Bangalore Software Cluster in India is another case showing how governments use anchor companies to promote innovation park development. The introduction of Indian Institute of Science and Hindustan Aircraft Ltd. were two government actions that provided the initial stimuli for the cluster (Basant, 2006; 2008).

When entrepreneurs are in the process of furthering their individual interests, they could shape local environments by building institutions to further the interest of emerging industry. Many researchers (for example Rosenfeld, 2002; Feldman et al., 2005; Feldman & Francis, 2006) stated that entrepreneurs and entrepreneurial capacity are critical elements and agents for the emergence and expansion of innovation park, local environment, and regional economic growth because they are able to create, attract and organize necessary resources, such as investments, social capital, skilled labour, and institutions to support their ventures. For example, one of the driving forces behind the success of Bangalore cluster is the entrepreneurship that is brought by overseas returnees who have substantial close relationships with other leading IT centers in the world, facilitating the knowledge circulation within the cluster (Van Djik, 2003).

Based on the above discussion, the third proposition is that local governments can also utilize the influence of anchor companies and entrepreneurs to promote the development of government planned innovation parks.

### **2.3.3 Higher education institutes and research-industry linkage**

Innovation parks are always directly or indirectly associated with the education sector through universities or research institutes. The presence of higher education institutes is one of the factors that influence the development of innovation parks for three reasons. First, higher education institutes supply and draw on professional talents to a region. They also serve as the principal source of scientific findings that nearby firms can use (Wallsten, 2000; Yusuf & Nabeshima, 2007). Second, knowledge spillovers derived from higher education institutes are highly localized, therefore, being proximate to a higher education institute is an asset for companies (Adam, 2001; Fu, 2007; Keller, 2002). Third, higher education institutes have the potential to serve as nodes for entrepreneurship and science-industry interplay (Andersson, Schwaag-Serger, Sorvik, & Wise, 2004). For example, the dedication from Stanford University and its entrepreneurial professors has helped to cultivate a vibrant business atmosphere and industry-university networks that laid a solid foundation for Silicon Valley development.

Building relationships between higher education institutes and private sectors have been taken as a measure by governments to promote innovation park development. Ottawa Innovation Park is a typical example of how government uses research institutes to promote innovation park development. First, the Canada government allocated unprecedented federal R&D spending to the area which stimulates the early emergence of telecommunication cluster in Ottawa Innovation Park (Mallet, 2015). Second, the Canada government promoted the development of Ottawa Innovation Park by providing billions of federal R&D investment to facilitating rapid growth of public scientific research labs after WWII, including the National Research Council, the Defence Research Establishment, the Communication Research Center, and the Atomic Energy of Canada Laboratory (Mallet,



2015). These government-initiated research advantages further contributed to the flourish of Ottawa Innovation Park by attracting multinational firms such as Computing Devices of Canada, Leigh Instruments and the relocation of Northern Electric's two R&D bases (Doyle, 2000). As a result, Ottawa Innovation Park was even growing faster than Silicon Valley in California in 1990s (Singh, 2003).

Based on above discussion, the fourth proposition is that local governments can also act as an intermediary agent for R&D commercialization to promote the development of government planned innovation parks in addition to acting as a bridge between HEIs and industries directly.

#### **2.3.4 Innovation milieu and institutional thickness**

Business environment is a broad term that includes regulation and legal environment, physical infrastructure, taxation structure, competition laws, markets, and skills (Porter, 1990). It is critical to the performance of innovation parks (Ketels, 2003; Porter, 1998; Landabaso, 2001, Rosenfeld, 2002). Innovation parks are characterized by networks of interdependent firms, knowledge-producing institutions, bridging institutions and customers, linked in a value-adding production chain (OECD, 2004). The networks allow rapid learning between small companies. Inter-firm collaboration within networks is now by far the most important channel of knowledge and resource exchange in innovation parks (Rosenfeld, 2002; Liefner et al., 2006; Enright, 2001; OECD, 2004). The business environment and the networks collectively make up the innovation milieu and institutional thickness required by innovation parks (see Camagni, 1995; Yun & Lee, 2013; Kocak & Can, 2014).

In a study of Silicon Valley, Saxenian (1994) stated that the environment of creativity and idea exchange generated by networking of alliances among professionals, suppliers,

and competitors are the driving force of the development of Silicon Valley (Saxenian, 1994). In addition, the social networks, supporting service activities and spin-offs derived from Stanford University and industry leaders, such as *Fairchild Semiconductor*, constitute the institutional thickness and innovation milieu which are the ultimate engine in Silicon Valley (Castell & Hall, 1994).

Based on above discussion, the fifth proposition is that the role of local governments is becoming more complex over time and they need to give more effort in promoting institutional thickness that takes a long time to nurture, in order to cultivate the growth of planned innovation parks so that they can reach self-functioning eventually.

## **2.4 Innovation park development in China**

### **2.4.1 Layered governments with differentiated roles**

In China, the innovation parks are promoted by governments as vehicles of innovation improvement and regional development (Tan, 2006). They are recognized as important elements of national and sub-national economic development and industrial policies (Zeng, Liefner, & Si, 2011). The architecture of the current Chinese government in monitoring innovation parks is multi-layered.

The State Council is the highest-ranking policy-making body in China and has the ultimate decision-making power for S&T and innovation policy (OECD, 2009). In 1988, in order to promote technological capacity and advance economic reform towards a knowledge-based economy, the State Council implemented the Torch Program (Jongwanich, Kohpaiboom, & Yang, 2014). The program aimed at supporting the development of high-tech industries through the establishment of science parks and incubators, funding projects, and promoting human resource training (Jongwanich, Kohpaiboom, & Yang, 2014). Since then, China witnessed the first wave of park

development. However, the growing number of parks was a consequence of the impact from both central and local governments (Table 2-1). At the national level, the role of central government is to identify and implement overall development strategies, and to approve and designate the national level innovation parks in the country. The operation and management powers are distributed to sub-national levels of governments so that they have a great degree of freedom to pursue their own development (Hall & Mark, 2011). Within the sub-national level, the local governments are responsible for controlling the fixed-assets, financing, administration, and infrastructure supply (Miao, 2013). Therefore, the practical power of managing innovation parks is in the hand of local government. Most innovation parks are developed using local financing. Even the national-level innovation parks, such as Zhongguancun Science Park (ZSP) in Beijing, and Zhangjiang High-tech Park (ZHP) in Shanghai are locally administrated and managed by local government-owned companies (Breznitz & Murphree, 2011).

Table 1: Levels of governments and their responsibilities (Source: adapted from Miao, 2013)

Levels of government		Roles of governments
National-level	Central government	Strategy making
Sub-national level	Provincial government	Approve the plans from local government; comprehensive planning
	Municipal government	Approve the plans from local government; controlled planning
	Local government (district government or park administrative committee)	Detailed planning; financing; construction; tax collection; administration; attract investment

## 2.4.2 An overview of innovation park development in China

Establishing innovation parks are the major ingredients of the Torch Program (Hu, 2007) which is considered as one of the many economic reform experiments. The first innovation park in China is Zhongguancun Science Park (ZSP) in Beijing, which was approved by the Chinese State Council in 1988 (Tan, 2006; Zhang & Sonobe, 2011). Since then, sub-national officials have undertaken the task of establishing innovation parks. By 2017, a total number of 157 national-level innovation parks have been established at different locations throughout China (MOST, 2017) (Table 2-2). In the meantime, a large number of sub-national level innovation parks have also been established by different local governments (Hu, 2007), each of which operates in its own way (Breznitz & Murphree, 2011).

Table 2: A list of national innovation parks in China (Source: adapted from MOST, 2017)

Year	Number of approved innovation parks in that year	Total number of innovation parks
1988	1	1
1991	26	27
1992	26	53
1997	1	54
2007	1	55
2009	2	57
2010	26	83
2011	5	88
2012	17	105
2014	9	114
2015	16	130

2016	15	145
2017	12	157 (including Suzhou Industrial Park)

After the embryotic stage of ZSP (in the early 1980s), levels of governments became more decisively involved in the development of innovation parks (Cao, 2004). The semi-spontaneously formed ZSP started when a company’s entrepreneurs and researchers worked together to decide on strategy and direction (Tan, 2006; Miao, 2013; Cao, 2004). Later on, Zhongguancun Electronic Street (the predecessor of ZSP) was promoted by local government (in the climate of national political-economic reforms) by providing initial funds and free offices to companies. In 1988, ZSP was finally recognized and established by the government (Tan, 2006). Beijing Experimental Zone administrative committee was established by the government to directly manage ZSP.

Zhangjiang High-tech Park (ZHP) in Shanghai is another example that illustrates government decisive role in park development. It was clearly planned, constructed and managed by the government by establishing the government-owned Zhangjiang Enterprise (Lai & Shyu, 2005; Shen & Xu, 2009). In order to promote the development of ZHP, municipal government implemented a series of strategies, including providing one-stop service, tax holidays, training activities for tenants, offering venture capital, special funds for entrepreneurs, and supporting R&D integration (Lai & Shyu, 2005). Until now, levels of governments implemented 70 policies to stimulate the development of ZHP.

Levels of governments have been using a complex and multi-layered policy pack to promote innovation park development. For example, national policies are set to govern “things like the educational composition of the workforce and investment in R&D”

(Breznitz & Murphree, 2011, pp 78), while provincial, municipal, and local policies are set to accomplish local goals of employment creation, GDP growth, and support non-cutting-edge companies who are not eligible to receive national benefits (Breznitz & Murphree, 2011).

## **2.5 Conclusions**

It is believed that co-located innovation contributors could form a “learning region” (Boekema et al., 2000; Oinas, 2000) which increases regional innovation capacity through producing and transmitting tacit knowledge (Gertler, 2003). Therefore, governments try to emulate the successful local innovation system by purposively making the innovation contributors co-locate in government planned innovation parks. Except for geographical proximity, there are four other forms of proximities which are even more important to the production and share of tacit knowledge in innovation parks, they are social, organizational, institutional, and cognitive proximity (see Amin and Cohendet, 1999, 2000; Zysman, 1994; Boschma, 2005). Interactive learning and knowledge spillover may be enhanced by geographical proximity because it could reinforce the other dimensions of proximities (Boschma, 2005), in turn, facilitating innovation capacity in the parks.

Many authors claim that the private agents should be the engine of the innovation process due to the crucial role that is played by the private sector in the forming stage of innovation system (Cooke, 2001; Wolfe & Gertler, 2006; Lundvall, 2007). However, in some regions, it might be difficult to depend solely on the private sectors due to the government’s heavy engagement in economic activities. For example, the growth of planned innovation parks in China is underpinned by strong government interventions. In addition to creating geographical proximity, there are multiple factors that Chinese local governments are heavily involved to cultivate a government planned innovation park.

Recent theoretical works on innovation parks mainly cover the developed countries of OECD. There is a lack of empirical evidence of government planned innovation parks outside OECD scope (Bakouros, Mardas, & Varsakelis, 2002). Moreover, most empirical works on Chinese government planned innovation parks are written in Chinese and often consist of the government reports, or newspaper articles. The academic literature on planned innovation parks is limited and most of the literature on government planned innovation parks mainly focuses on eastern China. Local governments in China are the major players in building and cultivating the government planned innovation parks. Their roles vary significantly across different localities. This research adopts three research routes to study the roles of local governments in the development of planned innovation parks in non-eastern regions of China: 1) use a life cycle perspective to explore the evolving roles of local governments; 2) use a method of classifying government policies and strategies into *hard* and *soft* environments to describe the actual actions of local governments; 3) use a demand-and-supply perspective to illustrate and evaluate the function of local governments.

### **3 Methods and data**

The main goal of this research is to explore and depict the roles of governments, especially what are the actual actions taken by different local governments, in the development process of planned innovation parks. To accomplish this goal, an exploratory and inductive approach is adopted for this study (Glaeser & Strauss, 2006; Liamputtong, 2013). Given the explorative nature of this research, thematic analysis and grounded theory are the primary data analysis methods (Charmaz, 2006 and 2014; Breckenridge et al., 2012).

#### **3.1 Study area**

Three innovation parks in this research are located in two administrative districts. Tianfu Software Park (TSP) is situated in Chengdu High-tech Industrial Development Zone (HIDZ) in Chengdu City, Sichuan Province. Optics Valley Software Park (OVSP) and Future Innovation Park of Wuhan (FIP) are located in East Lake High-tech Development Zone, also known as Optics Valley, in Wuhan City, Hubei Province. While each innovation park has a park-level administrative committee, the committee is appointed by and reports directly to a development zone government, which is referred to as local governments, i.e., HIDZ and Optics Valley governments, in this study.

The establishment of HIDZ and Optics Valley began in 1988. Each was approved as national-level high-tech zones by the State Council in 1991 (MOST, 2001). In 2008, HIDZ and Optics Valley were classified as “first-class high-tech development zones” (MOST, 2016). Based on the “Assessment Criteria System of National Science and Technology Industrial Zone”, HIDZ and Optics Valley have always been ranked in the top ten of all national high-tech industrial development zones (Tongji Development Institute, 2014). In the 2015 assessment report, HIDZ was ranked third among the 116 national high-tech development zones. Optics Valley was in the eighth place (Bureau of Development of



CHIDZ, 2017). The two high-tech development zones are therefore considered as successful cases by the state government. Since their establishment, HIDZ and Optics Valley both contribute significantly to the economic growth of the respective cities (DSTSP, 2012; SBW, 2016).

The first studied case is FIP. It is located in the Longshan area which is a peripheral area of Optics Valley. The construction of FIP started from October 2010 and it was recognized as one of the four future cities in China by the State-owned Assets Supervision and Administration Commission (SASAC) of the State Council in 2011. Its establishment is to attract talents, innovative firms and research institutions with a focus on optoelectronics information, biomedical industry, new energy, environment protection, precision instrument manufacturing and high-tech service industries. Since its inception, FIP has attracted over 100 major projects from 12 Fortune 500 companies, 18 state-owned companies, and 8 industrial technology research institutes. Further, it has been regarded as a talent base by the local government to implement some important talent programs, such as Thousands Talent Program, Hundred Talent Program, and 3351 Talent Program of Optics Valley (Administrative Committee of FIP, 2017).

OVSP was established in 2000, and it was the first government-planned innovation park in Optics Valley (AAI, 2009). Until now, OVSP has attracted over 110 companies, including 85 local companies, 25 nonlocal companies, and 6 Fortune 500 companies. It also host several major financial back-offices and high-tech service companies, such as China Merchants Bank of China (CMBC) and Bank of China (BOC) (OVSP, 2017). After 17 years of development, OVSP has become the largest software industrial park in Midwestern China.

The last studied case is TSP which is located in the southern part of HIDZ. It is one of the earliest software industrial bases in China and is considered as the “hotbed” of software industry of Chengdu. In addition to software industry, the industrial orientation of TSP also includes IC design, IT, big data, and high-tech service industry. TSP is developed and managed by the government-owned *Chengdu High-tech Investment Company*, representing local district government. The core area of TSP was put into operation in 2005, since then, the park has attracted IBM, SAP, EMC, Philips, Siemens, Dell, Alibaba, Tencent and 600 other well-known companies (TFSP Administrative Committee, 2017).

The selection of these planned innovation parks is for the following reasons (Table 3). First, they are in different lifecycle stages. OVSP and TSP are in the same phase of transforming from growth stage to maturity stage, while FIP is still between start-up stage and growth stage. Second, they represent different industrial positioning. Comparing to OVSP and TSP, FIP has much broader industrial development scope (Administrative Committee of FIP, 2017). As such, they receive different levels of industrial supports from governments. Last, from a hierarchical perspective of innovation parks, FIP is a higher-level innovation park than TSP and OVSP because it is one of the four Future Cities approved by the SASAC of the State Council. These three cases are, therefore, conducive to the unveiling of the roles played by the local governments in the development of innovation parks in different regions and life cycle stages.

Table 3: Three study cases

Name of the park	Location	Year of opening	Life cycle stage	Industrial positioning	Innovation park hierarchy

Future Innovation Park	Optics Valley	2010	Between start-up stage and growth stage	Optoelectronics information, new energy, biomedical	One of the four Future Cities approved by the State Council
Optics Valley Software Park	Optics Valley	2000	Between growth stage and maturity stage	Software and ICT industries	Financed by local government
Tianfu Software Park	Chengdu High-tech Industrial Development Zone	2005	Between growth stage and maturity stage	Software and ICT industries	Financed by local government

### 3.2 Data collection

The primary method employed in this research is semi-structured key informant interviews. To collect reliable data, purposive sampling (Liamputtong, 2013) was used in data the collection process. Firstly, three initial categories of interviewees were identified, including government officials from innovation park administrative committees, CEOs or managerial staff and general staff from tenant companies. The first key informant, a CEO from a tenant company in TSP, was accessed by using the company's contact information. Then, *snowball sampling* (Liamputtong, 2013) was employed to approach other key informants.

The quality of qualitative research depends largely on whether the sample provides enough data to respond to research objectives thoroughly. This is the standard for data quality more so than the actual sample size itself (Mason, 2002). Data saturation will be reached when few new unique data are being generated from each additional data source (Bowen, 2008; Padgett, 2008; Bryman, 2012). During the field research, it was found that data saturation was reached after 19 in-depth interviews were conducted. Those interviewed included five government officials, seven CEOs, one company manager, and five general staff members from tenant companies in three innovation parks as well as one manager from a private park development company. The interviews sought to obtain relevant information about the role of governments in innovation park development (Table 3-1). The in-depth interviews with CEOs, managers, and government officials ranged from one to two hours. The interviews with general staff were shorter and they were ranged from 20 to 30 minutes.

The in-depth interview is an active interaction between the interviewer and the interviewee (Liamputtong, 2013). Pre-designed interview questions (see Appendix A) were loosely followed. Some pre-designed question were either shunned or revised, and extemporaneous questions were added during the interview to “delve into the hidden perceptions” (Marvasti, 2004, p.21). Moreover, research data were also collected from secondary sources in order to validate interview data (Denzin, 1989) and understand park development. Government documents and brochures were collected from government offices during the field work. Relevant government websites and newspaper articles were reviewed and retrieved.

All the interviews were audio-recorded. Every interview was given an ID number with three digits (Table 4). The first digit represents two cities, i.e., Chengdu and Wuhan, the

second digit represents the job of the interviewees, and the last digit represents the participant sequence in the job category. For example, #111 means this participant was the first interviewed CEO in Tianfu Software Park in Chengdu. Fifteen secondary data are also imported and coded in NVivo, for example, government documents, government reports retrieved from government websites, and newspaper articles. Every secondary data source was given an ID number with one digit and one letter (Table 5).

Table 4: A list of interview participants

Interviewee ID #	Name of the innovation park	Job title	Date	Location	Length	Note
111	Tianfu Software Park, Chengdu	CEO	05/11/2016	Company meeting room	1 h	Mature SME
112			05/17/2016	Office	1 h 30 min	
113			05/18/2016		1 h	
114			05/19/2016		1 h 35 min	
121		Technician	05/17/2016	Office	25 min	
122				Rest area in the park	20 min	
123						
124						
131		Government official	05/11/2016	Meeting room	30 min	Talent solution department

132			05/18/2016	Office	1 h	Company service department
211	Future Innovation Park of Wuhan, Wuhan	Manager	05/24/2016	Meeting room	1 h 40 min	
212	Optics Valley	CEO	06/19/2016	Office	1h 30 min	Mature SME
213	Software Park, Wuhan		06/21/2016		1 h	
221		Technician	06/16/2016			Interviewed through online chatting
231	Future Innovation Park of Wuhan, Wuhan		06/26/2016	Meeting room	1 h 15 min	Park promotion department
232		Government official	06/15/2016		1 h 20 min	Park management department
233	Optics Valley Software Park, Wuhan		06/22/2016		1 h	Internet Plus Office
			06/14/2016			Former government official from

234				Office	1 h 20 min	a government incubator in Optic Valley
241	Optics Valley, Wuhan	Manager from private park development company	06/16/2016		1 h	Participated the development of two parks in Optics Valley

Table 5: A list of secondary data

Document ID #	District	Name of the data	Type of the data	Source
1A	High-Tech	Get to know TSP	Article on website	Official website of TSP
1B	Industrial Development Zone. Chengdu	Talent services in TSP		
2A		Policies of attracting investment in ELHDZ	Government document	Official website of ELHDZ
2B		<i>Ten Gold Policies</i>		
2C		Policies to promote S&T finance innovation		
2D		Policies of the <i>City Partner Program</i> in Wuhan		
2E		Interim procedures of the <i>3551 Program</i> in the Optics Valley		Official website of the 3551 Program

2F	East Lake High-Tech Development Zone, Wuhan	Policies to promote the development of <i>Internet Plus</i> in the Optics Valley		Internet Plus Office
2G		History of the Optics Valley		Official website of ELHDZ
2H		Achievements of the <i>Ten Gold Policies</i> in the Optics Valley	Government report	Official website of MOST
2I		<i>Wuhan Remote Sensing and Spatial Information Industrial Research Institute</i> in the FIP		Official website of FIP
2J		Interpretation of the <i>Ten Gold Policies</i> in the Optics Valley		Official website of Hubei province
2K		Achievements of <i>Optics Valley Returnee Recruitment Program</i>	Newspaper article	Official website of ELHDZ
2L		IP protection in the Optics Valley		
2M		How to apply for <i>Innovation Voucher Program</i>	Government announcement	Official website of ELHDZ

### 3.3 Data analysis

Considering the research objectives and exploratory nature of this research, thematic analysis was utilised for data analysis. Thematic analysis is a method that can help researchers with analysing, identifying, and reporting patterns or themes within the data in



order to provide an answer to the research questions being addressed (Braun & Clarke, 2006). Eventually, a theoretical framework will be derived from the data analysis based on the overarching grounded theory method. NVivo 11 was used in data analysis process. NVivo 11 is a commonly used qualitative research software. It helps qualitative researchers organize, analyze and find insights from qualitative data, such as interviews, documents, articles, and web content.

Data analysis started with transcribing the interview audio materials into Chinese text. Self-transcribing the interview is necessary for getting familiar with the data and having initial ideas. All the interview transcripts and secondary data were imported into NVivo 11. Then, coding of the data was done, which is the foremost and essential step in thematic analysis (Liamputtong, 2013). This is because codes, categories, and themes will be generated through the coding process. First, in order to obtain as much as initial codes regardless to research objectives, line-by-line open coding was conducted (Braun & Clarke, 2006). A total of 512 initial codes were extracted in this step. Second, axial coding was used to connect and collate initial codes into 45 categories. Because the categories that had been generated thus far were not completely related to the research objectives, redundant categories were eliminated in the next step. A total of 23 categories were selected and refined according to the research objectives. The fourth step was to generate several themes that could systematically and directly respond to the research questions by bringing the categories back to the data again. A total of 10 themes came out of this step. Thematic analysis is a repetitive process that is continually refined. The entire data set is searched back and forth repeatedly.

It was discovered in the data analysis that the roles and working priority of governments are evolving in accordance with the growth trajectory of innovation parks. Hence, a life

cycle perspective was integrated into data analysis to refine the initial themes. Finally, four themes, including government as a “developer”, government as an “enticer”, government as a “facilitator” as well as government as a “regulator”, were generated through a complete data analysis process (Table 5). The next chapter will present and discuss each of these themes in relation to the propositions identified in the previous chapter.

Table 6: Data analysis process and example of codes, categories, and themes

Data analysis process		Examples of codes, categories, and themes	
Thematic analysis	Open coding	1. Import all the interview transcripts and secondary materials into NVivo	
		2. Use line-by-line coding to generate initial codes regardless to research objectives.	<ul style="list-style-type: none"> <li>1. industrial orient or reorient of innovation parks</li> <li>2. bring reputation to the tenant companies</li> <li>3. local environment for SMEs</li> </ul>
	Axial coding	3. Connect and collate initial codes into categories.	<ul style="list-style-type: none"> <li>1. place attachment</li> <li>2. foundation of park development</li> <li>3. different financial resources</li> </ul>
		4. Reorganize the initial categories and eliminate redundant categories according to research objectives.	<ul style="list-style-type: none"> <li>1. company cluster</li> <li>2. service provided by the park</li> <li>3. social networks</li> </ul>
	Theoretical coding	5. Generate the initial themes that directly respond to research questions.	<ul style="list-style-type: none"> <li>1. land provision</li> <li>2. land development</li> <li>3. park construction</li> <li>4. park management</li> <li>5. critical mass in the parks</li> <li>5. demands from private sectors</li> </ul>

			<ul style="list-style-type: none"> <li>6. physical environment</li> <li>7. non-physical environment</li> <li>8. function of incubator</li> <li>9. shared reputation</li> <li>10. market function</li> </ul>
		<p>6. Generate the final themes by integrating a life cycle perspective into data analysis.</p>	<ul style="list-style-type: none"> <li>1. government as a developer</li> <li>2. government as an enticer</li> <li>3. government as a facilitator</li> <li>4. government as a regulator</li> </ul>

## **4 Roles of local government in developing planned innovation parks**

### **4.0 Introduction**

This chapter presents the empirical results of three case studies of planned innovation parks in China according to the three research routes proposed in Chapter 2. The research reveals that the roles of local governments evolve during the life cycle of innovation park development in accordance with varying requirements of the parks at different stages of their development lifecycle. Generally, each local government works first as a *developer* in the pre-development stage, acts as an *enticer* in the start-up stage, performs as a *facilitator* in the growth stage; and serves as a *regulator* in the maturity stage. The following sections will discuss each of these roles that local governments play.

### **4.1 The role of local government as a “developer”**

In the context of urban development, a developer is “a person who invests in and develops the urban or suburban potentialities of real estate, especially by subdividing the land into home sites and then building houses and selling them” (Dictionary.com, Jan. 12, 2018). The role of local governments in such cases is usually confined to urban planning activities. However, in our case studies of innovation park development, it is found the role of local governments goes way beyond the traditional urban planning activities. Local governments are actively involved in site selection, industrial planning, land development and park construction. In a sense, local governments are the primary agency that acts as *developer* shaping the success or failure of innovation parks in China.

#### **4.1.1 Site selection and industrial planning**

In China, the state-level innovation parks are mostly initiated by local governments although such initiation has to be endorsed by the central government. All three of our cases were initiated by the local governments. According to an official at the Optics Valley

Software Park (OVSP) management committee, “The project proposal of establishing Optics Valley Software Park and planning were initiated by Optics Valley district government and appealed to MOST. Then, the project was approved by the central government” (Interview #232, line 98). One of the critical elements in the proposal of innovation park development is the park plan. This plan prescribes the park location, development goals and process, as well as the industrial sector orientation.

The development of innovation parks is often taken by the governments as a tool for Chinese version of urban sprawl (Tian & Ma, 2009). Innovation parks could boost the development of newly opened high-tech development zones. Therefore, the location of newly built innovation parks is often in the remote development zones on the margin of cities when they are first planned. The remote areas are ideal for innovation park projects because they have more available, raw, and low-price land than the core area of the cities. For example, interviewee #232 said that the OVSP was the first government-planned innovation park in Optics Valley in 2000. At that time, Optics Valley was a newly established development zone, the road conditions in the area were poor. There were only dirt roads leading to the location of OVSP. He said that people think of the place as a “remote area” (Interview #232, line 25). Although Optics Valley was a new district in 2000, much of the land had already been built up (Miao, 2013). The construction of this innovation park was confined by the land availability, which is an important factor affecting the location decision. Even though only half of the total land was usable in the Valley, the remote location was still selected as the site for OVSP by the local government in order to accelerate district development. The situation of FIP was quite similar to that of OVSP (Interview #132, line 50).

Industrial planning activities are in the hands of local governments that may or may not involve public or private professional planning agencies. “The local governments have the dictatorial power in deciding the industrial orientation of the parks” according to interviewee #241 (Line 72). Optics Valley has developed eight different high-tech industries, such as ICT, bio-tech, optoelectronics, new energy and environment protection. These are distributed among eight innovation parks by the local government (Interview #232, line 567). Our case studies of OVSP and NSP are both situated in Optics Valley. Their development was planned by Optics Valley district government. The industrial planning of OVSP was made by the local government after a thorough examination of strengths and weaknesses of local industrial capacity and capability. Optics Valley was the new urban district in Wuhan at the time it was established as the first high-tech development zone in Wuhan (WELHDZ, 2017). Compared to other business center districts in Wuhan, while its GDP share in Wuhan is relatively lower, Optics Valley has a greater potential for developing self-innovation software and ICT industry (Qi, 2008). A former official on the Optics Valley management committee (Interviewee #234) said, “A noticeable number of young and innovative companies in software, ICT, and culture and innovative industry had sprouted in, and then scatter around, the Optics Valley area. Besides, the universities are gathering around here which provides an abundant supply of talents.” About 70% of the total internet talents and 80% of the total internet companies in Wuhan are concentrated on Optics Valley (WHIT, 2016). She continued, “The district government noticed the potential for developing self-innovation software and ICT industry in (the) area” (Interview #234, line 123). Therefore, OVSP was planned to specialize in software and ICT industries in order to take advantage of talent resources (Interview #232, line 36). Since its establishment

in 2000 OVSP has become the hot spot for software and ICT SMEs in Optics Valley (Interview #212; Interview #213).

The industrial planning of NSP is somewhat different from what is observed in the case of OVSP. NSP is another software park in Optics Valley. It is located in Huashan area in the periphery of Optics Valley. The ground-breaking of NSP started in 2006. The primary goal of the district government is to develop NSP so as to use NSP as a growth pole to stimulate economic growth of Huashan area. However, Huashan area was primarily an agricultural area. There are no higher education institutions or research institutes nearby. When Optics Valley district government made the industrial planning for NSP, it focused on the technology advantage evident only the central areas of Optics Valley but neglected that it has a poor foundation for the software industry, inadequate software talents, agricultural production tradition, and a lack of urban infrastructure in Huashan area. As a result, after almost ten years of development, there is still few software SMEs in NSP. A CEO of a tenant company in OVSP said, “The facilities around NSP are way too poor and there is very few amenities there, which is a huge obstacle for talent recruitment. We will not move into the park (NSP) without talents” (Interview #212, line 246).

The case of industrial planning of OVSP and NSP in Optics Valley suggest that the success of innovation parks in China are dependent on the proper and practical development plans. Local governments play a decisive role in visioning the future of innovation parks when industrial planning is conducted. The goal, rationality and planning processes of local governments will shape the future success of any innovation parks (Interview # 232; Interview #212).

Investigating and strictly controlling the entry of companies is another strategy taken by the local governments for industrial planning and for insuring the park remains specialized

in a particular industry. For example, the administrative committee of FIP deliberately filters the applications of companies wishing to invest in the park. An official in FIP claimed, “The major industry of this park is optoelectronic and related industries... only the qualified companies in these industries will be permitted to move into the park. Low-end companies with little R&D input are not welcome in the park, even if they can make an immediate contribution to the park’s revenue” (Interview #231, line 233). A manager of a tenant company in FIP corroborated this policy, “The park administrative committee will strictly examine the qualifications of the move-in applications...Almost every tenant company is focusing on optoelectronic and related industries” (Interview #211, line 53, line 77).

#### **4.1.2 Land development and park construction**

Land supply is fundamental to developing an innovation park. According to the Land Use Rights system (established in 1988), the state of China is the owner of all land and thus has the full control over land supply and land use (Tian & Ma, 2009). This characteristic of the Chinese land supply and land use system establishes government as the determinant in the land supply for park development.

There are three different land development modes observed in our case study: they are government development mode, public-private partnership mode, and private development mode. In each of the modes, the roles of local governments are critical in deciding land supply, making or approving construction schemes, undertaking park construction, and selecting private company partners.

Governments’ development mode is that land development of innovation parks is carried out solely by government bodies at the local level. Under this mode, the local governments establish park investment companies to initiate a park development proposal, carry out land



development and execute park construction (Interview #132; Interview #231). Both TSP and FIP follow the government development mode (Interview # 132, line 18; Interview #231, line 154; Doc #1A, page 1). In the case of TSP, the local district government established an investment corporation “*Chengdu high-tech investment real estate company*”. The corporation is solely owned by the local government and it conducted the land development process of TSP (Interview #132, line 17). The state-owned corporations need the financial resources provided by the governments to lead the land development and park construction of TSP and FIP. FIP is supported financially by the central government budget from SASAC as FIP is one of the four national-level Future Innovation Park Projects in China (Interview #231, line 134). On the other hand, TSP is supported financially by the local government budget (Doc #1A, page 1).

Under the public-private partnership mode, since the planning of innovation parks were conducted by governments, the partnership is often initiated by the local government in order to ease the financial pressure which the local government faces in land development and park construction. NSP adopted the public-private partnership mode (Interview #241, line 255; line 14). After the primary land development of NSP was conducted by a government-owned company and exclusively-invested platform company—*Huashan Investment Company* (Interview#241, line70), a private developer—*Yida Industrial Park Development Company (YIPDC)* was invited by the district government to join in the park construction. The deal offered the benefits of preferential land policies. A manager from a private park development company said, “The development of NSP is a win-win game for our company and the government...After the primary land development was finished by the government-owned park investment company, our company was invited by the government to carry out the secondary land development. That was because the government

did not have such a large amount of money to conduct park construction all by itself. This plot should have been priced in the category of ‘commercial land’, but the government gave us the ‘industrial land’ pricing which was substantially lower than ‘commercial land’. This was one of the major reasons bringing us together...And the government (also) allotted us a piece of ‘residential land’ next to the park” (Interview #241, line 70, line 106, Line 199). The development of innovation parks requires tremendous amount of investment. By putting part of the financial and construction responsibility in the hands of private companies, the public-private partnership mode may reduce the financial burden and risk on the local government. Interview #232 commented, “Obviously, this mode lowers the risk to the local governments” (Line 110). This mode was also adopted by the government of Taiwan in developing Hsinchu Technology-Industrial Park (HTP) (Ning, 2002), and the private developers of HTP stood out through a complete marketized bid process. In the most cases in mainland China, however, the private developers are usually selected by the governments for different reasons, such as the brand awareness of the developers, the comprehensive capacity of the developers, or the willingness of the developer to maintain a long-term symbioses with the governments (Interview #241, line 207).

Private development mode is not very common in the land development and park construction associated with innovation parks. It is similar to a real estate development by a private firm (Interview #241, line 97). Upon the approval by the local government, the second project of NSP (NSP II) was proposed, invested and constructed by *YIPDC Inc.* (Interview #241, line 96). Although the private developers are the executors of land development and park construction, the whole process is still under the supervision of local governments, from the planning to the park operation. “Our company has collaborated with the government in constructing NSP, but we have also developed innovation parks

independently. The NSP II, which is across the street to NSP, is fully invested by us...” (Line 96), interviewee #241 said. The innovation park development is large-scale urban planning development. If successfully executed, they can significantly stimulate industrial upgrading and economic growth of the region. Therefore, the local governments are motivated to monitor, supervise and assist the whole park construction process. “(Even though the NSP II is fully financed by us) almost every stage of the park development, from the planning stage to facility construction, is under the supervision of the local government. It also gives us some project amendment suggestions” (Interview #241, line 163).

#### **4.1.3 Provision of infrastructure**

The local governments have the practical power over their hosted innovation parks by controlling the land development, financing, administration, and most importantly, by providing the infrastructure (Miao, 2013). The success of innovation parks relies heavily on the complete infrastructure, including transportation, education, health care and the provision of other general service. This is because the complete infrastructural facility system is one of the primary attractions for companies to locate in the innovation parks (Guy, 1996).

However, in the minds of local governments, “park industrial development comes first; infrastructure and facility development comes after.” The implication of such development mentality often means a slow start of park operation and a lot of difficulties for the parks to attract innovative firms into the parks. For example, five years after the construction of OVSP started, the area of OVSP has really started to change regarding infrastructure and facility development (Miao, 2013). In 2005, in order to promote the development of OVSP and the whole district, the local government made a master plan of Optics Valley, called “*The master planning of new town of S&T in Wuhan*”. According to this master planning,

the local government invested over 19.91 billion RMB in infrastructure construction, building new roads, creating a drainage system, developing a district greening system, establishing district-exclusive power company, and building public hospitals and schools (Doc #2G, page 13). In addition, to accelerating the completion of infrastructure system in the area, the local government used preferential land policies to attract private real estate developers to conduct the development of residential communities, supermarkets, and the Optics Valley Palace. It was not until 2009 that the efforts of local government towards the infrastructure system around OVSP were considered complete. The finished infrastructure substantially promoted the development of OVSP. In 2009, the park was full of tenant companies and started to flourish as the core area of Optics Valley (Interview #232, line 36).

The situation in FIP is similar to OVSP. Three years after the establishment of FIP, the infrastructure system around the park was still very poor. For example, there was only one bus route lead to FIP, one dining hall, one ATM, and one telecom operator office in the park. As a result, in 2013, Huawei was the only tenant company in FIP. Through additional efforts of local government, by 2016, there were established two new bus routes, two new dining-halls, a hotel, several supermarkets residential communities, and other facilities. (Interview #211, line 148, line 158). As the infrastructure system is becoming complete, more tenant companies are moving into FIP, and it is becoming a livable innovation park (Interview #231, line 102).

The preliminary stage can last a long time. However, the government-planned innovation parks often need immediate move-ins by a number of tenant companies to maintain park operation. Therefore, it is necessary for the local government to use strategies to attract

tenant companies and investment to facilitate the next stage of innovation park development.

#### **4.1.4 Summary**

At the pre-development stage, constructing physical space for planned innovation parks is the main task of local governments. Due to the park's requirements for the *hard* supports, such as construction funds, land supply, infrastructure provision, and the *soft* support—that of practical park planning, local governments primarily act as a *developer* to plan and construct the parks from scratch with a thorough consideration of the foundation of the area.

#### **4.2 The role of local government as an “enticer”**

Because innovation parks are initiated and constructed by the local governments, local governments are then responsible for their successes. One of the major tasks for the local governments at the start-up stage of innovation park construction is to entice tenant companies that can boost industrial specialization in the planned industrial fields, recruit talents that can enhance local innovative capability and capacity, and search for financial resources that can continue to support the start-up business in high-tech industries. To achieve such goals, the local governments will set up an administrative committee for each innovation park and act as an “enticer” to conduct these recruitment activities in addition to daily management of innovation parks (Interview #131, line 48; Interview #132, line 21; Interview #231, line 153, line 189, line 200, line 424; Interview #232, line 50, line 95, line 106; Interview #234, line 133).

##### **4.2.1 Enticing anchor companies**

Tenant firms are the main body producing commercial value and have a catalytic effect on the formation of the business environment in the nascent development of the planned innovation parks. While large anchor companies only account for a small portion of the

total number of tenant firms, they play a disproportionately significant role in seeding and upgrading innovation parks because they act as a magnet for other small and medium sized companies and support the projects that improve the business environment (Singh, 2003). A project manager who works in a private innovation park development company said, “...the Optics Valley Software Park truly became prosperous after we helped the park administrative committee attract Huawei, HP and other anchor companies, then the SMEs moved in as followers...” (Interview #241, line 142). An official working in the OVSP administrative committee said the FIP took the same investment attraction strategy, “The industrial development of the FIP is basically centered on Huawei—the most important anchor company in the park. Later on, the innovation-based SMEs or start-ups in related fields followed in its footsteps” (Interview #232, line 63). The words from interviewees confirmed the “attraction effect” of anchor companies in attracting SMEs, which contribute to the formation of innovative company clusters in planned innovation parks. By contributing to financial revenues, anchor companies help to stabilize the early development stage of innovation parks. An official remarked, “It is essential to introduce the large-sized and famous anchor companies to the park at the start-up stage. The development of innovation parks at this stage benefits from the stability of the anchor companies in both production and business operation aspects...Besides, unlike the SMEs with high mobility, once the anchor companies move in, they are unlikely to move out” (Interview #232, line 344). Regarding the importance of anchor companies to the innovation parks at the start-up stage, every innovation park under this research adopts the same company attraction strategy: attract anchor companies first, then SMEs (Interview #231, line 194; Interview #131, line23).

However, newly established planned innovation parks are usually located in the relatively remote, lagging areas of cities due to abundance of low-price land. Local governments also expect the parks to serve as a growth pole driving the economic growth of the area. Hence the development mode of planned innovation parks normally taken by governments is “park development comes first, amenity development comes after” (Interview #232, line 40). This development mode makes the newly established parks less attractive to anchor companies than the built-up area in the cities with well-developed infrastructure, good housing conditions, easy-to-access traffic conditions, as well as plenty of amenities which are necessities for attracting talent. Unlike the growth trajectory of Silicon Valley, which experienced years of development as well as the home-grown tenant companies (Castells & Hall, 1994), the innovation parks in China require rapid formation of sizable company clusters. Besides, it is not easy for anchor companies to relocate unless they are expanding or opening a new market in the area. Therefore, local governments often need to initiate favourable policies to *lure* the anchor companies to move into their parks. Being an “enticer” becomes the priority of the governments at the start-up stage, interviewee #232 (line 339) asserted that “At the start-up stage of OVSP, the government puts a lot of effort into attracting the anchor companies, such as, HP, Huawei and other Fortune 500 companies. And I will say without the effort from the government, the anchor companies would never even have moved in here”.

Then what has been done by the governments to attract anchor companies? First, the governments are changing their bureaucratic attitude and getting down from their pedestals. The park administrative committees proactively initiate potential partnerships with the anchor companies through participating in different industrial conferences and exhibitions (Interview #231, line 200). Sometimes the park administrative committee will turn to

private companies for help due to a shortage of resources and knowledge. A manager in a private park development company said, “We have a long-term symbiosis with the local government who consults us for investment-attraction-related advice and cooperation. The large companies, such as IBM and HP or other Fortune 500 companies in the ICT industry are the prospective tenants (clients) in our customer resource reservoir based on our prior partnerships with them” (Interview #241, line 133).

Second, because the settling down or relocation of anchor companies could be costly, “hard supports” provided by governments will certainly be great incentives for them to move in. For example, the qualified tenant anchor companies will be subsidized by up to 100 million RMB for rewarding their registered capital and offsetting their office costs, as long as they move into the parks (Document #2A, page 1). Tax subsidy is another attraction instrument, which could go up to 50 million RMB for companies with more than 1 million RMB annual revenue (Document #2A, page 1). Rent exemption is also an effective attraction strategy. Interviewee #232 (line 57) said, “In order to attract companies at the start-up stage, all the tenant companies were exempted from paying office rent for three years. Anchor companies like Huawei were even granted a longer rent exemption.” In some cases, the park administrative committee would even grant the anchor companies the right to build their own office building in the park and provide them with lower land prices. An official in the TSP administrative committee said, “In order to retain an anchor company who was planning to move out because the existing office space in the TSP could not meet its requirements, the local district government granted the company a piece of land in the E section in the TFP for the construction of a self-use office building” (Interview #132, line 25). Although this enticement is a rare occurrence, because the design and construction of the office buildings in the park are usually unified, the governments are willing to make an



exception for anchor companies. There are other “hard supports” provided by the governments, such as supporting R&D activities (Interview #211, line 59, line 98; Doc #2J, page 5), supporting equipment purchases (Interview #211, line 485), and setting up industry funds (Interview #231, line 269; Interview #233, line 42, line 155; Interview #234, line 176).

#### **4.2.2 Enticing innovative SMEs**

Despite the importance of anchor companies to innovation parks, the number of employment positions provided by them is limited. It is the small and medium-sized enterprises (SMEs) that provide the major employment opportunities in the parks. Historically, the agglomeration of SMEs is also the foundation of clusters (Schmitz, 1995; Schmitz & Nadiv, 1999). The number of tenant SMEs and their vigour largely influences the development of innovation parks.

In addition to the attraction effect of the anchor companies, the SMEs still need more incentives to draw them into the newly built innovation parks. The location disadvantage of new innovation parks will add to the operation cost of SMEs. Therefore, providing “hard support” to them could be an effective method.

Rent subsidies are commonly-used and well-received strategy to attract SMEs. The rents in the parks are always lower than other places in the same cities. For the entrepreneurs who start their businesses from scratch, their top concern at the start-up stage is cost reduction. Several SME CEOs said, “Obviously, rent-free is the most important factor that attracts us to be here” (Interview #122, line 7); “Rent-free is really appealing to start-ups like us” (Interview #114, line 48). Rent-free is usually applied for the start-ups in on-park incubators. For companies that are larger than start-ups, the park administrative committee only charges them part of the rent. An official in FIP said, “Other than the rent-cut policy

that is the basis of government programs, such as *Hundred Talents Program* and *3551 program*, this administrative committee (of the FIP) also has the autonomy to set up more flexible rents catering to the needs of different promising companies” (Interview #231, line 223). A manager in a tenant company added, “This company takes up 350 m<sup>2</sup> of office space, but we only have to pay for 50 m<sup>2</sup> according to the *3551 program*. The rent is 30 RMB/ m<sup>2</sup> which is much lower than the average rent (50 RMB/m<sup>2</sup>) in Wuhan” (Interview #211, line 79). The TSP also has rent subsidy policies for its tenant companies. “A large number of companies were attracted to the park by the rent-cut policy at the start-up stage of the park, which helps with the initial formation of the company cluster” (Interview #111, line 225). According to the CEO of a tenant company, “The lower rent is one of the major reasons why I was attracted to this place. Companies will be exempted half of the rent for the first three years after the opening year. There is another rent policy, the first year rent-free, that the qualified tenant companies could apply for, but the application was so tedious that only a few companies actually received it” (Interview #111, line 85).

Different rent policies have different practical effects. In the case of NSP, the park administrative committee subsidizes 30 RMB/ m<sup>2</sup> for office rental (with no more than 10 m<sup>2</sup>/person). However, this rent policy was not sufficient to attract SMEs. A CEO said, “I used to have my company located in NSP, but shortly after we moved in, I had my company relocate to OVSP. Because the office space provided by NSP was far beyond our needs as an SME. Even with the government’s rental subsidy we still cannot afford the rent” (Interview #213, line 61). The inefficiency of the rent policy accounts for the small number of tenant SMEs in NSP.

Due to their lack of experiences, labours and resources, SMEs need supports more than rent-cuts. The park administrative committee also provides help and subsidies for business

registration (Interview #114, line 109), legal consultancy (Interview #114, line 264; Interview #234, line 357), financial reporting assistance (Interview #114, line 252; Interview #234, line 357), information exchange (Interview #114, line 65; Line 198), intellectual property registration (Interview #112, line 319), and even psychological counselling (Interview #232, line 480; Interview #112, line 159) at no extra charge. These “hard supports” provided by the governments help tenant SMEs with cost reduction to a large extent.

#### **4.2.3 Enticing the talents**

Intellectual capital is becoming as important as financial capital as the basis for future economic growth (Etzkowitz, 2003). Skilled personnel are the main providers of knowledge and technology that are required by innovative companies to stay competitive in the market. Enticing talent has become an important task for local government. However, with the increasingly fierce competition for talent among assorted cities, the local governments need to take action to prevent brain drain.

Government-led talent recruitment programs are a common measure. According to an official in TSP, “Tianfu Talent Recruiting Program is a job fair tour led by us (the park administrative committee) ...This program has been carried out for nine years. Every March and April, the personnel office will gather over 100 tenant firms to hold a job fair in the first-tier cities, such as Beijing, Shanghai, and Shenzhen ” (Interview #131, line 55). Similarly, the “Optics Valley Returnee Recruiting Program” (OVRRP) is a well-attended job fair tour led by the Optics Valley Administrative Committee (OPAC) every year. “OVRRP is a job fair tour as well as a park promotion event, in which hundreds of firms in the innovation parks go to the first-tier cities, such as Beijing, even Silicon Valley in California as a group” (Interview #233, line 293). Since the OVRRP was started in 2012,

this program has recruited over 10,000 technology experts who were originally from Hubei province (Doc #2K, page 1) to come to Optics Valley to work or even establish their own technological innovation-based businesses. The OVSP administrative committee also organizes on-campus job fairs in Wuhan every year with over 100 tenant companies' participating (Interview #232, line 439).

The government-led recruitment programs help to draw human resources to the area. But the governments have overlooked differences in the requirements for varying sizes of companies. SMEs are badly in need of experienced talent. However in reality, the experienced non-local talent and fresh graduates recruited through government-led recruitment programs usually favor large-scale companies rather than home-grown SMEs (Interview #213, line 80). Besides, unlike the large-scale companies with adequate labour, the SMEs commonly don't have the resources to participate in the job fair tours. This means the SMEs benefit little from the government-led recruitment programs.

Housing is another factor that greatly affects the job choice of talented recruits. It is important for fresh graduates, especially the non-local graduates. Therefore, low-cost apartment buildings that are exclusively built for those who work in the park by the local governments as an enticement technique (Interview #231, line 407; Interview #132, line 241). A manager of a tenant company in FIP said, "The talent apartment building is very close to the park and is really convenient for us. It is low-cost and well-maintained by the park administrative committee. Because the park is relatively remote and far away from residential area, many potential talented recruits don't want to work here and it poses an obstacle for recruitment. This talent apartment building solves the problem to some extent" (Interview #211, line 180).

Except for regular talent, the advanced talent and entrepreneurs are the practitioners and pioneers of innovation who are vital to industrial development (Schumpeter, 1934; Utterback, 1994; Larson, 2000). The governments not only long for their skills, but also long for the social capital and resources that come along with them. The *3551 Program* (Doc #2E) and the *City Partner Program* (Doc #2D) are the government-initiated talent programs attracting advanced personnel and entrepreneurs to set up their own businesses and bring in all kinds of resources to Optics Valley. In these two programs, the Optics Valley government provides many “hard supports” to subsidize the tax-costs, procurement-costs, R&D-costs, as well as operation-costs for their businesses (Interview #211, line 347, line 359, line 363, line 470, line 484). Those with the most highly skilled talents will be rewarded with a maximum of 10 million RMB once they settle down in Wuhan. But the “hard supports” are far from sufficient to retain the most highly skilled talented people who are the main targets in the competition for talent among the cities. Building a tolerant policy and business environment and informative communication platform for them and making them to feel a sense of belonging are also very important (Doc #2D, page 2). An official on the Optics Valley administrative committee said, “The advanced talent and entrepreneurs could do anything in Optics Valley as long as that is not prohibited by law” (Interview #233, line 21).

In addition, a solid park reputation is helpful to attracting SMEs and talent to innovation parks. Therefore, in addition to using the government-provided hard support, the governments also spend sufficient funds in raising the public awareness and industrial profile of innovation parks to attract SMEs and talented professionals. For example, park administrative committees frequently attend and hold industrial exhibitions, trade shows, conferences. Some parks even have their own magazine publication to make the park more

famous (Interview #234, line 181; Interview #234, line 98, line 171, line 253, and line 415). Interviewee #231 said, “Many companies move in here because of the reputation of OVSP. If you told other people or your clients that you have a business here, people will think of you as a person who really knows the industry, and they will give you credit for it” (Interview #213, line 91). As stated in 4.2.1, screening the application of potential tenant companies is helpful to make the park known as “a place-to-be” for a particular industry. As a result, more talent has been attracted to the TSP. Interviewee #112 and interviewee #232 interpreted that it is because a specialized innovation park could provide more career options with opportunities for promotion, which is beneficial for their accumulation of experience and self-improvement.

#### **4.2.4 Enticing financial institutions**

Venture capital is recognized as one of the primary drivers for the high-tech start-ups that are significant to the success of planned innovation parks. To stimulate possible coupling of venture capital and start-up innovative firms, the local governments attempt to attract diverse financial institutions, including bank headquarters, non-bank financial institution headquarters, and angel investment companies to settle in or near the parks. The local governments will reward them with as much as 100 million RMB once they move in (Doc #2A, article 6). Local governments even provide them with a compensation up to 80% of their total venture investment (Doc #2A, page 2).

Office building accommodation is another factor that has been taken into consideration. For example, there is a financial office building in the A5 section of FIP which only accommodates financial institutions and venture investment companies (Interview #231, line 272) and provides them with office-rent subsidies. For example, a subsidy of 1,000

RMB per m<sup>2</sup> is provided for purchasing office and a subsidy of 30% of the office-rent up to five years is provided (Doc #2C, page 2).

#### **4.2.5 Summary**

At the start-up stage, the main task of the government is to act as an “enticer” to attract companies of different sizes, the talent and the financial institutions. The major attraction strategy taken by the governments is providing “hard” supports to cater to their needs for financial support. Regarding methods used to attract tenant companies and help with talent recruitment, the governments should solicit opinions from different companies and talent. Otherwise the government supports may fail to meet the needs of innovation parks.

#### **4.3 The role of local governments as a “facilitator”**

The role of local governments evolve in the life course of innovation parks. At the start-up stage, innovative firms, especially SMEs, focus mainly on reducing their cost and gaining a foothold in the market while paying little attention to their interaction with other participants in the area (Menzel & Fornahl, 2009). At the growth stage, tenant companies in innovation parks start to value their interactions with other firms and they expect the park administrative committee to help them with establishing relationships with other participants (Interview #114, line 198; Interview #211, line 313). Therefore, in addition to continuing to provide preferential policies to attract more firms to move into the parks, the local governments focus on creating a milieu that fosters a set of relationships between the actors in innovation parks. In our case studies, there is abundant evidence indicating the local governments are playing a *facilitator* role in shaping local business environment.

##### **4.3.1 Facilitating inter-firm cooperation**

Establishing potential connections between firms is one of primary duties of the local governments when innovation parks have passed their start-up stages. An official in

*Internet Plus Office* in the Administrative Committee of the Optics Valley said, “We can help tenant companies to get in touch with other companies which they normally would not have access to. For example, if a company has a really great technology and wants to do business with a much larger company, we can bring them into contact” (Interview #233, line 39). In our case studies, this *facilitator* role of the local governments are sometimes well perceived. For example, A CEO of a tenant company in OVSP said, “The officials will keep an eye on their tenant companies, helping to establish relationships between SEMs and large companies. My company got in touch with *AcFun* and *Douyu Live* with the help of the government. Even though we didn’t make the partnership happen, the government’s bridging does give us the possibility to do business with large and famous companies” (Interview #213, line 180, line 234). However, sometimes, the *facilitator* role of the local governments are doubted by entrepreneurs. Because they believe that the achievement of business collaboration is a matter of the trade-off in each company’s resources (Interview #213, line 264; Interview #212, line 272), while governments can intervene to a very limited extent in the trade-off process. Interviewee #112 (line 207) and interviewee #212 (line 272) commented, “Of course the governments could help to build up the connection between companies, but the success of a partnership can only count on the company itself”. Therefore, entrepreneurs often think the government one-on-one bridging is not efficient (as confirmed by Interview #213, line 238; Interview #211, line 343; Interview #232, line 279). To the contrary, some entrepreneurs think it will be more efficient and useful if the park administrative committee building a business information exchange platform (Interviewee #111; Interviewee #112). Through the platform, companies could share information while enjoying a transparent and fair environment



which would be a great help to all tenant companies. In the sites of our case study, the governments have not taken any action in this respect (Interview #111; Interview #112).

According to Su and Huang (2008), comparing the development trajectories of spontaneously formed and government-led innovation parks, the most fundamental differences arise from the impact of entrepreneurship, social capital and network patterns. A CEO in OVSP said, “The vision of the CEO influences the company’s development and the industry as a whole. The vision comes from frequent communication and mutual learning with other entrepreneurs” (Interview #212, line 75). Therefore, facilitating entrepreneurial networking is another strategy adopted by the government to shape local business environments. For example, an official on the administrative committee of Optics Valley said, “We regularly organize meetings with different themes for the CEOs. And sometimes we will invite experienced entrepreneurs to give a talk to the novices (Interview #233, line 275). However, the CEOs were not that impressed. Regarding government-organized entrepreneurial social activities, a CEO in OVSP commented, “I am aware of all those activities but I usually don’t go. First, I am rather busy. Second, most of the activities don’t work for me. I prefer in-depth communication with my friends and CEOs in my trusted social circle” (Interview #213, line 177). Another CEO in OVSP added, “Unfortunately, for me, the park has not created a sense of the ‘park’, let alone a satisfying peer communication environment. I only go to private meetings in my social circle where I can get useful information. The park-organized social events are too superficial and inefficient for experienced entrepreneurs like me” (Interview #212, line 46).

The reflection of the CEOs in TSP about government-organized social activities is similar. Interviewee #112 said, “The TSP administrative committee provides several social activities for CEOs. For example, the committee opens a CEO online chat group, organizes

golf tournaments. But the CEOs are too busy to participate in the activities. In addition, the results of these activities is doubtful because the in-depth communication between entrepreneurs usually happens in a close circle” (line 267). Another CEO added, “The Park organizes many social events but they are mere formalities. It is impossible to have an in-depth communication with other people in those social events because the participants usually are not the core personnel of a company” (Interview #111, line 334).

#### **4.3.2 Facilitating commercialization of R&D findings**

In order to encourage the transformation of R&D findings into products, the municipal government promulgates preferential policies and subsidies for the commercialization of R&D findings in innovation parks, for example implementing “the Ten Gold Policies” (Doc #2B; Doc #2H; Doc #2J) and establishing on-park Industrial Technology Research Institutes (ITRIs). There are seven government-built ITRIs in FIP through the partnerships with seven higher education institutions (HEIs) (Doc #2I). Interviewee #231 said, “The main task of ITRI is to transform S&T findings into products. These products could then be sold to other companies or used by the ITRI to incubate spin-offs. The local government has subsidized the ITRIs with 50 million RMB for their operations. For example, the Resource and Environment ITRI has incubated 70 start-ups” (Interview #231, line #67, line 293, line 300).

Even though the government has founded ITRIs in FIP, the connection between tenant companies and the ITRIs is still weak. An official said, “Except for the start-ups which were incubated by the ITRIs and have a close relationship with the ITRIs, other tenant companies rarely have formal partnerships with the ITRIs. The tenant companies are more than welcome to ask us for help to build relationships with the ITRIs but they hardly ever ask us for help regarding this problem” (Interview #231, line 302). A manager in a tenant

company in FIP explained that it is the red tape that holds them back. “The companies have to go through a cumbersome process if they want to have a formal partnership with the ITRIs or other research institutes. We would rather have informal cooperation with the researchers than establish a formal partnership” (Interview #211, line 324). This situation also exists in TSP for the same reason. A manager in a tenant company in TFP said, “We used to have a formal talent training agreement with *Chengdu Institute of Technology* when we were located in the institute-owned incubator. But we ended the partnership when we moved out because it is too troublesome to sign a formal cooperation agreement with the institute” (Interview # 112, line 48).

#### **4.3.3 Facilitating financial connection for firms**

Problems in obtaining financial resources is one of the difficulties faced by SMEs (Löfsten & Lindelöf, 2003). A start-up CEO in TSP said, “I think the most important thing for being in the park is whether the government can provide us with high-quality financial resources” (Interview#114, line 111).

While some governments (for example, the FIP) use preferential policies to attract financial institutes to locate in newly-built innovation parks, some governments act as a bridge to connect the companies and the financial resources. For example, TSP provides financial connections to tenant companies by showing the investors around the park. However, the park-introduced financial resources sometimes are not well-received by tenant companies. Interviewee #122 said, “You can see the investors wander around in the park with the park administrative officials. They just walk into a company randomly. The success rate of this government-introduced financial connection is really low” (line 44). And the park-introduced financial resources are not trusted by the companies. A CEO said, “The venture capital market is still incomprehensible. If we accept venture capital, the

venture capital company will get hold of a part of our shares and they probably will get more shares with follow-up investment. Then we will take the risk of losing complete control of our company. I don't think it is good for a start-up like us" (Interview #114, line 74). He continued, "Besides, we don't just want the first round of investment, we want to have someone who really care about the development of our company. It is very hard to realize in the current venture capital market. Sometimes even investment fraud happens (Interview #114, line 283).

None of the companies in this study came into agreement with the park-introduced investments, they were either self-invested (Interview #111, line 63; Interview #112, line 106; Interview # 114. line 164), invested by the CEO's former employer or friend (Interview #212, line 65; Interview #211, line 118) or invested by friend-referred investment (Interview #213, line 152). Interviewee #213 commented, "The governments indeed can provide the tenant companies with some investment resources. But reliable investment resources usually come from friends' referrals or already existing resources" (Interview #213, line 150).

The governments also set up special industrial funds to support tenant companies directly and use government-established venture capital funds to lead and motivate private venture capitalists to invest in new SMEs (Interview #213, line 155). For example, in the Optics Valley, the *Internet Plus Office* has its own industrial funds— the *Internet Plus Industrial Fund* (IPIF) to invest in qualified companies (Interview #233, line 42; Interview #213, line 155; Doc #2F, page 2, page 3). According to *Article 6* of *Internet Plus Policies* (Doc #2F, page 3), the government of Optics Valley has founded the *Internet Plus Venture Capital Fund* (IPVCF) to lead the private venture investments with a maximum of 50% of their total investment to a maximum of 100 million RMB. This government action helps to

reduce the risks to private investors, which may in turn, motivate them to make more investment.

#### **4.3.4 The role of incubators**

Incubators are widely used strategies for supporting new and small enterprises. In the selected innovation parks, the incubators provide some hard supports such as free office space and the tenant start-ups may apply to use conference rooms for free. Interviewee #232 said the free conference rooms in the OVSP helped the tenant companies save 3 million RMB in 2015 (line 424). Hard support is not the only thing that incubators can offer. An official on OVSP administrative committee said, “We not only provide free office space to the start-ups but also offer them all kinds of consulting services, such as company management and talent recruitment” (Interview #232, line 463). The park incubators also offer resource connections and help the start-ups applying for government subsidies. All the services provided by the park incubators are free” (Interview #232, line 463. According to a former official in a government-established incubator, “The government officials in the incubators are not as standoffish as they used to be. We have really close relationships with the tenant start-ups. We help them with paper work and encourage them to apply for government subsidies. We take the success of the tenant start-ups as the success of the incubator, and it is a recognition of our work” (Interview #234, line 156). In addition, the tenant start-ups can participate in the park-organized open classes to learn from the more experienced entrepreneurs and communicate with others.

Every tenant start-up needs to go through a screening process. The administration of the incubator selects the start-up move-ins through an expert review process to ensure that the start-ups are consistent with industrial specialization of the incubator. Focusing on an industry gives an advantage to the incubator. Interviewee #234 said, “There are plenty of

companies in the same industrial chain in the incubator. Downstream and upstream collaborations and inter-company learnings are common things here, and every company has its own specialty. For example, some companies are doing original design, some are doing 3D modeling, and others are specializing in promotion and distribution. These vertical networks signify that the companies in the park can meet the needs of every stage in the value chain. This is a credit to the administrative committee who has managed to form an industrial chain by deliberately selecting tenant firms and breaking down the barriers of inter-firm collaboration. This ‘industrial specialty’ gives an incredible advantage to the incubator” (line 380).

The first high-tech company incubator in China was established in Optics Valley in 1987 (Miao, 2013). “All the incubators are used to be established by the government due to high operating costs. But in recent years, we can see that the number of private incubators is booming.” (Interview #233, line 168). “The private incubator eases the burden of the government in terms of managing the large number of the start-ups. Therefore, the governments encourage private incubators by giving them subsidies” (Interview #232, line 195). Both public and private incubators exist in the OVSP. The entrepreneurial environment in the incubators benefits from government support.

#### **4.3.5 Summary**

The business environment is a combination of *hard environment* and *soft environment*. But the government provision of hard supports usually runs through the lifecycle of innovation parks. Constructing the soft environment through facilitating institutional thickness becomes the main task of the governments at the growth stage.

The local Governments attempt to facilitate *institutional thickness* from different perspectives, including facilitating inter-firm cooperation, building social networks and

financial connections, facilitating R&D findings commercialization, and establishing start-up incubators. However, the entrepreneurs in China rely more on trusted social circles when they communicate with each other and deal with investment. Therefore, it is inefficient for governments to try to facilitate institutional thickness in a built-from-scratch innovation park by merely *bridging* the participants and overlooking the importance of trust-based relationships.

#### **4.4 Government as a “regulator”**

In addition to numerous roles that the governments have taken to promote the healthy development of innovation parks, maintaining a fair, competitive, and stimulating playing field is the last, but not the least, role that levels of governments need to perform. As a *regulator*, government, especially the local governments, need to promulgate development policies, set up mechanisms to implement rules, and establish a governmental body to oversee the abeyance to laws and regulations by the business ventures in the innovation parks.

##### **4.4.1 Regulate the business environment**

It is important for the governments to construct a fair business environment for all the innovation companies. In the system of government planned innovation parks, the governments are acting as a resource allocator since governments hold most of the scientific resources, industrial funds, and national program subsidies. In our case study sites, many preferential policies and stimulating financial incentives are established by the governments. For example, the district government of Optics Valley set up the *3551 Program Special Fund* which takes more than 5% of the total annual public finance budget to attract and support returnees to establish high-tech start-ups (Doc #2E, page 4). According to Doc #2E, chapter 2, article 7 (page 3), qualified applicants will be subsidized

with one to three million RMB, and two to ten million RMB of equity investment. The *City Partner Program* is a municipal-level government subsidy policy to attract and support entrepreneurs and investors. According to Article 2 of the City Partner Program (Doc #2D, page 1), the qualified entrepreneurs will be subsidized with one million RMB and ten million RMB of equity investment. The entrepreneurs who make a great contribution to the city will be subsidized with as much as one hundred million RMB. However, this could be a bad thing for both the individual company and the market as a whole. A former government official said, “If an innovative company was picked by the government as a “winner” and the company started to count on the support of the government, it is likely to have some friction effect on innovation and get left behind by other companies in the market competition since they have lost impetus to innovate, to compete” (Interview #234, line 277). She continued, “For example, there is a company in the OVSP, which is in a really close relationship with the district government, and the company even got granted an entire office building in the park by the district government. But the company only occupies three floors, the rest of the building are rent out to others. What a waste of government subsidies! At first, the district government wanted to cultivate this company as a “face-saving” company for its political achievement purpose. However, the government’s over-involvement slows down the innovation pace of the company and the company has got withered in the competition” (Interview #234, line 285). The governments in China should serve better as a “regulator” to maintain a good and fair business environment for both large companies and SMEs.

#### **4.4.2 Regulate the legal environment**

When a firm debuts with an innovative product or technology, others rush to adopt it, giving rise to inevitable copycats and driving down profit margins to unsustainable levels.



Therefore, it is important to protect the fruits of innovation through intellectual property (IP) protection, such as patents and copyright.

In our case studies, the government of the Optics Valley has enacted several regulations to construct a more comprehensive IP protection environment since 2015 (Doc #2L, page 2). For example, the district government sets up a special Intellectual Property Court in the Optics Valley (Doc #2L, page 4). In addition, in order to attract more IP agencies to locate in the Optics Valley, the district subsidizes qualified agencies with two hundred thousand RMB every year. With the efforts of the district government, there has been 45 IP agencies in the Optics Valley (Doc, #2L, page 3, page 4). The government even helps individual companies to build their own intra-company IP protection system (Doc #2L, page 3). The outcome of these government endeavours is promising. In 2016, 143 tenant SMEs started to apply for IP with the help of the local government and the number of patents experienced a drastic increase of 30% (Doc #2L, page 1, page 2). The adoption of the *Innovation Voucher Program* is another government measure to construct an IP protection environment in the Optics Valley by subsidizing the tenant companies when they are using IP products (Doc #2M, page 1, page 2). A manager from a tenant company in FIP said, “All the qualified tenant companies can apply for the Innovation Vouchers. Last year we had the voucher for 75,000 RMB. This program raised the public awareness of IP rights to a large extent” (Interview #211, line 287).

#### **4.4.3 Regulate the talent**

When government planned innovation parks are maturing, the governments have attracted a large number of talented specialists to the parks by using different strategies in previous stages. Wang et al. (2007) found out that high mobility is a significant character of the talent in innovation parks, and the mobility ratio is increasing every year. Therefore, in the

mature stage, the role of the park administrative committees should shift from a talent “enticer” to a talent “regulator” by managing resources that support the social and emotional wellbeing of the people recruited to the park for their talents. This is typically done by providing recreational and professional development programs for them (Interview #131, line 78, line 87; Interview #231, line 139).

According to interviewee #112, the talents in TFP are made up of mostly young people who are highly creative and career aggressive specialists in the software and ICT sectors (Line 139). Talent job hopping between companies is very common in the TFP, “They can even find a new job when they come across each other in a greenspace, in a sitting area, or on the footpath” interviewee #111 said (Line 124). The earlier-phase talent enticement policies would not make sense without efforts to retain talent once it arrives. Providing programs in an effort to create social inclusion and other intangible localized social environmental assets should create a sense of belonging for the talented people, and are therefore important efforts by government to support talent retention in the parks (Interview #112, line 153). For example, the administrative committees in all three study cases organize a variety of social events and training events to cater to talents’ basic social needs and to their career-improvement aspirations. (Interview #231, line 138; Interview #112, line 160; Interview #131, line 97; Interview #232, line 448). A CEO from a tenant company in TSP said, “The park administrative committee is trying to construct a good social environment. For example, the committee often organizes competitive games, such as basketball games, builds several clubs, and organizes various networking activities which could bring the young talent together” (Interview #112, line 261). However, these activities are not well-received by the talent. A technician in a tenant company in TFP said, “Very few people around me have participated in the activities. Some of us even never heard of

them” (Interview #121, line 32, line 59). Another technician in TFP added, “I didn’t know the administrative committee organizes these activities in the park. I did not see any poster or other broadcast about these activities” (Interview #123, line 46). To meet the talented technicians’ needs in career-improvement, the park administrative committees provide open classes and other free on-park talent training services. For example, the administrative committee of TSP provides over 100 open classes and on-park talent training workshops every year (Doc #1B, page 1). The administrative committee of FIP also hosts a number of open classes every week (Interview #231, line 137, line 381). However, the acceptance levels of these activities are unsatisfactory also. A manager in a tenant company in FIP said, “The open classes often come from the cooperation relationship between the park administrative committee and some private training institutions...These open classes and training activities are not suitable for all the people. The class contents are not something we need. Even sometimes the open classes are just for advertising the private training institutions” (Interview #211, line 238).

Monitoring the salary level is another method of regulating talent market in innovation parks (Interview #131, line 123; interview #112, line 150). A CEO of a tenant company in TSP recalled, “Several years ago, the explosive growth of the mobile game industry in the park made the salary level increase a lot in a very short period of time, which gave other tenant companies a hard time in talent recruitment” (Interview #111, line 253). In order to supervise the human resource market in the park, the TSP administrative committee sets up a Human Resource (HR) Communication Platform which has provided over 30 events for on-park HR executives (Doc#1B, page 1). “The park administrative committee of TSP frequently hosts HR Annual Meetings according to different industries. The HR executives of tenant companies will share the information of salary level and other information related

to human resource at the meetings. So, we can monitor the salary level of the whole park” (Interview #112, line 403). This method is useful for preventing vicious competition for talents between tenant companies, and it could help the park administrative committee maintain a fair and stable talent market.

#### **4.4.4 Summary**

At the maturity stage, the attraction of government-provided *hard* supports to tenant companies decreases. Tenant companies put more value on the *soft* environments by requiring a fair business environment, a comprehensive legal environment and a stable talent environment. The main task of local governments is to act as a *regulator* using a set of regulatory strategies to cultivate and maintain the soft environments instead of continue being a government resource allocator.

## **5 Discussion and conclusions**

### **5.1 A summary of the thesis**

Planned innovation parks are government or private initiatives to create and cultivate geographical, cognitive, social, organizational, and institutional proximity of innovation contributors. Different from the innovation clusters in the West, whose successes primarily depend on the function of private sector, every stage of planned innovation park development in China is controlled or supervised by local governments due to the decisive role and the character of the supervisory system of Chinese governments. To enrich the current literature and enhance our understanding of the mechanism of developing planned innovation parks in China from local government perspective, this thesis sets a primary aim of exploring and describing the roles of local governments, especially what are the actual actions taken by the local governments and their effects in the development of planned innovation parks. In order to reach this aim, three research routes have been adopted to guide through this research: 1) a life cycle perspective has been used to explore the evolving roles of local governments; 2) a method of classifying government policies and strategies into *hard* and *soft* environments has been used to describe the actual actions of local governments; 3) a demand-and-supply perspective has been used to illustrate and evaluate the function of local governments. The three research routes have been applied to study three selected empirical cases, TIP, OVSP, and TSP, from middle and western regions in China. The methodology for this research is a combination of semi-structured key informant interviews and qualitative analysis based on government documents, reports, newspaper articles gathered from various sources.

## 5.2 Significance of empirical findings

Many researchers (for example, Felsenstein, 1994; Saxenian, 1978, 1996; Sturgeon, 2000; Sutherland, 2005) asserted that government roles are secondary in the development of innovation clusters and private sectors are the determinants. Therefore, the existing studies have primarily focused on the effect of private sectors. Even though innovation parks evolve overtime in response to changes in technology and product markets, few scholars have investigated innovation clusters from a clear life stage sequence. This may be attributed to the fact that the innovation clusters in the West have all long passed their initial development stages and their life cycle processes are not as easy to discern as those associated with the planned innovation parks in China.

The first contribution of this thesis is that with giving the four *hats* to local governments, this research reveals that the roles of local governments in the development of innovation parks in China are fundamental. In this research, the development of planned innovation parks is divided into pre-development, start-up, growth, and maturity stages. Given the changing requirements from the innovation parks and the participants over time, the crucial roles taken by the local governments are constantly evolving along the trajectory of development lifecycle of the innovation parks. At the pre-development stage, the prerequisites of the getting-off-the-ground of the three selected parks are *soft* requirement—industrial planning, and *hard* requirements—land supply, construction fund and land development. The local governments in the selected cases all took the responsibility of creating innovation parks with a provision of high quality office space and practical industrial planning. Therefore, the roles of local governments can be termed as a *developer* at this stage. At the start-up stage, innovation parks demand talents and a number of tenant companies in a short period of time. The selected cases were located in the

peripheral areas in the cities when they were opened. The poor infrastructure system posted obstacles in attracting talents, tenant companies and other institutions for the parks. Talents and tenant companies need strong financial incentives (*hard* requirements) to move into newly opened innovation parks. Therefore, the local governments in the selected cases all offered various *hard* supports to entice talents and tenant companies. The roles of local governments at this stage can be coined as an *enticer*. At the growth stage, talents, entrepreneurs, and tenant companies in the selected cases started to emphasize the importance of *soft* business environment, including informal relationships with others and institutional thickness in the parks. However, the *soft* environment often takes a long time to grow in the planned innovation parks that are often built from scratch. Therefore, the local governments in the selected cases act as a *facilitator* to promote the formation of institutional thickness by bridging the gaps between the innovation contributors in the parks and offering various social events and activities. At the maturity stage, entrepreneurs and tenant companies require a *soft* business environment where they can compete and thrive with less governmental constraints. Therefore, the local governments act as a *regulator* by constructing a supportive legal environment, and learning to *let go* (Miao, 2013), so that the planned innovation parks can become self-sustaining without the support of governments eventually. Previous research on Chinese planned innovation park primarily focused on the traditional *planner* role of government, this research provides a reconceptualization of the evolving roles of local government in the making of planned innovation parks.

The empirical studies of the selected cases found that the local governments have two ways to contribute to the formation of financial supply in planned innovation parks. First, providing government financial supports, such as rent-cut policies, tax holiday policies,

R&D inputs subsidiaries, and various industrial policies which are important to the development of tenant companies, especially those that are at their start-up stages. These preferential policies are also the strong incentives to attract companies to move into the parks. Second, private investment is another very important finance resource for the innovation-based companies because not all tenant companies are qualified for specific industrial policies. Therefore, the local governments in the selected cases facilitate a private investment network by attracting investment institutions to locate near to tenant companies. In this way government is acting as a bridge between investors and investees. However, we found, just like Fritsch and Schilder (2008) had asserted, that the advantage of geographical proximity between investors and investees is largely overestimated. The function of the second method by local governments is also overestimated in this research. In the selected cases, some entrepreneurs said the venture capital market in the area is so premature that they are reluctant to receive the investment. In addition, *trust* is a critical element in investment process, all the entrepreneurs and tenant companies in this research take investment from their acquainted resources. This situation suggests that governments' contribution to the formation of private investment network is not a prerequisite to the development of the planned innovation parks and the direct government funding has a more important role in developing planned innovation parks.

Some findings of this research are consistent with the literature on the effect of anchor companies in facilitating the growth of innovation parks (for example, Link & Scott, 2003; Basant, 2006; 2008). Yet, this study also found that not all types of the anchor companies have such effect. R&D based anchor companies have a more significant role in promoting the development of planned innovation parks by attracting talent and SMEs. "Attracting anchor companies first" has been taken as an investment attraction strategy by many local



governments in China. However, this strategy does not live up to the expectation of local governments in the case of NSP. The administrative committee of NSP attracted several backstage service bases of Fortune 500 companies. These backstage service bases do not conduct R&D activities, and have little contribution for attracting talents and SMEs to the area. The success of FIP, however, is mainly because the administrative committee attracted the R&D base of Huawei into the park.

The significance of research-industry linkage in promoting the development of innovation parks has been studied by many researchers (for example, Yusuf & Nabeshima, 2007; Adam, 2001; Keller, 2002). That the local governments act as a *bridge* between HEIs and firms is the most obvious way to facilitate research-industry linkage. In this research, the *bridging* role of local governments is obstructed for two reasons. First, it is obstructed by the regulation constraints that the HEIs are faced with. Second, the tenant companies in innovation parks do not qualify for the incentive that encourage them to cooperate with the HEIs because their innovation activities are usually not related to S&T research. The HEIs, on the other hand, have the needs to commercialize their S&T findings. Therefore, the S&T commercialization agents—ITRIs—were established by the local government of FIP. This agent role has a great effect in facilitating research-industry linkage and in turn contributes significantly to the growth of the planned innovation parks. In FIP, the spin-off effect of ITRIs is more imperative to the development of the park than the direct cooperation between the firms and the HEIs. The current literature on innovation parks in the West asserts that the spontaneously formed innovation cluster is the most desirable mode for innovation park development (Belussi, 1999; Cooke, 2001; Fromhold-Eisebith & Eisebith, 2005). It is argued that the governments cannot supersede the market in the creation of innovation clusters because they are results of entrepreneurial activities and market

function. Further it is said that the institutional thickness— *soft* environments are hard to create (Desrochers & Sautet, 2004). The empirical results of this research reveal that innovation clusters can be created from scratch by the local governments. In order to create a well-functioning innovation cluster, the roles of local governments evolve from merely constructing *hard* environments to cultivating *soft* environments at the same time. The methods used by the local governments to promote favorable *soft* environments include facilitating relationships between companies, entrepreneurs, financial institutions, and research institutes. Although we found that the methods sometimes are not well received by the tenant companies in the parks, they none-the-less enhance opportunity for engagement which may lead to cooperation. This in turn, might promotes institutional thickness invisibly and slowly.

### **5.3 Policy implications**

The layered governments with differentiated roles are all involved in the development of the planned innovation parks in China, from the central government to local governments. The local governments execute the decisions and plans of the central government by interpreting them into localized strategies and policies.

Four implications for local governments emerged from this study. Establishing planned innovation parks is not only the large scale urban development projects but also is regarded by the regional or local governments as a strategy to improve their public profile and to compete for the resources and supports from the central government. As a result, some local governments are likely to treat the planned innovation parks as a political trophy (McDonald, 1987; Bakouros et al., 2002), and in turn, may make some local governments to misplan the innovation parks to fulfill political ambitions. As shown in the previous discussion, a successful planned innovation park development requires practical industrial

planning based on the foundations of the area. For example, the development of the NSP does not quite live up to the expectation of the local government because of the defect in industrial planning and rushing to create another growth pole in the Optics Valley. In addition, the inappropriate and inflexible rent-cut policy is another factor that results in the situation of NSP. Therefore, the first implication can be proposed that the local governments should be committed in a long-term development of the planned innovation parks with clear and practical industrial planning from the very beginning. Adjustments should be made to government subsidies for each park accordingly.

Second, the local governments allocate government funds and resources through offering various incentives that tenant companies and institutions can apply for, or by implementing policies under which tenant companies are subsidized directly. Industrial policies are often criticized as *picking winners* (Stiglitz, 1999). The development of tenant innovative companies can be promoted by government supports, but it can also be impeded by the over involvement of the governments. The situation of *picking a winner* that is mentioned by Interviewee # 234 is an example of wasting government supports and how government supports hinder the development of tenant companies. Therefore, it is necessary to soon adjust the giving-out of subsidies and other government supports by evaluating the performance of subsidy receivers consistently in order to avoid wasting public resources.

Third, facilitators of the development of innovation parks should give attention to removing obstacles, relaxing constraints, and eliminating inefficiencies that hinder the productivity and innovation in the parks (Porter, 2000). Our case studies indicate that there is little formal partnership between the tenant companies and research institutes because of regulatory constraints attached to the latter. Therefore, local governments should take some actions that help to relax the constraints.

Last, making the favourable environments for the planned innovation parks to thrive include *hard* environmental factors and *soft* environmental factors. Creating a favorable *soft* environment for the planned innovation parks is more difficult than constructing a supportive *hard* environment. The institutional thickness that evolves within favorable soft environments as they evolve within the innovation system is fundamental to the long-term achievements of innovation parks (Castells & Hall, 1994; Freeman, 1995; Lundvall, 2007). The local governments in three study cases all put great efforts in creating *hard* environment by providing various policies and strategies that cover the issues such as tax, accommodation, R&D and talent, and most of these supports are well received by the participants in the innovation parks. However, the favorable *soft* environment factors such as entrepreneurship, interactive learning, and informal relations between the innovation contributors in the parks is still not satisfactory. Therefore, the local government should pay more attention to constructing a favorable soft environment within the planned innovation parks without reducing their attention to create supportive hard environments. This could be realized by more effectively cultivating mutual trust between the innovation contributors, providing communication platforms, and by relaxing government control over the market.

#### **5.4 Future research**

There are some limitations in this study that deserve further attention. First, due to the limit of time and resources, the number of investigated tenant companies and government offices in this research is limited. More in-depth examinations of in-park incubators would be helpful. Evaluation of the differences between the government policies towards all tenant companies, compared with the special policies for their incubated start-ups is needed. The working mechanism of government-university established S&T commercialization

institutes, such as ITRIs, and their function to the development of the planned innovation parks await more elaboration and analysis. Second, the number of the selected innovation parks in this research is limited. This could be dangerous when trying to generalize the findings of this study to other innovation parks. The three studied innovation parks are located in national level high-tech development zones. There are many more sub-national level innovation parks specializing in other types of innovative industries. These also need to be investigated. More case studies should be conducted in order to improve the research on the planned innovation parks and thereby propose relevant policies for their healthy development in China.

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## Appendix One: Letter of Consent/Information

### LETTER OF CONSENT/INFORMATION<sup>1</sup>

Dear Participant:

I am asking you to participate in a study relating to “Wearing four hats: making planned innovation parks by Chinese local governments.” This study will take place in Wuhan, Chengdu, and Shanghai, China and involve answering questions relevant to various aspects of your view on the innovation park planning and developing process and your working experience that related to this topic. The interview will take 40 minutes to 2 hours to complete. There are no benefits or risks associated with participating in this study. Your participation in the interview is voluntary. The interview will be recorded and notes will be taken during the interview. If there are any questions you feel uncomfortable with, please don’t respond. The recorded information will be stored at the University of Lethbridge and at the University in Shanghai in the principal investigator’s locked office for future research.

The information from this study will be reported in general terms without reference to your particular results. Your name will not be used in any circumstances. A summary of this study results will be delivered to your office. The complete results of the study will be summarized and published in the principal investigator’s master dissertation and scholarly journals. If you wish to obtain a copy of the published papers, you may contact me. If you wish to receive a copy of published research papers, please provide your contact information.

I hope you will participate in this study, but if for any reason you decide to withdraw, you are free to do so. If you choose to withdraw from the study, the data relating to this interview will be destroyed, and will not be used in the study. The participation in this study is completely voluntary.

If you have any questions about the study, please call me at my personal phone 18627072742 from May to June, 2016 or at the University of Lethbridge (Phone: 001-403-360-2365 with 14 hours’ time difference or Email: [qianhui.bai@uleth.ca](mailto:qianhui.bai@uleth.ca)) after June 2016. You may also call my supervisor at the University of Lethbridge, Dr. Wei Xu, at 001-403-332-4561 or email at [wei.xu@uleth.ca](mailto:wei.xu@uleth.ca).

Qianhui Bai, graduate student  
Department of Geography

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<sup>1</sup> Note: The consent letter will be translated into Chinese. Qianhui Bai, the member of the research group and the graduate student in Geography department of Lethbridge University, will translate the letter. Dr. Wei Xu, the leader of the research group and the Professor in Geography department of Lethbridge University, will check for the accuracy and completeness of the form.

## Appendix Two: Script for Interview Invitation

### SCRIPT FOR INTERVIEW INVITATION<sup>2</sup>

Dear Sir/Madam:

I am inviting you to participate in a study relating to “Wearing four hats: making planned innovation parks by Chinese local governments.” This study will take place in Wuhan, Chengdu, and Shanghai, China and involve answering questions relevant to various aspects of your view on the innovation park planning and developing process and your working experience that related to this topic. The interview will take 40 minutes to 2 hours to complete and several professional questions will be asked. There will be no personal information recorded. The interview is one important part of my Master thesis for the study of the innovation park planning and developing process in Wuhan, Chengdu, and Shanghai, China. I would be grateful if you could accept this invitation and join me for an interview.

Please reply this email/call me at 0014039292719 to confirm your attendance at the interview. If you have a disability and require any special arrangements to assist you at the interview, please let me know.

The location and time of the interview venue will be confirmed with you once we get your response.

Yours sincerely,

Qianhui Bai, Graduate Student  
Department of Geography  
University of Lethbridge

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<sup>2</sup> Note: The consent letter will be translated into Chinese. Qianhui Bai, the member of the research group and the graduate student in Geography department of Lethbridge University, will translate the letter. Dr. Wei Xu, the leader of the research group and the Professor in Geography department of Lethbridge University, will check for the accuracy and completeness of the form.

## **Appendix Three: A list of sample interview questions (list 1)**

### **A list of sample interview questions**

(For government officials)

1. How many years have you worked as an administrative staff in management committee?
2. What is your routine work?
3. What's the basic function of innovation park management committee?
4. In what way do you work with the government and tenant firms?
5. How do you bridge the links between university, technology institutions (or technology lab), and innovation-based tenant firms?
6. What kinds of support can management committee provide to tenant firms?
7. How does management committee put government's policies into effect?
8. What can innovation park management committee do for innovation-based tenant firms in terms of helping them with improving innovation capability, marketing skills or other aspects you can think of?
9. What do you think of the entrepreneurial (innovation-pursuant, cultural) milieu in this innovation park?
10. How do you think government's role is affecting this innovation park?

## **Appendix Four: A list of sample interview questions (list 2)**

### **A list of sample interview questions**

(For CEOs in tenant companies)

1. How many years have you worked here?
2. What is the funding resource of this firm?
3. How long has this firm been located (or relocated) in this innovation park?
4. Why does this firm locate (or relocate) to this innovation park?
5. What are the benefits that you think this firm can get because of locating (or relocating) to this innovation park?
6. Have you ever communicated with other managerial staff in counterpart tenant firms in terms of knowledge, information, and technology sharing and learning?
7. What do you think of this innovation park?
8. What do you think of the entrepreneurial (innovation-pursuant, cultural) milieu in this innovation park?
9. Do you feel the impacts from government in developing this innovation park? If yes, please provide some examples.
10. In what way do you work with the government and other tenant firms?
11. What do you think of the inter-firm competitiveness?
12. What kinds of support does this firm get from governments and innovation management committee?
13. What do you think of the government's policies?
14. How does management committee put government's policies into effect?
15. Has this firm ever had any types of networking with other tenant firms and universities (or other technology institutions and technology labs) in terms of technology, information interchange?
16. What kinds of benefit do you think this firm gets from being here?
17. How do you think government's role is affecting this innovation park?