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Global Innovation Networks in the IT and New Media Industry in Beijing, China:

The Role of Individuals in SMEs

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Abstract: The increasing globalization of innovation activities has generated “*globally organized web of complex interactions*” for innovation, which are called global innovation networks (GINs). The current study on GINs has extended our understanding of network participants to the small and medium-sized enterprises (SMEs) from emerging economy, and enlightened us on the drivers behind the participation of global networks. However, little is understood on how SMEs from emerging economy manage to participate in GINs. Due to the limited resources, personal contacts are more often used by SMEs to acquire knowledge. Thus, this thesis takes individual perspective as the starting point to investigate the role of individuals in sustaining the engagement of emerging economy’s SMEs in GINs. Based on the primary data from a case study on 15 SMEs in the IT and new media industry in Beijing, China, results mirror mainly the need to engage in GINs for knowledge sourcing. The reasons behind the case firms’ decision to source knowledge globally further reveal the specific role of individuals as establishing new international linkages and bringing in former international linkages to connect the firms into GINs.

Key words: Global Innovation Networks, SMEs, Beijing, China, Role of individuals

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1 Introduction

Innovation is recognized by the research community as one of the key drivers of the modern knowledge economy (Lundvall & Johnson, 1994). Our understanding of innovation has shifted to non-linear models, in which we see innovation involves a complex and interactive learning process (Lundvall, 1992). As a result, collaboration becomes essential for innovation. Firms continuously collaborate with other organizations either in close proximity or from distance locations to get access to the knowledge that they need. Knowledge transfers among those networks of interaction and significantly affects innovation activities in firms.

Many studies have analyzed interactions within local systems, such as clusters and regional innovation systems (Maskell & Malmberg, 1999; Asheim & Gentler, 2005), to understand the impact of networks on innovation, whereas collaborations for innovation at international levels have traditionally received less attention. This is due to the fact that innovation does not take place randomly all over the place but concentrates in certain locations (Martin, 2012), and the dominant assumption for it is that the majority of interaction related to innovation activities tends to take place in close geographical locations (Leydesdorff et al., 2006). Recent study indicates that the geographical location of partners does make a difference for innovation (Bathelt, Malmberg & Maskell, 2004; Gertler & Levitte, 2005; Moodysson, 2008). For example, the case study of Norway by Fitjar and Rodríguez-Pose (2011) on geographical dimension of innovation collaboration shows that collaborating with distant international agents makes firms more innovative than others that mainly interact with partners in close geographical proximity.

With the lower barriers on technology and international mobility, going beyond national borders to expand knowledge sources and collaborating with international partners to retain comparative advantages has become more common worldwide (Dunning, 1994; Guy, 2015). Based on the seminal work of Archibugi and Michie (1995) on the taxonomy of the different forms of global interaction for innovation, Plechero and Chaminade (2013) distinguishes four principal modes of globalization of innovation: the *global sourcing of innovation*, the *global exploitation of innovation*, the *global generation of innovation*, and the *global research collaboration*. The increasing globalization of innovation activities generates broad global innovation networks (GINs), which could be defined as “*a globally organized web of complex interactions between firms and non-firm organizations engaged in knowledge production related to and resulting in innovation*” (Chaminade, 2009). In general, a network consists of a set of nodes that are linked through edges (Taalbi, 2017). With regard to GINs, any participants in this web of innovation activities can be conceived as the nodes which are globally connected by the edges. Those edges are international linkages generated from different types of relationships. According to Cano-Kollmann, Hannigan, and Mudambi (2017), these international linkages could be formed either at organizational level or at individual level, and these so-called “organizationally-motivated linkages” and “individually-motivated linkages” enable the very functioning of GINs.

Over the last few decades the interest in the global spread of innovation activities has grown significantly as a result of the increasing research concern from economic geographers (Liu, Chaminade & Asheim, 2013). There are more and more knowledge intensive activities, such as research and development (R&D) and other innovation activities, starting to locate in fast growing emerging economies. Firms in countries like China are experiencing a transition from conducting production-based to innovation-based activities (Althenburg, Schmitz & Stamm, 2008; Chaminade

& Vang, 2008). Those emerging economies have witnessed rising innovation generated by both local and foreign firms, and they have challenged the focus of developed countries as the core location for idea generation or product development (Corsi, Minin & Piccaluga, 2015). The importance of the role played by emerging economies in GINs is increasing, while in turn GINs also provide significant potential for those countries to accelerate learning and capability development (Chaminade, Castellani & Plechero, 2014; Plechero & Chaminade, 2016). Under this new circumstance, emerging economies like China have become new international hubs that are closely integrated into GINs.

Apart from economic geographers, international business scholars have also given GINs lots of attention (Frost, 2001; Cantwell and Mudambi, 2005). However, their main focus still remains at the organizational level. Almost without exception, the majority of their research is about the relationship between multinational corporations (MNCs) and their subsidiaries (Cano-Kollmann, Hannigan & Mudambi, 2017). There is little doubt that establishing international partnerships and engaging in GINs is costly, and thus firm size is often considered as an important variable on internationalization (Fitjar & Rodríguez-Pose, 2014). In the 1970s only the largest corporations in the world could establish market overseas (Saxenian, 2002), but now with the availability of new transportation and information and communication technologies (ICTs) even the smallest firms are capable of joining the innovation activities globally. As suggested in the UNCTAD report in 2006, the current leading position of MNCs on globalization of innovation may change, and new participants of GINs, such as innovation networks driven by small and medium-sized enterprises (SMEs) from both high and middle income economies, may emerge (Barnard & Chaminade, 2017). Therefore, when we discuss the topic about global innovation networks in emerging economies, certain attention shall be shifted from the subsidiaries of foreign MNCs to local SMEs.

In addition, it is traditionally believed that SMEs rely more on personal relationships in local networks to acquire knowledge because of their less capability to search for and use knowledge (Kaufman & Todtling, 2002), but recently the importance of global linkages for SMEs' innovation has also been emphasized by the scholars in GINs study (Barnard and Chaminade, 2017; Chaminade, Castellani & Plechero, 2014; Aslesen & Harirchi, 2015). Hence, according to this rationale, it makes more sense for the thesis to take personal relationships as the starting point in order to understand how SMEs engage in global innovation networks. Current research on innovation has explored the role of individuals in transferring the innovation related knowledge on a global level (Faggian, Rajbhandari & Dotzel, 2017); nevertheless, these international linkages motivated by individuals haven't been taken as an important component in the study of GINs. The extensive research on GINs focuses too much on organizationally-motivated linkages (Cano-Kollmann, Hannigan & Mudambi, 2017). Bathelt, Malmberg, and Maskell (2004) separated local and global interaction in their paper with a conceptual model of "local buzz" and "global pipelines". As a critical component of GINs, global pipelines refer to formal, structured, and thoroughly planned connections built between firms and the outside world. Taking MNCs as an example, they built up global pipelines to transmit and receive knowledge around the world through two channels: the internal network, constituted by all affiliates over the world, and the external network, formed by customers, suppliers or collaborators (Ietto-Gillies, 2015). But just like all other connections, even "global pipelines" are embedded in individuals. In the context of similar architecture of learning between individuals, it is the relational proximity being the defining factor of the success, instead of the physical proximity (Faulconbridge, 2007).

In today's world individually-motivated linkages, the so-called "personal relationship", are more likely to develop large global diasporas which have become important and growing participants of

GINs (Saxenian, 2006; Cano-Kollmann, Hannigan & Mudambi, 2017). Personal relationships are able to span globally based on friendships, family relations, and acquaintanceships, and individuals often could leverage their social connections within personal network to seek professional opportunity (Lorenzen & Mudambi, 2015). Every now and then, thanks to the valuable connections they hold, certain individuals are considered as a key strategic resource and get hired by the organizations. In other words, the global connections established by the organizations may originate from the personal relationships held by their employees. Thus, the role of individuals in GINs deserves to be paid more attention to.

1.1 Aim and Objectives

Despite the existing literatures about GINs in emerging economy and SMEs-participated GINs, within the topic the international linkages motivated by individuals have not received enough attention. The aim of this thesis is to fill this gap by investigating the role that individuals played in supporting emerging economy's SMEs to engage in global innovation networks. Due to the availability of novel data that can be used to explore this aspect, Chinese IT and new media industry in Beijing is chosen as the study case for the thesis. Based on primary data extracted from interviews on SMEs in IT and new media industry in Beijing, China, the question about "*what is the individuals' role in sustaining the engagement of emerging economy's SMEs in GINs?*" will be analyzed.

1.2 Outline of the Thesis

The rest of the thesis is organized as follows. The section 2 theoretical framework includes literature review and research questions, which serves as the foundation for the thesis. The section 3 on methodology includes the data collection methods that guide the analysis of the empirical evidence. The section 4 is empirical analysis which presents the main findings based on the case study of the IT and new media industry in Beijing, China. The last section further discusses the findings and concludes the whole thesis.

2 Theoretical Framework

This section will review the literature about GINs, starting with the discussion of different forms of global interaction for innovation to understand globalization of innovation and global innovation networks. Then, the current changes of players in GINs will be reviewed. Afterwards, the drivers of GINs will be analyzed, especially the research about the role of individually-motivated linkages in international knowledge flows. The thesis discusses that under certain conditions social relations are no longer constrained by geographical locations, especially for a country like China (Tung, 2008; Chaminade, Castellani & Plechero, 2014; Naghavi & Strozzi, 2015), due to the mobility of people. Last but not least, the literature review part will be followed by the research question.

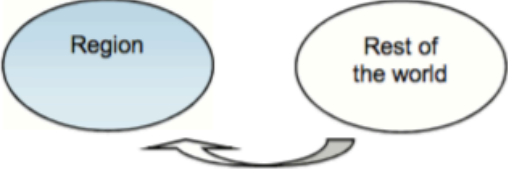
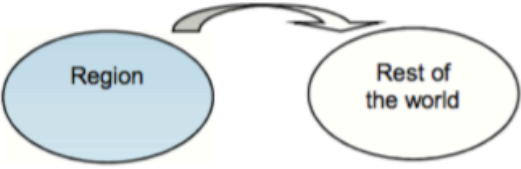
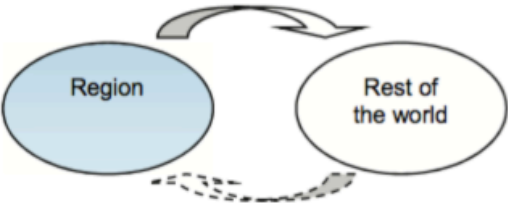
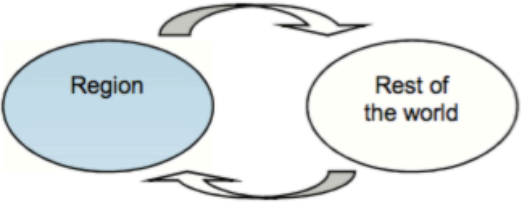
2.1 Literature Review

2.1.1 Four Modes of Globalization of Innovation

Innovation has long been an international phenomenon (Chaminade, De Fuentes, Harirchi & Plechero, 2016), but geographical spread of innovation activities is a relative recent phenomenon (Plechero & Chaminade, 2013) with the emergence of GINs in the 1990s and 2000s (Ernst, 2009). Through the global networks, firms quickly gain access to knowledge and complement/compensate their own capabilities for conducting innovation activities. Knowledge sharing is seen as the “glue” that keeps these networks growing (Ernst, 2009). Plechero (2012) indicates that the flows of knowledge can take different directions. More specifically, through GINs knowledge could flow from the region to the rest of the world, knowledge could also flow from the rest of the world to the region, and bidirectional flows of knowledge between firms in the region and other organizations in the rest of the world could also be possible. Based on the former work in the innovation literature, Plechero and Chaminade (2013) distinguish between four modes of globalization of innovation: the *global sourcing of innovation*, the *global exploitation of innovation*, the *global generation of innovation*, and the *global research collaboration*.

The *global sourcing of innovation* refers to the international acquisition of foreign sources of technology or knowledge for a firm’s innovation, such as know-how, machinery and equipment, licenses, or international training. The *global exploitation of innovation* refers to the use of new products or services as a firm’s strategy to gain access to international markets. The *global generation of innovation* refers to the offshoring of innovation activities by a firm to a different country for the purpose of serving the home country or global market in a location outside the firm’s home country. The *global research collaboration* refers to the joint development of know-how or innovation between a firm and various partners from more than one country via R&D joint ventures, R&D alliances, and contractual R&D (Plechero, 2012; Plechero & Chaminade, 2013). The overall picture of four modes of globalization of innovation is shown in **Figure 1**. However, we shall notice that the current classification of globalization of innovation is still highly organization-oriented, and networks at individual level are neglected in the study of GINs.

Figure 1. Four Modes of Globalization of Innovation

Mode of globalization of innovation	Activities included in this mode of globalization
<p>Global sourcing of innovation (Flow of innovation to the region)</p> 	<p>Source of technology or knowledge from an international organization (clients, suppliers, consultancy etc.) including:</p> <ul style="list-style-type: none"> • International extramural R&D • International acquisition of machinery and equipment • International acquisition of other external knowledge
<p>Global exploitation of innovation (Flow of innovation from the region)</p> 	<p>Use of new products or services mainly as a strategy to access international markets</p>
<p>Global generation of innovation (Flow of innovation from the region, but often exploited back by the region)</p> 	<p>Offshoring of innovation activities both internal and external to the firm for the purposes of serving home country or global markets in a location outside the firm's home country</p>
<p>Global research collaboration (Flow of innovation from and to the region)</p> 	<ul style="list-style-type: none"> • International research collaboration with other firms • International research collaboration with other universities and research centers

(Source: Plechero, 2012; p. 34, Lund University)

2.1.2 Changes of Players in GINs

When it comes to emerging economy, the image of a market full of imitated products from developed world will come to the mind. We often have the impression that developed world is the core location for idea generation and product development, while emerging economy is in charge of international production of goods and services. Yet in the last forty years we have witnessed a reverse cycle of global innovation generated from the inputs from emerging countries, such as China (Corsi, Minin & Piccaluga, 2015). Plechero and Chaminade (2016) indicate innovations from emerging economies arises an interesting puzzle. Even though their level of technological competencies is still low and their regional innovation systems are still in development, the level of

international networks for innovation that emerging economies get involved in is quite high. Emerging countries have become home to knowledge clusters that are tightly integrated into the GINs (Chaminade, Castellani & Plechero, 2014; Cano-Kollmann, Hannigan & Mudambi, 2017). Based on the data analysis, Branstetter et al. (2015) indicates the number of patents granted by the European and US patent offices to inventors residing in China is rising and the number of the world's leading firms running R&D centers in China is also expanding. We shall see emerging countries like China are playing an increasing role in GINs.

In addition to the involvement of emerging economies, our understanding of GINs has switched from a MNCs phenomenon to the phenomenon that includes more participation of SMEs (Barnard & Chaminade, 2017). Since the World War II, due to technological and organizational innovations MNCs have been greatly involved in international business activities (Ietto-Gillies, 2015). The involvement of MNCs in the global scope has indeed enhanced the international diffusion of knowledge and innovation. Especially for less developed countries, the local subsidiaries of foreign MNCs are often seen as the main contributors to bring global connections into the regions. However, the potential of MNCs to spur innovation in the local regions still depends on the type of subsidiaries and their mother organizations (Lorenzen & Mudambi, 2015). As a consequence, the role of subsidiaries of foreign MNCs on innovations from emerging economies might not be as dominant as it seems. Prahalad (2006)'s paper has provided examples of innovations in emerging economies that were generated from SMEs instead of local subsidiaries of foreign MNCs. The study of Barnard and Chaminade (2017) on the characteristics of different forms of GINs supports that GINs are not an exclusive phenomenon of large MNCs from developed countries but one that includes the participation of SMEs as well. They find that when SMEs have limited resources, GINs function as a compensatory mechanism for the firms to conduct innovation activities. Aslesen and Harirchi (2015) also show that global collaboration has a strong and significant impact on SMEs' innovation. As mentioned by Saxenian (2002), with the lower barriers on technology and transportation it makes even the smallest firm capable of finding international partners. SMEs can form GINs, and accordingly the importance of SMEs in GINs is worth paying attention to.

Overall, it can be seen that the changes is happening in global innovation networks. Considering the current negligence of networks at individual level in the literature, this thesis will take a closer look at global innovation networks in SMEs in emerging economy from the perspective of individuals. In order to further understand how emerging economy's SMEs sustain their presence in GINs, in the following sections current literature about drivers of GINs, especially individually-motivated linkages, will be reviewed.

2.1.3 Drivers of GINs

The industrial sector a firm belongs to makes a difference to their level of collaboration with international partners outside the region. Chaminade, Castellani, and Plechero (2014) indicate that not all sectors are equally globalized or have a same degree of internationalization of innovation activities. For example, industries like ICT, transport and life science are the most innovative and globalized. Important forms of knowledge needed for innovation are not freely traveling in the air simply for everyone to access (Martin, 2013). In order to carry out innovation activities, firms need to get access to explicit knowledge, which is the kind of knowledge that can be readily articulated, codified, accessed and verbalized, and tacit knowledge, which is the kind of knowledge that is difficult to transfer by means of writing or verbalizing (Polanyi 1966; Nonaka & Takeuchi, 1995). Different forms of knowledge are sourced and exchanged between economic actors within innovation networks (Martin, 2013). Asheim and Gertler (2005) point out that globalization and

localization of innovation activities is highly contingent to the type of the knowledge base which is dominating the industry. Hence, industries rely on knowledge with a more tacit nature will have different modes to acquire knowledge than industries that depend more on explicit knowledge.

Asheim (2007) further boils industrial knowledge bases down to analytical knowledge, synthetic knowledge, and symbolic knowledge. Analytical knowledge base refers to industrial settings based on strong science-based, explicit knowledge content, which is often created in formal model or by cognitive and regional process, such as biotechnology and ICT sectors. Knowledge exchange in these industries is either through collaboration between organizations or globally configured communities of scientists, and knowledge is typically accessible through publications and patent databases (Martin, 2013). Synthetic knowledge base refers to industrial settings with relatively strong tacit knowledge content, where innovation is often the result of the application of existing knowledge or the new combination of knowledge, such as industrial machinery, shipbuilding, and plant engineering industries. Interactive learning between users and producers and communities of individuals who share their expertise and knowledge with one another are important ways for synthetic knowledge based industries to collaborate (Martin, 2013). Symbolic knowledge base refers to cultural-related creative production industries, such as media and advertising, where innovation is more about the creation of new ideas and images. Its knowledge transfer is mainly through cooperation between companies within projects and interaction in interpretive community where people share similar socio-cultural experience and backgrounds (Martin, 2013). Comparing to analytical knowledge and synthetic knowledge, symbolic knowledge has the most tacit nature. Based on the knowledge base prevailing in the industry, GINs are organized differently by each firm (Liu, Chaminade, & Asheim, 2013). The comparison of three knowledge bases is shown in **Table 1**.

Table 1. Three Knowledge Bases – Comparison

Knowledge Base	Analytical /Scientific	Synthetic /Engineering	Symbolic /Artistic
Knowledge Nature	Explicit	Relatively Tacit	Most Tacit
Knowledge Exchange	Through collaboration between organizations or globally configured communities of scientists	Through interactive learning between users and producers and communities of individuals who share their expertise and knowledge with one another	Through cooperation between companies within projects and interaction in interpretive community where people share similar socio-cultural experience and backgrounds
Industries	Biotechnology, ICT	Industrial Machinery, Shipbuilding, Plant Engineering	Media, Advertising

(Source: Asheim, 2007; Martin, 2013)

Apart from the influence of dominant knowledge base in the industry that a firm belongs to, the absorptive capacity of single actors is also important for the global interaction for innovation (Cohen & Levinthal, 1990; Moodysson, 2008; Plechero, 2012). Literature considers that firm level competences, such as the human capital, the prior international experience of managers, and the educational background of the CEO, determine the capability of a firm to perform internationally (Chaminade, Castellani & Plechero, 2014). Because of the differences in the dominance of tacit knowledge and explicit knowledge, it is believed that analytical knowledge based industries cooperate and exchange knowledge in a global level, while cooperation and knowledge exchange in

synthetic industries and symbolic industries are less global configured (Martin, 2013). However, proponents of a diminished role of geographical proximity emphasizes that globalization and advanced technology for interpersonal communication have reduced the need for spatial proximity and direct fact-to-face interaction to exchange the tacit dimension of knowledge (Gertler, 2008). Especially with the easier access to cross-border transportation, mobile individuals could bear tacit knowledge with their mind and carry it across geographical distance. Therefore, international knowledge flows highly relies on the mobility of talent.

Human capital has been considered as an essential factor for the firms to create and sustain international competitiveness in a knowledge-based economy (Tung, 2008). Tacit knowledge resides within individual employees, who gained it through experience or socialization, and if the employees who hold tacit knowledge choose to leave the firm the knowledge will move along with the person. As a key internal resource, human capital is also crucial for a firm to develop absorptive capacity which can benefit its adoption of foreign technologies or collaboration with external partners (Cohen & Levinthal, 1990; Plechero, 2012). Geographical boundaries may constrain knowledge spillover among firms, but to some extent the mobility of individuals could buffer the negative effects of geographical barriers. For the sake of survival, the firms have to maintain and raise the quality of human capital by effectively attracting and retaining international human talents. In the next section, this special component, individually-motivated linkages, of GINs will be further discussed.

2.1.4 Individually-motivated Linkages

As human capital is embedded in individuals, the movement of individuals from one country to another was treated as zero-sum additions to the national sheets of knowledge and talent (Flanagan, 2015). This focus on the quantity transfer of human capital has made “brain drain” and “brain gain” become the most significant and widely studied topics of migration flows from developing countries to developed countries. The study of Hunt and Gauthier-Loiselle (2010) draws attention to the impact of skilled immigration on innovation and the individual determinants of innovation. Their empirical data measured by US patents per capita shows that when the share of college-graduate immigrants in the population increase 1 percent, patents per capita will increase by 6 percent. The positive effects of high-skilled immigration on promoting destination country’s innovation are also supported by other studies (Gagliardi, 2015; Bosetti, Cattaneo, and Verdolini, 2015).

It was believed out-migration of high-skilled individuals would cause negative influence to the sending areas since human capital is transferred from developing to developed world. However, Tripl (2013) points out that international knowledge flows through mobility of highly skilled individuals is more than one-way effect to both systems. Through conducting study on interaction between international migration and intellectual property rights in promoting innovation of emerging and developing countries, Naghavi and Strozzi (2015) also emphasize the importance of the movement of labor, independent of trade and foreign direct investment (FDI), for transferring knowledge from the developed world to the developing world. Thus, international migration of high-skilled migrants from emerging economies brings the benefits to not only the destination areas but also the country of origin. Unfortunately, the majority of studies assessing the consequences of mobile talent still mainly focus on the receiving areas, whereas the current number of studies on the impact of migration on the sending areas is rather few (Faggian, Rajbhandari & Dotzel, 2017). Within the few studies, recent research finds that under certain circumstance mobile talents could encourage people in the origins to invest in their education to increase local human capital (Beine et

al., 2008; Stark, 2004). Based on characteristics of recent migrants, study also finds that degree holders are more mobile than those who are less educated. More mobile individuals give rise to a larger variety of international knowledge linkages connecting back to the sending areas, and it is consistent with the finding of Fitjar and Rodríguez-Pose (2014) that education encourages international innovation collaboration.

In addition to education, return migration also has an impact on the origin area's international linkages. New economic opportunities created by talented immigrants returning back to their countries of origin have been recognized by Saxenian (2002). She calls those high-skilled mobile talents, who return to Asia and apply their skills and capital in home region, "The New Argonauts". The new argonauts transfer technology, skill and know-how between the old and new regions and maintain close relationships with both sides, turning "brain drain" into "brain circulation". Saxenian sees the roles of the transnational flows of people as important as states and multinational corporations acted in global production networks. The innovations in ICTs makes migrants easily stay in contact with their home countries (Kotabe et al, 2013), and the innovations in transportation and transaction costs lowers the barriers of the cross border movement of goods and people (Cano-Kollmann, Hannifin & Mudambi, 2017). This results in the phenomenon of "diasporas". Diaspora investment and entrepreneurship in their home countries contributes to the diffusion of technology and production knowledge, the internationalization of domestic firms, and foreign investment from non-diaspora sources (Kotabe et al, 2013). Tripp (2013)'s research about international mobility of elite "star scientists" also suggests that international transfer of knowledge between the sending and receiving regions is made possible by large majority of both expatriates and returnees maintaining linkages to the science system at their countries of origin. With the linkages generated from transnational network, knowledge flows from host countries to the countries of origin and stimulates innovation in developing countries (Naghavi & Strozzi, 2015). Considering the increasing impact of individuals on cross-country innovation activities, greater research attention also needs to be paid to the role played by highly skill return migrants on global innovation networks.

Personal-level ties are important for gaining knowledge across geographical distance (Ellis, 2011). Especially for SMEs, due to their limited resources individually-motivated linkages are more often used by them to acquire knowledge (Kaufman & Todtling, 2002). Personal relationships enable partners to trust each other, and thus enhance knowledge sharing (Mellewigt, Madhok & Weibel, 2007). Based on the study of Italian SMEs, Ceci and Iubatti (2012) suggest the centrality played by the personal dimension in relationships, and they also show that personal relationships play a critical role in diffusing innovation. Hence, the role of individuals in promoting SMEs' innovation is worth paying attention to. In the meantime staying in an extensive social network also brings more opportunities for SMEs (Leppäaho & Pajunen, 2017). Saxenian (2002) has mentioned the transnational individuals can create these kinds of social networks and enable even the smallest firms establish mutually beneficial relationships over long distances. However, even though the important role played by individuals in SMEs has been recognized by scholars, little is known about how SMEs engage in global innovation networks via individually-motivated linkages. Furthermore, there are a very high proportion SMEs engaging in GINs in emerging economy (Barnard & Chaminade, 2017), but no studies to our knowledge have conducted research about how SMEs in emerging economy engage in global innovation networks via individually-motivated linkages. In order to explore this aspect and fill the gap, the research question needs to be specified in the next section.

2.2 Research Questions

So far we have understood innovation related knowledge transfers along the networks of interaction, and global linkages does make a difference for innovation (Gertler & Levitte, 2005; Moodysson, 2008; Aslesen & Harirchi, 2015). From the aforementioned literature review, clearly identified changes of GINs have narrowed down our focus to SMEs in emerging economies. With detailed review of the drivers of GINs, the interest of this thesis has further fallen on the role of individuals in GINs. Among the literature on the topic of GINs, Chaminade, Castellani and Plechero (2014), Plechero and Chaminade (2016), and Cano-Kollmann, Hannigan and Mudambi (2017) have recognized the participation of emerging economy in GINs, especially a country like China. Moreover, Barnard and Chaminade (2017), Chaminade, Castellani and Plechero (2014), and Aslesen and Harirchi (2015) have also brought out the inclusion of SMEs in GINs. Individually-motivated linkages are considered as more important channels for SMEs to source knowledge and conduct innovative activities (Kaufman & Todtling, 2002); however, the current research within the topic has not paid enough attention to the role played by individuals to sustain the engagement of emerging economy's SMEs in GINs. To address this research gap, individually-motivated linkages of SMEs in emerging economy which are engaged in GINs are going to be investigated. The main research question for this thesis is thus as follow:

What is the individuals' role in sustaining the engagement of emerging economy's SMEs in GINs?

In order to answer this research question, the thesis will conduct case study on the SMEs in IT and new media industry in Beijing, China. As an emerging economy, China has attracted certain attention from innovation studies on international networks (Plechero, 2012; Plechero & Chaminade, 2013; Chaminade, Castellani & Plechero, 2014; Corsi, Minin & Piccaluga, 2015). This thesis intends to explore the role of individuals and enrich the understanding of the engagement of Chinese SMEs in global innovation networks.

3 Methodology

In this section, the methodological approach and methods adopted by this study will be described. It contains three parts. The first part will begin with a discussion of general research approaches. Then, it will be followed by the research methods adopted in this study for data collection and analysis. The third part will address the limitations of the research approaches that are employed in this thesis.

3.1 Research Approach

3.1.1 Qualitative Approach

The main purpose of this study is to understand the role of individuals in sustaining the engagement of SMEs in GINs. To achieve this goal, a qualitative approach is selected for this study. Under qualitative approach, data typically collected in the participant's setting, and data analysis inductively builds from particulars to general themes. The researchers "*seek to establish the meaning of a phenomenon from the views of participants*" (Creswell, 2013). The detailed perspectives of participants are being heard, but the patterns or themes of the data are interpreted by the researchers. Unlike quantitative research, data collection in qualitative research is mainly through documents, observation and interviews (Miles & Huberman, 1994). A qualitative approach is especially suitable when little research has been done on a concept or phenomenon that needs to be explored and understood (Morse, 1991; Creswell, 2013). The engagement of emerging economy's SMEs in GINs is a relatively new research topic in the study field, and within the current limited research about the topic, the role of individual in GINs is rarely mentioned. For the purpose of this study, due to the difficulties of using conventional indicators to capture the role individuals played in sustaining the engagement of emerging economy's SMEs in GINs from a quantitative perspective, the qualitative approach will be used to answer the research question.

3.1.2 Case Study

Case study, as one type of qualitative approaches, is being used by researchers to develop an in-depth analysis of a case, often a program, event, activity, process, or one or more individuals (Creswell, 2013). It can involve either single or multiple cases together with numerous levels of analysis (Yin, 1984), so case study is suitable to conduct detailed analysis of small number of units. It enables us to gain insight into complex and emerging issues that have not yet been fully investigated (Soy, 1997). As mentioned before, this thesis touches upon a relative new research topic with limited focus on the role of individual in GINs; therefore, case study will be an appropriate approach for this study, and to be more specific, IT and new media industry in Beijing, China is the study case in this thesis.

3.2 Data Collection

The following section will introduce the design of the case study for gathering the empirical data. This thesis attempts to understand the role of individuals in sustaining the engagement of emerging economy's SMEs in GINs. IT and New Media as an emerging industry and China as an emerging economy have drawn increasing attention from scholars. With this intention, IT and new media industry in Beijing, China is chosen as the specific study case to conduct the research. This study

case is originated from the Wallenberg research project at Lund University which focuses on SMEs in the IT and New Media industry in a global comparative perspective. Face-to-face interviews of SMEs in the IT and new media industry were conducted by the researchers of the Wallenberg project in Beijing, China during spring 2016. All interviews were participated by at least two researchers, and one of them is Chinese speaker. Thanks to the permission from the researchers within the original project, I am able to get access to the interview recordings and transcriptions for this thesis. The goal of the interviews was to understand how and why firms use global networks to innovate. Beijing, China was one of the locations that the original research project focused on. The selection of the case firms was not random. Instead, based on the selection criteria on firms' size (less than 250 employees), the innovativeness and international linkages of the firms together with the recommendations from the local contacts in Beijing, a total of nineteen SMEs were chosen as the case firms, within which I have the access to the files of fifteen SMEs. However, due to the agreement, all information gathered from the interviews will be treated confidentially. Hence, this thesis will also avoid mentioning any information that is possible for anyone to identify the firms. I will name case firms, Case Firm 1 to 15 (CF1, CF2...CF15).

Above mentioned interviews are, therefore, served as the main measures of gathering data for empirical analysis in this thesis. Interview is one of the most flexible and widely used methods for gaining qualitative information. A semi-structured interview with open-ended questions was conducted in each of above mentioned fifteen small and medium sized case firms. Semi-structured format helps interviewer to define the area to be explored with the possibility to explore information that is important for interviewees but may not have previously been thought of by the researcher (Gill et al., 2008). Under open-ended interviews, the interviewees are able to talk openly about the topic, and it allows researchers to collect data from interviewees to help explain the initial research question (Creswell, 2013). In order to gain more accurate information, the chosen respondents for the interview questions also need to have a thorough understanding of their innovation activities in the firm. Thus, all interviews were conducted with firm representatives. Each interview lasted for around one hour, and it took place at the locations of the case firms. All interviews were recorded. The questions included in the interview are divided into four sections: the case firm's innovation, the way case firm acquires external knowledge, regional innovation ecosystem, and the background information of the case firm. All sections provide the research with comprehensive information of how the case firm acquires external knowledge at global level. Even though the original aim of the interviews was not specifically at enhancing the understanding the role of individuals in GINs, the primary data gathered from the interviews of each case firm in IT and new media industry in Beijing, China allows us to disentangle this aspect and helps us to find answers related to the research question.

3.3 Data Analysis

For qualitative data analysis of the interviews, the first step is transcribing all the interviews. I personally transcribed nine interviews out of fifteen case firms, and got approved for access to the transcriptions of the rest six case firms. The next step is coding and describing data. Software NVivo is used to remark and highlight the essential information in the interviews. At the same time, pattern codes are also created in the software to further construct a clear structure for the data (Miles & Huberman, 1994). The aim of the research question in this thesis is to identify the individuals' role in sustaining the engagement of SMEs in GINs, and thus individually-motivated international linkages are generated as the main category, in which keywords "international students", "foreign employees", and "work abroad before" are identified. Company backgrounds also provide valuable information about the reasons the firms go global to acquire knowledge for

their innovation activities. Keywords “market share”, “knowledge base”, “total employees and R&D staff”, “reasons for sourcing knowledge abroad”, and “international linkages at organization level” are thus created under the company background category. Another pattern also emerged during the interviews when the case firms were asked about how they engaged in GINs. That is they monitor and acquire knowledge related to their innovation through international technology forums and international conferences and fairs; accordingly, “international technology forums” and “international conferences and fairs” are coded as two new keywords.

3.4 Address the Limitations

The credibility of the data gathered from the interviewees is an important issue in qualitative research. Credibility is an important aspect to establish the trustworthiness of qualitative research (Bryman & Bell, 2011). To enhance trustworthiness in research, triangulation is fundamental to validate data through cross verification from two or more sources (Bogdan & Biklen, 2006). Four basic types of triangulation, namely data triangulation, investigator triangulation, theory triangulation, and methodological triangulation, were identified by Denzin (2006). In this thesis, data triangulation and investigator triangulation are employed to robust the research findings. Specifically, different data sources, such as online reports and websites of the case firms, are utilized within the case study for data triangulation. Throughout the process of data collection, at least two researchers were participated in the entire interviews to make sure investigator triangulation.

During the interviews, to avoid confusion-induced credibility issues interviewees were reminded constantly by the interviewers that the acquired external knowledge should be related to the firm’s innovation activities. The interviewees were also asked to specify the knowledge linkages that were related to their innovation activities, such as the types and locations of their partners. By doing so, the risk of getting untruthful answers from the interviewees is minimized.

4 Empirical Analysis

4.1 Overview of IT and New Media Industry in Beijing, China

As mentioned before, this thesis is based on an original research project conducted at Lund University with a focus on IT and new media industry. This specific industry is quite interesting to conduct GINs research. Because when it comes to the aspect of the industry related more to media, according to its industrial knowledge base it is supposed to rely strongly on symbolic knowledge base. Based on similar socio-cultural experience and backgrounds, the knowledge required in the industry is supposed to be local (Martin, 2013). However, in the case of IT and new media industry, the thesis finds even though its market is relatively localized, its innovation networks still expand globally. In the case of 15 SMEs in Beijing, China, all of them are more or less present in GINs. As suggested by Moodysson (2008), types of knowledge needed in an industry do not remain static but change over time. With more technology attributes incorporated in the symbolic industries, IT and new media industry has become the one that goes beyond its original industrial knowledge base to tap into global networks.

Table 2. Market Share of the Case Firms

Case Firm \ Market	CF1	CF2	CF3	CF4	CF5	CF6	CF7	CF8
Domestic	100%	100%	100%	100%	100%	80%	Both*	100%
International						20%	Both*	
Case Firm \ Market	CF9	CF10	CF11	CF12	CF13	CF14	CF15	
Domestic	100%	100%	100%	100%	Both*	First*	First*	
International					Both*	Later*	Later*	

*Interviewees either didn't give percentages or hadn't started to sell when interviews conducted. (Source: own elaboration based on the interviews of the case firms)

The market share of each case firm is recorded in **Table 2** as shown above. It is worth noticing that CF13, CF14, and CF15 hadn't had any sales activity up to the time that all interviews ended. According to their strategic business plan, both domestic market and international market are being considered for the future sales. CF7 targets both domestic market, but so far its sales are few and "hard to tell". In total, 73% (11 out of 15) of the case firms' main markets are located in China. This result is consistent with Saxenian (2002)'s observation of transnational communities in the case of China that most of the companies started by Chinese returnees focus almost exclusively on the Chinese market. It also confirms the findings of other studies that Chinese firms, especially in the Beijing region, show a lower tendency of exploiting their innovation globally (Guan et al, 2009; Plechero & Chaminade, 2013). China has the world's fastest growing consumer market, and it tops the world in terms of Internet users and mobile phone users (Xie, 2017). With Internet and information technology at the core, a vast user base ensures that IT and new media industry is flourishing in China. Considering the market size in the domestic sphere and the better knowledge of the local market, it could be the reason why most of the case firms haven't put their eyes on the global market. Even for the firm (CF15) which has the ambitions to go global, it also mentioned

“Get larger, get more money and then... First, focus on Chinese market because we know it. Our CEO is a very good experience in the China market. Then, we go to global” (Source: interview on CF8).

Although serving the national market may to some extent affects firms' choices to collaborate locally or globally, the interviews indicate that the innovation networks of all 15 case firms are not constrained within the country. Asheim and Gertler (2005) have mentioned globalization and localization of innovation activities is highly contingent to the dominant knowledge base in the industry that a firm belongs to. Therefore, it seems necessary to also identify the specific knowledge base of each case firm in IT and new media industry in Beijing, China. On a scale of 1 to 5, 1 means not important at all while 5 means very important. The results of each case firm's estimation on how important different forms of knowledge for their innovation activities are recorded. Due to confusion-induced issues, the interviewee of CF7 was not able to evaluate the importance of knowledge for the firm's innovation. As a result, the total sources to identify the industrial knowledge base are 14 case firms. 79% of the case firms (11 out of 14: CF2, CF3, CF4, CF5, CF6, CF9, CF10, CF11, CF12, CF14, and CF15) consider engineering knowledge as the most important one; 57% of the case firms (8 out of 14: CF1, CF2, CF4, CF8, CF9, CF12, CF13, and CF14) think scientific knowledge is most important for their innovation; 21% of the case firms (3 out of 14: CF3, CF11, and CF12) see artistic knowledge as the most important knowledge for innovation. Based on the results shown above, we shall notice that the dominant knowledge base in IT and new media industry in Beijing, China is not as static as what we assumed at the beginning. Overall, engineering, scientific, and artistic knowledge is viewed as most important, relatively important, and slightly important for the current innovation activities in the IT and new media industry in Beijing, China.

From a micro-perspective on innovation, a concrete innovation project in firm often involves all three knowledge bases, having one as the critical knowledge to the competitiveness of the firm (Martin, 2012). In the case of SMEs in IT and new media industry in Beijing, China, 4 case firms (CF2, CF4, CF9, and CF14) evaluate scientific and engineering knowledge as equally important for their innovations, 2 case firms (CF3 and CF11) indicate the equal importance of engineering and artistic knowledge for their innovations, and 1 case firm (CF12) thinks all three, scientific, engineering, and artistic knowledge, are critical for the firm's innovation. The requirement of combinatorial knowledge with a current focus on engineering and scientific knowledge may offer a good explanation for the existing international knowledge linkages of SMEs in IT and new media industry in Beijing, China. As we know, scientific knowledge has explicit nature and it can be codified. By contrast, engineering knowledge has relatively tacit nature but it also includes explicit part in new application and new combination of knowledge that can be written down and transferred among online technology forums. Scientific and engineering knowledge neither depends on institutional or cultural knowledge, nor requires complicated language skills, so comparing to artistic knowledge it is easier to transfer across countries (Hunt & Gauthier-Loiselle, 2010). The current focus on scientific and engineering knowledge in the industry could create a need for sourcing knowledge at global level, and the convenience to acquire scientific and engineering knowledge through global networks could also facilitate the case firms' engagement in GINs. Together with labor mobility, individual could carry combinatorial knowledge with their mind across border, playing an important role in establishing new linkages or bringing in preexisting linkages for the case firms and sustaining their engagement in GINs. As a hybrid industry between analytical-based ICT industry and symbolic-based Media industry, IT and new media industry goes

beyond its original industrial knowledge base and taps into global networks to acquire different forms of knowledge for its innovation activities.

Its combinatorial knowledge base in IT and new media industry in Beijing, China gives us some insight into the engagement of SMEs in GINs, and the evidence gathered from the interviews also shows that all case firms are more or less present in GINs. It can be observed that among the four modes of globalization of innovation, global sourcing of innovation is the most common mode adopted by the case firms when they participate in GINs. Up till the end of all interviews, R&D departments within all case firms, if applicable, were located in Beijing, and all forms of international knowledge were acquired through their networks to the headquarters in Beijing for their innovation activities. The interviews reveal that the international knowledge sourced by the case firms mainly comes from personal international connections (12 out of 15: CF1, CF2, CF3, CF4, CF5, CF7, CF8, CF10, CF11, CF13, CF14, and CF15), international technology forums (10 out of 15: CF2, CF3, CF5, CF6, CF8, CF9, CF10, CF12, CF14, and CF15), international conferences and fairs (9 out of 15: CF2, CF4, CF6, CF7, CF9, CF10, CF11, CF14, and CF15), global connections at organizational level (8 out of 15: CF2, CF4, CF6, CF8, CF10, CF11, CF12, and CF15). From the above data, we could see that personal international connections are the major global linkages that sustain 80% of the case firms to engage in GINs. It is also noteworthy that all kinds of connections are in fact embedded in individuals, and personal connections could even be the foundation of formal relationship establishment, such as global collaboration at organizational level. Now, before we jump into the deep investigation of the role of individuals, to fully grasp the engagement of SMEs in GINs it is also important to first listen to the case firms' reasons behind their decisions to acquire knowledge globally.

4.2 Reasons for Case Firms Engaging in GINs

To some extent, the targeting market could influence the decisions of the firms to go global or not. If a firm, like CF7 or CF13, targets both international market and domestic market, one would expect the firm to go acquire knowledge abroad to fit international market standard. However, as mentioned in section 4.1, sales in most of the case firms are located in domestic market. From the interviews, pressure from the market side, limited knowledge capabilities and resources in the region, and preexisting international connections to facilitate knowledge sourcing were revealed by the case firms as three reasons for going global to acquire knowledge.

First, it could be found that the requirement from domestic customers is one of the reasons that even though the case firms target domestic market, they still choose to acquire knowledge outside the country. One case firm (CF10) stated, *“Some information from customers' requirements. The customers know there are some foreign technologies, they're very interested. They want us help them to... to buy it or to know... know some information about that”* (Source: interview on CF10). Chinese customer market is large yet expanding. Considering the potential of such market, it attracts not only excellent enterprises within the country but also global leading companies. Even though almost all case firms put their eyes only on the market that they are familiar the most with, they are still facing fierce global competition with competitors in the domestic market without crossing border. In order to compete with international competitors and win the customers, they have to keep up their innovation knowledge to the global level. One firms (CF8) emphasized,

“Because... in a sense, the customers who use our services are the top companies in their fields... so to some extent... considering our users' point of view, we hope we could also get support or information from world leading companies. Even some customers of ours, they are choosing

suppliers globally... globally... so we have to build international union through global collaboration” (Source: interview on CF8).

Another reason mentioned by the case firms for their decisions to source knowledge globally is that they can't find qualified organizations or talent in Beijing region. Many case firms stated in the interviews that the high level technology or knowledge is still located outside China so that it leaves them with no choice but going abroad to acquire from the best. CF4 explained their choice to do training abroad instead of in China as *“Because in China, the training in those areas are not that broad so we choose Britain”* (Source: interview on CF4). CF5, on their preference to acquire knowledge from international technology forum than domestic forum, stated, *“CISDA, it's a national technology forum... it didn't reach such high level as the Stack Overflow... this is my personal point of view”* (Source: interview on CF5). CF7 also stated their intention to go internationalization, *“Emmm, because the best VR technology is located in the U.S”* (Source: interview on CF7). On a lack of talent in the region, some case firms decide to set up their branch overseas and source talent from the outside. CF14 is one of the case firms emphasized on sourcing talent as the reason they go abroad, *“I think for talent... [...]... it's actually the reason I set up...start company in Seattle is that... [...]...we have branch who have more talent from XXX in Seattle, yeah”* (Source: interview on CF14). Especially, certain technology or knowledge related to innovation is in fact originated from the outside, and thus acquiring knowledge from the original place becomes the inevitable choice. CF8 stated on the choice of going global to source knowledge,

“I have to admit that some core business of our company and its core theory is foreign product, so it will have its own birthplace or original place. And about the other aspect of our technology, about knowledge, it originally comes from the western world, so in fact we have to gain information from a global perspective” (Source: interview on CF8).

Former research has shown that when their regions are lack of certain knowledge capabilities and resources, firms need to cross their geographical locations to access knowledge (Gertler & Levitte, 2005; Moodysson, 2008). This point was proved by the statement of CF11 when they were asked whether technology competencies affect their decision to go international. They stated, *“Yeah, it's... I think they have the influence because you know, we don't get the knowledge or technology; I have to find it outside”* (Source: interview on CF11). The lack of proper or competent knowledge sources in China was also confirmed by the case firm (CF2) as the reason they chose to go abroad,

“On the technological level, the majority of same type domestic enterprises have not yet reached their level. We can't find enterprise in China that has similar quality, so we have to get supports from them. Some problems could only be solved by those companies... yeah, that's the reason, so it depends on technological capability.” (Source: interview on CF2)

The third reason mentioned in the interviews is the former international connections held by the case firms, either from formal business cooperation or from individual international experience, to facilitate knowledge sourcing. Establishing new partnerships and engaging in innovation networks is usually really expensive, and considering the limited resources SMEs have, former connections they held inevitably become very important resources for their innovation activities. Especially when SMEs have already owned international business relationships or high-skilled migrants within the firms, those preexisted international connections will not burden the firms with too high costs but sustain their engagement in GINs to globally source innovation related knowledge. One case firm (CF6) explained their decision to acquire knowledge from international linkages is not due to the local region's lack of certain knowledge or technology but due to *“other reasons... Before we*

had business collaboration... on products... such as business cooperation...[...]” (Source: interview on CF6). CF10 also has contact with other companies at international level because of the former partnerships. They stated, *“Because in our company used to distributor for some foreign software. [...] ... and now we still keep the good relation, cooperation”* (Source: interview on CF10). On explaining getting contact with foreign professor, CF11 stated, *“You know, in 2007- 11, we had R&D project from... [...] ... This project is... is Finland-China cooperation project. Now, we connect with the Finnish...[...]*” (Source: interview on CF11). At the same time, former personal contacts were also mentioned by CF11 as the international linkages for their innovation activities, *“Now, we have classmates in Taiwan but before in 2000... 2011...[...]. So, my classmates connect to me to as our resources and then, I find who is the best in the copyright- in our...[...]*” (Source: interview on CF11). Same as the case firm, CF2, their former international business and personal connections are another major reason they chose to engage in GINs,

“Our parent company, XXX, has collaborated with American company since 1998 or 1996. It has been almost 20 years. With German company... it also has something to do with personal connections. Like the CEO of our company and the CEO of German company used to work at the same place, so it has historical root. They have already had a really close relationship” (Source: interview on CF2).

Apart from CF11 and CF2, some other case firms also pointed out that their decision to source knowledge through GINs did not only result from the reason that they cannot find knowledge in the region but result from their social proximity with personal contacts overseas. With the availability of preexisting international contacts, they don't need to spend time and effort to build relations with new partners no matter in the region or abroad. One case firm (CF1) stated their preference for using former international connections than looking for a new one from local, *“Sometimes we can find it, but you know that is decided by the background. It is like actually we can find it, but you know my professional study process is from Europe so I have...[...]*” (Source: interview on CF1). CF14 also stated about the potential of building global networks with their former contacts, *“For example, my...my colleague, who work in Starbucks now, maybe we have some...you know, cooperation”* (Source: interview on CF14). Social proximity can also facilitate the engagement of SMEs in GINs to source knowledge across border. On answering whether they go abroad to source artistic design knowledge for their innovation activities is due to the reason that they cannot find a proper or good designer in Beijing, CF15 stated, *“Not exactly. It's... it's just that there is... we know this guy is good then, we pick out him”* (Source: interview on CF15).

To sum up, the reasons given by the case firms to explain the engagement in GINs are pressure from the market side, limited knowledge capabilities and resources in the region, and preexisting international connections to facilitate knowledge sourcing. The need for international knowledge to facilitate innovation and serve customers urges the case firms to build connections and get involved in global networks for innovation, while preexisting international linkages readily connect the case firms into global networks for acquiring knowledge related to innovation at a lower cost. Therefore, we shall notice that the engagement of the case firms in GINs results from two aspects, building new international linkages or exploiting preexisting international linkages. From the perspective of individuals in the firms, when there are requirements for international knowledge in the firms' innovation activities, the employees need to take initiatives to establish international linkages so that they can make the firms engage in GINs to acquire knowledge globally. Whereas when individuals hold global personal connections from former experience, the firms will benefit from those employees' preexisting international linkages and tap into GINs for knowledge sourcing.

Indeed, human capital is a critical factor for the firms to develop competencies and stay engaged in global networks.

4.3 The Role of Individuals

4.3.1 Establishing New Linkages at Global Level

According to the opinion of the interviewees from SMEs in IT and new media industry in Beijing, China, it shows that some case firms think the technological competencies and capabilities in the region are still relatively low compared to the developed world and they need high level knowledge to facilitate their innovation activities. Meanwhile some case firms' customers also have certain demands for international knowledge. This thesis finds that to meet the requirement of international knowledge, individuals within the case firms take initiatives mainly through two channels, using Internet or joining international conferences and fairs, to establish new linkages at global level and connect the firms into GINs.

Many case firms indicate that the availability of the Internet to connect them with the outside world compensates for the lack of technological competencies and capabilities within the country. 10 out of 15 case firms (CF2, CF3, CF5, CF6, CF8, CF9, CF10, CF12, CF14, and CF15) confirm they stay engaged in GINs by joining international technology forums or acquiring online databases from international websites. Especially for now, the current focus of most case firms in IT and new media industry in Beijing, China is still on scientific and engineering knowledge. Those forms of knowledge are not highly context specific and resistant to transfer across geographical borders. When companies cannot find scientific and engineering knowledge they need for innovation in the local region, they are still able to source it through global networks on the Internet. Just as CF9 and CF15 mentioned, *“if you want to find some technology information, you could find it any time on the Internet”* and *“because for now, in the computer science even in...; all knowledge is in public; so, it's easy to get it”* (Source: interviews on CF9 and CF15). Using Internet is the most common and accessible way for SMEs to acquire some of the codified knowledge at global level.

Even though Internet plays an important role for SMEs to compensate their limited resources for innovation, the interviews reveal that linking to international knowledge database through Internet is normally organized by employees themselves. Since Internet came to China in 1994, China has topped the world with its largest number of Internet users (Xie, 2017). The high Internet penetration rate ensures the acceleration of global network establishment and knowledge diffusion. The first role of individuals this thesis finds is that they use Internet to source innovation knowledge at global level and sustain case firms' engagement in GINs. With the help of Internet, individuals in the firms are able to establish new global linkages, through which they can transfer international knowledge back from online technology forums so that individuals can enrich their own knowledge base and thus benefit the firms' innovation. When answering the question that whether the firm used Bulletin Board System (BBS) of Technology on the Internet to acquire knowledge, one firm (CF8) stated, *“About this, some of our employees have used. But we don't organized it... It is not organization behavior but employee behavior”* (Source: interview on CF8). CF5 also confirmed the importance of individual behavior in sourcing knowledge from international technology forums, *“Yes, but it's still personal action. Every technician would do this. Almost all of them...[...]... Mainly it's international forum. The forum I'm talking about is online forum”* (Source: interview on CF5). The role of individuals in scouring international knowledge through Internet was further emphasized by CF3, when they stated, *“Because they study those knowledge themselves... [...]... All technicians would do that (acquiring knowledge from the Internet)”* (Source: interview on CF3).

Even for the artistic knowledge, international website is still an important source for designers at CF3 to acquire knowledge at global level. On this aspect, the conversation with CF3 was as follow,

“Interviewee: Actually we have two full-time designers. They are in fully charge of designs... [...] ... They go to various kinds of material websites, UE or UI website to study... [...] ... Interviewer: And is it international website or domestic website? Interviewee: I think it's both” (Source: interview on CF3).

Apart from using Internet, joining international conferences and fairs is another major way to establish international linkages and compensate the lack of technological competencies and capabilities in the region. 9 out of 15 case firms (CF2, CF4, CF6, CF7, CF9, CF10, CF11, CF14, and CF15) mention that they attend international conferences and fairs held either in China or abroad to find connections at global level and thus engage in GINs to acquire certain knowledge related to their innovation through newly built international linkages. At international conferences and fairs, firms are able to monitor high level technology and talk with potential international partners in related industries. The knowledge acquired from international conferences and fairs are also mainly scientific and engineering knowledge. Because of different focus of each case firm's innovation, the knowledge they gained slightly varies. During the interviews, when interviewees were asked to specify which forms of knowledge they can acquire by joining international conferences and fairs, one firm (CF15) stated, *“It's hard to define because it's new-... Both (scientific and engineering knowledge). Because it's in the computer science...[...]*” (Source: interview on CF15). CF4 answered, *“I think it's still for scientific knowledge... Actually, it's for both (scientific and engineering knowledge), but more for scientific knowledge”* (Source: interview on CF4), while the knowledge CF2 focused on was *“engineering knowledge. Mainly conferences or seminars are about engineering application, because the object of our work is about application”* (Source: interview on CF2).

But joining international conferences and fairs sometimes can be costly for SMEs, especially when they need to transport the whole R&D team abroad for the participation. From the interviews, it reveals that instead of organizing it at the firm level, most of the case firms only have firm leader and key personnel participate in international conferences and fairs. Therefore, the second role played by individuals is that they take initiatives to build new connections through international conferences and fairs and thus sustain case firms' engagement in GINs for further knowledge sourcing. The importance of individuals' role was emphasized in the interviews. When answering how the firm join trade fairs, one firm (CF6) stated, *“At foreign countries, we join international fairs... [...] ... Normally, I go by myself, but sometimes I also take engineers”* (Source: interview on CF6). The interviewee of CF10 also pointed out the participation of the firm leader in international trade fairs, *“But my... my boss go abroad several times, maybe every year to see...to...to observe some international trade show”* (Source: interview on CF10). It is almost the same situation as in CF9, they stated, *“On CS exhibition, our team CEO went to the United States and travel around... then he had discussions with chip manufacturers and got some information about foreign market”* (Source: interview on CF9). What's more, the role of individuals in sustaining case firm's engagement in GINs was further elaborated by CF10 and CF11. On connecting with the foreign professor, CF11 explained, *“For the Germany professor... [...] ... I know they do the so-called the XXX engineering very well. I... I do not know him... know him before. I sent an email, ask him to attend to the conference, can to connect with him”* (Source: interview on CF11).

On explaining the establishment of new business relationship with foreign companies, CF stated,

“My boss... [...] ... so he’s the people who is often observe what happen abroad. So, yes, they usually first go abroad to find anything we can use or we can adopt it... [...] ... And he will keep in touch with them, to going on keep in touch with them...[...]” (Source: interview on CF10).

In the aspect of establishing new linkages at global level, we shall see that the individuals within the case firms take initiatives through two channels, using Internet or joining international conferences and fairs. By making new connections through each channel, individuals create international linkages that include the case firms into global networks for innovation and provide the opportunity for the firms to source outside knowledge. For the first channel, it demands high competencies of individuals because individuals’ roles are not only creating new international linkages but also sourcing innovation knowledge through the GINs. Only if they have the capabilities to assimilate new knowledge into their own knowledge base, can they facilitate the innovation activities at the firms. For the second channel, individuals’ global insight is more important for successfully creating international linkages. The initiatives in joining international conferences and fairs to build connections are usually taken by the firms’ leaders, who have a clear vision of which knowledge is important for their innovation activities (like CF11) and how to maintain the international linkages after the first contact (like CF10). Instead of sourcing knowledge directly, individuals’ global insight generates the right types of international linkages to sustain the engagement of the firms in GINs.

4.3.2 Bringing in Former International Linkages

Due to the valuable connections individuals hold, they are considered as key resources and thus get hired by the firms. Especially for SMEs, their less capability to search for and use knowledge makes the personal connections held by individual employees more critical for the innovation activities. As mentioned in the section 4.1, personal international connections are the most common linkages that connect the case firms into the global networks for innovation. 12 out of 15 case firms (CF1, CF2, CF3, CF4, CF5, CF7, CF8, CF10, CF11, CF13, CF14, and CF15) hold human resources with former international experiences that can bring in preexisting international linkages for the firms to engage in GINs.

Since the early 1990s China began to allow a large number of students to study abroad, it has generated a pool of foreign educated Chinese (Saxenian, 2002). Foreign educated Chinese returned home from overseas study and brought back international knowledge with their mind. Hence, the knowledge is transferred from the developed world to the developing world by the movement of individuals. Within the 12 case firms which have personal international connections, the majority of the case firms (10 out of 12: CF1, CF2, CF4, CF7, CF8, CF10, CF11, CF13, CF14, and CF15) have foreign background staff in the category of “international students”. With lower barrier for international mobility and the availability of communication technology, even after overseas students returned to China they are still able to maintain the international linkages with their former classmates and universities beyond the border. One firm (CF1) stated the way they keep in touch with former classmates and friends to consult scientific knowledge, *“Sometimes I call them sometimes I talk to them on the Internet on IM software...”* (Source: interview on CF1). CF4 emphasized the importance of getting scientific knowledge from international universities for their innovation activities, and for answering the way they built international linkages with universities, CF4 stated, *“I will give you two examples. The first is... XXX graduated from the American... Massachusetts... (MIT?)... Yes. XXX graduated from York University, Canada”* (Source: interview on CF4). The interviewee of CF13 has previous experience in the US university, and he thinks his education background has a great impact on the typical innovation of the company: *“my idea is*

coming from my education background” (Source: interview on CF13). At the same time, CF13 also confirmed the contribution of personal connections with former professors in the university in supplying scientific knowledge employed in their innovation activities,

“For scientific, because it’s very important to have... because you know, my current product with research community... by the way, my, you know... my supervisors, my previous supervisors and the other Professors, are very supportive for my company, yeah” (Source: interview on CF13).

Same as in CF15, they admitted that maintaining former international linkages with universities also helped them to further acquire scientific knowledge which is relevant for their innovation. For the case firms with a greater demand on scientific knowledge for their innovation, the international connections with universities become critical. Instead of taking initiatives at organizational level to establish new international linkages with universities, the individuals in the case firms who studied abroad before can contact their former university connections overseas and transfer back more international knowledge. By bringing in their former international linkages with classmates and universities, individuals connect the case firms into global networks and sustain their engagement in GINs for sourcing scientific knowledge to benefit their innovation activities.

In addition to overseas study experience, former work experience at international company can also offer individuals a great amount of international knowledge, which they can carry it with their minds to the next company. One firm (CF5) offered an example of how the firm benefited from one employee who had such international working background, *“For example, very practical, we have a partner who is from Hulu and he helped us a lot, because his technique is excellent and he is good at all kinds of aspects”* (Source: interview on CF5). Apart from bringing international knowledge, the international linkages individuals hold to connect with their former colleagues and companies may also bring new cooperative partner for the firms’ innovation activities. The collaboration between CF2 and their German partner company is originated from the personal work connections between two CEOs: *“the CEO of our company and the CEO of German company used to work at the same place, so it has historical root. They have already had a really close relationship”* (Source: interview on CF2). Hence, technology, skill, and know-how can be transferred between the both sides through the international linkages maintained by the returnees. Thanks again to the innovations in ICTs and transportation, the transnational flows of return migration stimulate innovation activities in China. CF13, CF14, and CF15 are the three case firms created by “the new argonauts”. But different from a decade ago when Saxenian gave the credit to “the new argonauts” in global production networks, this time return migrants play an important role in global innovation networks. Although at the moment, international linkages brought back by the return migrants at those case firms is still for the purpose of knowledge sourcing, we should expect after the development of innovation global exploitation of innovation will be another reason for the firms to stay engaged in GINs. The CEO of CF13 got his PhD in US, and after that he worked there for 3 years. With the familiarity with both markets, he started his innovation activities,

“For the US, they don’t have such a product yet, and for the Chinese part, they also don’t have such a, you know, product yet, so, that’s why we are the first one to, really created, such a XXX methodologies, and, the product” (Source: interview on CF13).

The founder of CF14 had international work experience in the world's leading companies, and the CTO of the firm is her former colleague at one of the international companies she worked. At section 4.2, CF14 has mentioned that lack of talents in the region is the main reason that the firm decided to engage in GINs. Then it is not surprising that the founder of CF14 attempted to exploit

her former international linkages to acquire more talents from her former workplace for innovation: *“I have many XXX colleagues... colleagues, who want to...want to join my startup”* (Source: interview on CF14). The interviewee of CF15 had 7 years work experience in the U.S, and he still maintains some contacts with the region like Silicon Valley due to former experience. Besides, the cofounder of CF15 also had 7 to 8 years work experience abroad. According to the interviewee of CF15, the preexisting international linkages they hold with former colleagues and companies decided their action to tap into GINs for knowledge sourcing and future global market exploitation. Therefore, individuals who had work experience at international company can bring in their former international linkages to sustain the engagement of the case firms in GINs so that the case firms can gain technology, skill, and know-how for their innovation activities from the global networks.

As an emerging economy, China attracts not only international companies but also international talents. From their own international background, foreign employees could bring in their international knowledge and connections to sustain firms' engagement in GINs and thus benefit the case firms' innovation activities. However, the interviews reveal that international linkages brought in by foreign employees is not a dominant phenomenon in the case firms. Foreign employees can only be found in 5 case firms (CF3, CF7, CF8, CF11, and CF15), in which the foreign employees of CF3 and CF15 are Chinese with foreign nationality, CF11's foreign employee comes from Taiwan, and all of them do not participate in R&D activities. CF7 has two foreigners working in the firm. Even though the main task they took was promoting the markets outside China, CF7 still indicated the contribution of foreign employees in their innovation,

“But now, because we have more foreigners working here, after conducting tests on 20ish versions, we get more improvements on our product. Now no matter on translation or the user experience, this version is really...[...].” (Source: interview on CF7).

C8 also mentioned they have foreign employees. To be more specific, according to their official website they have three employees who are foreigners. The knowledge owned by foreign employees is the core for their innovation activities,

“The algorithm of this software is developed by two foreign employees... [...] ... He worked at XXX Company before, offering service for those companies, and he came up with this theory during the work According to this theory, we continued to write codes to implement it and make the new product” (Source: interview on CF8).

In the aspect of bringing in former international linkages, we shall see that individuals within the case firms holds preexisting international linkages through three channels, overseas study experience, work experience at international company, and own international background. The first two channels are the most important ones for the case firms to engage in GINs. By exploiting preexisting connections through each channel, individuals can readily connect the case firms into global networks for innovation and facilitate knowledge sourcing for the firms' innovation activities. For the first channel, individuals are mainly helping the firms with scientific knowledge sourcing due to the characteristics of universities. For the second channel, a wide range of technology, skill, and know-how which are relevant for innovation could be acquired through the preexisting international linkages brought by individuals. Because of the valuable former connections they hold, individuals are once again playing an important role in sustaining the engagement of the case firms in GINs.

5 Conclusion

Interactive learning at global level matters for innovation and generates “*globally organized web*” called global innovation networks (GINs). The study of GINs has improved our understanding of its ongoing changes, such as the engagement of small and medium-sized enterprises (SMEs) from emerging economies (Barnard & Chaminade, 2017; Chaminade, Castellani & Plechero, 2014). For the drivers of GINs, we have known globalization of innovation activities is subject to the dominant industrial knowledge base (Asheum & Gertler, 2005), and firm level competencies have an effect on the firms’ access to global networks (Chaminade, Castellani & Plechero, 2014). The firms themselves need to have appropriate capabilities to assimilate and apply the knowledge they acquired from GINs. To a great extent, those appropriate capabilities are embedded in the individuals within the firms, and thus human capital is a critical factor for the firms to create and sustain their international competitiveness. Especially for SMEs, due to their limited resources human capital becomes an extremely important factor to secure firm level competencies. However, little is known in the study of GINs regarding what is the role of individuals to sustain the engagement of SMEs in GINs. This thesis intended to unfold individuals’ role in GINs and enhance the understanding of the engagement of emerging economy’s SMEs in GINs.

Through conducting a case study on 15 SMEs in IT and new media industry in Beijing, China, the important role of individuals in sustaining the engagement of SMEs in GINs has been revealed. With the lower barriers on ICTs and transnational transportation, it makes possible for individuals to establish new linkages at global level through Internet or joining international conferences and fairs for international knowledge sourcing. It also makes it easy for Chinese returnees to stay in touch with their former international connections and bring their preexisting international linkages with overseas friends, colleagues, universities or international companies into the firms. IT and new media industry in Beijing, China arises an interesting puzzle that its market is relatively localized but its innovation networks still expand globally. First, the thesis has shown currently, the requirement for combinatorial knowledge in the case industry, especially with a current focus on scientific and engineering knowledge, may offer some insight into the demand for knowledge sourcing at global level. Combinatorial knowledge highlights the role of individuals since mobile individuals could bear tacit knowledge with their mind and carry it across border. Second, the information from interviews has disclosed the case firms’ reasons of acquiring knowledge globally: limited knowledge capabilities and resources in the region, pressure from the market side, and preexisting international connections to facilitate knowledge sourcing. Regarding the first two reasons, the case firms have to take initiatives to build international connections so that they can engage in GINs to source international knowledge. For the last reason, the preexisting international connections readily link the case firms with GINs so that they do not need to spend time and effort to find new contacts but acquire knowledge at lower cost to facilitate their innovation activities.

This thesis fills the research gap by investigating the role that individuals played in supporting emerging economy’s SMEs to engage in GINs. It contributes to the current research on SMEs as participants in GINs. It explores the specific role of individuals in SMEs and provides a clear picture of how individuals establish new contacts at global level and bring in former international linkages to sustain the engagement of the firms in GINs. Transferability is one of the limitations of this thesis. The analysis on the thesis is only based on innovative firms in IT and new media industry in Beijing; therefore, we cannot make claims with regard to non-innovative firms or firms in the same industry outside the region. The industrial knowledge base we found in Beijing, China

does not represent the whole story of IT and new media industry. However, it is beyond the scope of this thesis to define IT and new media industry, considering the difficulty of drawing a clear border for this emerging industry.

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Appendix A – Interview Survey

**Global innovation networks, regional variety and its impact on the innovativeness of firms and regions:
The IT and new media industry in Sweden in a global comparative perspective**
全球创新网络、区域多样性及其对区域和企业创新的影响：从全球视角看瑞典IT与新媒体产业



International
Institute of Information
Technology Bangalore



This questionnaire is a part of an ongoing research project that aims to understand how and why firms in different regions around the world use global networks (GINs) to innovate. The project focuses on the IT and new media industry in four locations: Scania in Sweden, Oslo in Norway, Bangalore in India and Beijing in China. Our main interest is in innovation processes and knowledge sources related to innovation.

该项目研究比较四个区域的企业全球创新网络：瑞典斯科纳、挪威奥斯陆、印度班加罗尔和中国北京

All information gathered during this interview will be treated confidentially, i.e. it will not be possible for anyone to identify your firm. Moreover, no individual firm or organization will be mentioned in any publications based on these interviews. If such a need should arise, we will ask for your permission.

该项目所有访谈信息将保密，该项目的所有出版物都不会涉及可供任何人识别贵公司的任何信息。如果出版物需要涉及贵公司名称，我们将事先申请贵公司的许可。

Interviewer 访谈人 _____

Date of the interview 访谈日期 _____

Name of firm 公司名称 _____

Address of firm 公司地址 _____

Firm number (anonymous) 公司代码（匿名） _____

Name of respondent 被访谈人 _____

Function of the respondent

- | | |
|---|--|
| <input type="checkbox"/> CEO | <input type="checkbox"/> head of commercial / marketing department 市场部门负责人 |
| <input type="checkbox"/> Entrepreneur 公司所有人 | <input type="checkbox"/> other 其他 _____ |
| <input type="checkbox"/> head of technical department / R&D department 技术/研发部门负责人 | |

Contact details 联系方式

phone _____ email _____

INTERVIEWER

The interview is divided into four main blocks. The first is concerned with the company's innovation activity. The second part deals with how external knowledge is acquired. The third one is on the regional ecosystem, including the role of formal and informal rules, established practices and perceptions present in the society on the regional level. Finally the last one is related to the background information of the firm.

该访谈包含四个部分，1) 公司的创新活动；2) 公司如何获取外部知识；3) 区域创新生态系统，包括各类正式与非正式的规则、制度，社会上通行的看法和做法等等；4) 公司概况

If your unit is part of an enterprise group, please answer all subsequent questions in relation to this unit in NORWAY/SWEDEN/CHINA/INDIA only. (Please select the one that applies)

若贵公司是一个企业集团，请按您所在分公司的情况回答问题。

INTERVIEWER

We will start by asking some questions on the innovation activities of your company.

PART 1. INNOVATION ACTIVITIES 创新活动

1. Do you have an R&D department?

贵公司有研发部门吗？

No

Yes, how many employees in the R&D department as a percentage of total staff?

研发部员工占总人数比例____%

IF NO continue. IF YES, go to Q3.

2. Does the firm have employees (full-time equivalents) that are occupied with the development of new products /services/ solutions most of the time?

贵公司有没有主要从事新产品研发的人员？

No

Yes, how many in 2015? _____ %

3. Do you have employees with foreign background who are of the strategic importance for innovation activities? If yes, how do they contribute to innovation activities?

贵公司有没有国外背景的员工？他们参与创新活动吗？是如何参与的？

INTERVIEWER

Give the interviewer **Chart No 1** for the educational background of employees.

4. In the following chart you will find different educational backgrounds. Could you please indicate what is the dominant profile(s) of the employees occupied with the development of new products /services/ solutions most of the time? Please indicate the share (%) of the following fields (adding up to 100%).

请指出各类教育背景在从事创新活动的员工中所占比例

- a) Natural sciences 自然科学 _____%
- b) Engineering, technical studies 工程技术 _____%
- c) Artistic studies 艺术 _____%
- d) Management studies 管理 _____%
- e) Marketing studies 市场 _____%
- f) Other 其他 _____%

5. Could you describe a **typical innovation in your firm**?

请描述贵公司一个典型的创新

INTERVIEWER

If typical innovation is an example of a product, please follow up on the process – the activities behind development of the product

INTERVIEWER

Give the interviewee **Chart № 2** on types and levels of innovation.

6. During the **last three years**, did your unit introduce any of the following innovations? If yes, could you please indicate how novel they were **with respect to the typical innovations in your industry as whole – globally?**

过去3年中，贵公司有下列创新吗？若有，请问其新颖性如何？

Introduced innovation	Below average 低于平均水平	Average 平均水平	Above average 高于平均水平	New to the world 世界先进水平
P1. Innovation in goods 产品创新				
P2. Innovation in services 服务创新				
PR. Innovation in processes 过程创新				
O1. New management practices 管理创新				
O2. New business models 新商业模式				
Other types of innovation? 其他				

7. Do you have any IPR such as industrial design, copyright, trademark, patent on the innovations you introduced in the last three years?

贵公司过去三年是否持有列形式的知识产权：工业设计、版权、商标、专利

PART 2. KNOWLEDGE LINKAGES 知识联接

INTERVIEWER

In the next section we would like to understand how your company acquires **knowledge relevant for innovation** from other units within your company and from other organizations and individuals/networks of individuals externally and where those organizations, individuals/networks of individuals are located.

贵公司如何从其他分公司、其他组织、个人和网络获取与创新有关的知识？知识来源在何地？

INTERVIEWER

Give the interviewers **Chart № 3** on types of knowledge

8. Please look at Chart 3 which distinguishes between different forms of knowledge. Could you please estimate the importance from 1 to 5 of different forms of knowledge you need for typical innovation in your company described above? 1 – not important at all, 5 – very important.

贵公司进行创新时需要下列哪些类别的知识？他们的重要性是多少？

Scientific knowledge 科学知识 1 2 3 4 5

Engineering knowledge 工程知识 1 2 3 4 5

Artistic knowledge 艺术知识 1 2 3 4 5

Managerial knowledge 管理知识 1 2 3 4 5

Market knowledge 市场知识 1 2 3 4 5

Other 其他_____ 1 2 3 4 5

INTERVIEWER

Use **Chart № 4** on types of knowledge as a check list for yourself regarding the types of knowledge linkages that can be relevant. Do not give it to interviewee. Ask each type of knowledge one by one – if knowledge is used in innovation processes and where does it come from. In the case in which the interviewee indicates one of the sources marked with an asterisk, please proceed to question 9b.

9. a. We would like to understand how your firm acquires the different forms of knowledge indicated in the previous question. If a partner is a local subsidiary of a multinational company, please indicate.

b. Could you please indicate the type of partner and the specific location (city, not country)?

请按下表指出贵公司最重要的知识来源

Knowledge 知识	Type/Type of linkage 类别/链接 的类别	Name* 名称	Type of partners * 伙伴类型	Location* 地点	Subsidiary Yes/No 是否分公司
Scientific 科学知识					
Engineering 工程知识					
Artistic 艺术知识					
Managerial 管理知识					
Market 市场知识					

* only in case of sourcing using linkages marked with *仅针对星号的联接

PART 3. THE ROLE OF THE REGIONAL ECOSYSTEM OF INNOVATION 区域创新生态系统

INTERVIEWER

In the coming part we want to understand the availability and quality of the regional eco-system in terms of innovation and how it influenced your decision to source knowledge internationally.

First, give the interviewee **Chart № 5** with the figure explaining the rationale behind this part. Second, give **Chart № 6** with a list of organizations in the region as well as the scale means from 1 to 5.

Innovation Processes 创新过程

10. We would like to know how useful are other organizations in the region for your innovation processes, both directly – as partners – and indirectly – for example providing infrastructure, training, funding, etc. For each form of organization, please indicate their importance directly or indirectly using a scale from 1-5, being 1 not important at all and 5 very important.

您所在地区的各类单位对您的创新活动有没有直接（合作）或间接（提供设施、培训、资助等）的贡献？请指出各类组织对贵公司创新的重要性（按 1 到 5 打分）。

Organizations 组织	Directly 直接贡献	Indirectly 间接贡献
	重要性 1、2、3、4、5	
Other firms in IT & new media industry 其他 IT 和新媒体公司		
Other firms in different but related industries 其他相关行业的公司		
Universities and research centers 大学、研究机构		
Customers 客户		
Suppliers 供应商		
Competitors 竞争对手		
Government 政府部门		
Consultants 咨询公司		
Intermediaries (tech. transfer offices, industrial associations) 中介机构（技术转移中心、行业协会等）		
Venture capital, business angels 风投		
Other 其他_____		

11. a. Are you aware of any **policy initiatives in your region** that support innovation? (the interviewer could provide a list of policy initiatives and ask the interviewee if he/she is aware of them)
 您所在地区是否有支持创新的相关政策和机构？

b. If yes, which policy initiatives supporting innovation has your firm used in the last three years?
 过去 3 年贵公司得到过哪些相关政策和机构的支持？

c. Specify for the above mentioned policy initiative HOW you benefit from them? (Multiple options).
 贵公司在下列各方面是如何得到这些支持的？（多选）

1. Access to market knowledge 市场知识的获取	
2. Access to technological knowledge 技术知识的获取	
3. Sharing knowledge with suppliers, customers or competitors 与供应商、客户、竞争对手分享知识	
4. Sharing knowledge with universities 与大学分享知识	
5. Training, upskilling 获得培训	
6. Access to funding 获取资助	

INTERVIEWER

Give the interviewee **Chart № 7** with a list of institutional factors. We would like to know if those factors have influenced in a positive or negative way innovation in the firm (hampering, neutral, enabling).

12. The chart provides you with a list of other factors affecting the quality of the innovation environment in your region. We would like to know if those factors have influenced in a positive or negative way innovation in your firm (hampering, neutral, enabling). Insert a cross (X) in the option that applies

在下列影响区域创新生态的各要素中，哪些要素对贵公司的创新活动产生过积极或消极的影响？

Institutions 制度	Hampering 消极影响	Neutral 中性影响	Enabling 积极影响
Regulations (tax, labor regulations etc.) 制度（税收、劳动法等等）			
International standards 国际标准			
Societal values towards innovation 社会对创新的认知			
Societal acceptance of failure 社会对失败的接纳			
Culture of collaboration in the region (willingness of other firms to exchange knowledge related to innovation) 区域内的合作文化（与其他单位组织交流创新知识的意愿）			
Level of trust among different actors in the region 区域内各单位组织间的信任			
Regional actors having a joint vision for the development of the region 区域内各单位组织对区域发展的共同愿景			

13. In the case in which the responses were **enabling or hampering**. Do you have any concrete example?

如有积极或消极影响的因素，请举出具体的例子

Internationalization Processes 国际化过程

14. Have the availability and quality of the organizations in your region influenced in any way your **decision to acquire or not knowledge internationally**? If so, can you give an example?

区域内单位组织的水平和质量是否影响贵公司决定到国外获取知识？如果是，请举例。

15. a. Are you aware of any policy initiatives in your region that **support internationalization in any step of the development of innovation** – from acquiring knowledge to commercialization?

您所在区域是否有相关政策和机构支持企业创新的国际化过程（从获取知识到商业化）？

- b. If yes, which policy initiatives supporting internationalization has your firm used in the last three years?
过去 3 年贵公司是否使用过此类政策支持？

16. Have any of the institutional **factors (regulations, norms)** mentioned before influenced your decision to **acquire or not knowledge internationally**? If so when? Can you give an example?
贵公司决定到国外（或不到国外）获取知识，是否受到上述制度因素的影响？

17. Has **any other factor – not necessarily in your region** – affected your decision to **acquire or not knowledge internationally**? For example, difficulties finding partners, cultural differences, reputation of the host region, etc.
是否有其他因素影响您到国外（或不到国外）获取知识的决定？

PART 4. COMPANY BACKGROUND 公司概况

INTERVIEWER

Finally, we would like to check that the information we have from your company is correct

18. Are you 贵公司是

- A standalone company 独立的公司
- The headquarters of an MNC 跨国公司的总部
- A subsidiary of an MNC with head office located in 跨国公司的分公司，总部在 _____

19. Year of establishment of this unit 公司成立年份 _____

In case of merger or acquisition, indicate also the year in which the most recent merger or acquisition took place 如果是并购的公司，最近一次并购是在 _____ 年

20. Which percentage of your sales goes to the following markets 贵公司的市场销售

Domestic 国内 _____%

International 国际 _____%

Which are the most important markets? 最重要的国际市场是 _____

21. How many employees (full-time equivalents) are working in your firm?

贵公司全职人员有 _____ 人