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MAPPING NETWORKS OF INNOVATIVE CLUSTERS BETWEEN CHINA AND CANADA

CANADIAN VIEWS ON ASIA

MAPPING NETWORKS OF INNOVATIVE CLUSTERS BETWEEN CHINA AND CANADA

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EXECUTIVE SUMMARY

Although there is a very large Chinese immigrant community in Canada, economic linkages between the two countries are still quite limited. In this report, we examine the patterns of Canadian investments in China at the cluster and city-region levels and the process of how Canadian firms acquire, mobilize, integrate, and generate knowledge through investment networks.

We find:

1. Canadian investments in China are structurally different from the trade patterns between the two countries. In trade, comparative advantages of the two countries generate resource exports to, and manufacturing imports from, China. However, in investment flows, industries such as telecommunications, finance, automobiles, and mining dominate – areas in which both China and Canada have developed international competitive strengths and are strong in innovation and knowledge creation.
2. In knowledge-intensive industries, a distinct pattern of Canadian cluster firms investing in similar cluster areas in China can be identified. This generates global cluster networks for transnational learning and innovation. It should be noted, however, that fewer investments across clusters have occurred since the peak of the global financial crisis in 2009.
3. Many Canadian firms are still in a relatively early stage of building knowledge networks in

China. They are still focused on the process of acquiring market information and knowledge about business practices in China. Only a few Canadian firms can be identified that have entered a mature stage of knowledge creation between the two countries.

4. Public knowledge facilitators, such as governments and business associations, along with private knowledge facilitators, such as consulting firms, law firms, and banks, play crucial but different roles in supporting Canadian investments in China. While public facilitators tend to provide general information and make referrals, private facilitators leverage specific knowledge and expertise across borders.

We recommend:

1. *Develop stronger communities of knowledge facilitators.* This involves nurturing a larger group of individual facilitators and promoting communication and collaboration among organizational facilitators.
2. *Upgrade knowledge networks.* This includes designing policy programs to provide detailed information about the changing Chinese economy, to develop platforms for sharing experiences and expertise among investing firms, and to mobilize the knowledge bases of transnational immigrant communities in Canada.

Toronto, August 2015
Harald Bathelt and Peng-Fei Li



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CONTEXT: INNOVATION IN GLOBAL CLUSTER NETWORKS

Over the past decades, developed economies have entered a new stage in which innovation and knowledge are becoming key in establishing competitive advantages not only for firms, but for entire regions and countries. In the knowledge economy, natural resource endowments alone can easily turn from assets to liabilities in creating dynamic innovative ecosystems. For Canada, this suggests that the economy has to be structured in such a way that firms can be successful in the global competition for developing new ideas, products, and solutions.¹ In this context, a crucial question is how to promote Canadian business innovation that extends to the global knowledge economy.

Traditionally, many studies in economic geography, regional economics, and management offer a localization answer to this question. It is argued that in order to create knowledge, firms and in-

dustries should focus on their local environments. Many well-known examples of regions such as Silicon Valley, Hollywood, and the Third Italy substantiate the argument that innovation is created through intensive communication and interaction between professionals and engineers in local communities. This work suggests that intensive interaction between professionals and across firms in successful innovation centres creates a local culture of knowledge sharing and stimulates innovation dynamics. Further, the argument goes that these dynamics are difficult to imitate in other regions because they are based on localized capabilities and specific institutional arrangements that are both exploited and constructed in these communities.² The localized learning argument explains why economic activities become more agglomerated in specific regions, while at the same time powerful globalization forces greatly increase the transnational mobility of capital, labour, prod-

1 Council of Canadian Academies. 2009. Innovation and business strategy: Why Canada falls short. Ottawa: Council of Canadian Academies. Retrieved from <http://www.scienceadvice.ca/en/assessments/completed/innovation.aspx>

2 Storper, M. 1997. The regional world: Territorial development in a global economy. New York: Guilford; Maskell, P., and A. Malmberg. 1999. Localised learning and industrial competitiveness. Cambridge Journal of Economics. 23(2): 167–185.

ucts, and knowledge. In regional and national policy programs, these ideas have led to strategies of industrial clustering to strengthen innovative capabilities of regions and nations.³

After a decade of worldwide efforts to build new Silicon Valleys and industrial clusters, success cases are still relatively rare and it has become questionable whether a localization strategy is sufficient in itself to trigger regional economic growth and development. In the context of the globalizing knowledge economy, the localization model is confronted with many challenges because firms need to build capabilities to mobilize and integrate specialized knowledge pools and technologies that are spatially dispersed.⁴ Under these circumstances, innovation is not a purely localized phenomenon, but has become increasingly globalized. From a policy perspective, firms need to go beyond regional centres of excellence and build global networks of innovation. The limitations of the localized learning model also become apparent with reference to the Canadian economy.

One of the most competitive industries in Canada that is independent from the country's rich resource base is the telecommunications industry.⁵ The Waterloo region, with a strong technology base through its universities and an agglomeration of information-technology-related firms, is an example of the phenomenon of localized learning.⁶

3 Porter, M. 1990. *The competitive advantage of nations*. New York: The Free Press.

4 Bathelt, H., A. Malmberg, and P. Maskell. 2004. Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography*. 28(1): 31–56.

5 Niosi, J. 2000. *Canada's national system of innovation*. Montreal, Kingston: McGill-Queen's University Press.

6 Bramwell, A., J. Nelles, and D.A. Wolfe. 2008. Knowledge, innovation and institutions: Global and local dimensions of the ICT cluster in Waterloo, Canada. *Regional Studies*. 42(1): 101–116; Bathelt, H., D.F. Kogler, and A.K. Munro. 2011. Social foundations of regional innovation and the role of university spin-offs. *Industry and Innovation*. 18(5): 461–486.

And BlackBerry (formerly Research in Motion) has become the flagship case of a successful firm that was bred and nurtured in such an environment. In its heyday, the firm was a dominant player in the global smartphone market. However, in terms of its innovation structure, BlackBerry has always remained a 'local' firm. Almost all of its research and production facilities are located in the Waterloo and Ottawa areas. While there are many reasons that explain the fall of BlackBerry, important drawbacks are its over-embeddedness in a relatively peripheral cluster and the lack of global linkages.⁷

Apparently, the global economy has been in a state of turbulence for quite some time now, and firms often teeter on a knife's edge between success and failure.⁸ On the one hand, industrial leaders can quickly lose their edge in innovation, and vibrant regions can unexpectedly fall into stagnation. On the other hand, innovative firms from emerging economies, particularly China, have risen like a phoenix and make global competition less predictable.⁹ As a consequence, it is more difficult to tell from where the next round of innovative ideas and new business practices will originate. And it becomes a challenge for business managers and regional policy-makers to foster successful innovation.

7 Gillette, F., D. Brady, and C. Winter. December 5, 2013. *The rise and fall of BlackBerry: An oral history*. Bloomberg Businessweek. Retrieved from <http://www.bloomberg.com/bw/articles/2013-12-05/the-rise-and-fall-of-blackberry-an-oral-history>; Li, P.-F., and H. Bathelt. January 20, 2014. *Locating in a 'Silicon Valley' does not guarantee success for technology firms – they must also leverage knowledge and innovation globally*. USApp – American Politics and Policy. Retrieved from <http://blogs.lse.ac.uk/usappblog/2014/01/20/technology-firm-global-cluster/>

8 Dicken, P. 2011. *Global shift: Mapping the changing contours of the world economy*. New York: Guilford Press.

9 Si, Y., and I. Liefner. 2014. *Cognitive distance and obstacles to subsidiary business success – The experience of Chinese companies in Germany*. *Tijdschrift voor Economische en Sociale Geografie*. 105(3): 285–300.

In each industry, agglomerations are identifiable that are considered the mecca of technology development in their respective fields. But more and more new innovative clusters are developing elsewhere – particularly in emerging economies – and important knowledge and technology pockets are increasingly more widespread. For example, in high-tech industries, clusters have risen in regions such as Shenzhen, Shanghai, and Suzhou in China in the past 20 years alone. These clusters may have developed based on cost advantages, but they have grown out of varied contexts and developed their own knowledge dynamics. New competitive firms from these regions have developed different understandings of industrial dynamics and accumulated different expertise in their fields. Driven by local innovators, these industrial communities are quickly being transformed from knowledge-absorbing to knowledge-creating areas. They are developing into new innovative clusters with their own specific strengths and specializations. This is a novel trend that will have a distinct impact on the innovation strategies of firms, industries, and regions in developing economies, including Canada.

In this turbulent age, it becomes risky to blindly rely on localized learning networks in regional clusters – no matter how successful these may have been in the past. What is crucial for regional competitiveness under these circumstances is to search, mobilize, and integrate new ideas, technologies, and knowledge scattered at a global scale – and sometimes from very distant places. This does not imply that entrepreneurs need to be omnipresent, but it becomes increasingly important to connect with relevant key locations around the globe that drive the knowledge dynamics in the respective technology field. In each industry, a small world of remarkable hotspots or innovative clusters exists, and these continuously improve existing technologies and sporadically generate innovations that redefine the rules of the game in their global communities. To gain a global competitive advantage, firms, clusters,

and regions need to tap into such knowledge pools and become insiders in these places. In the context of Canada and China, this rationale suggests that we may be witnessing a process that generates novel patterns of foreign direct investment (FDI) linkages, a new structure of transnational knowledge flows, and perhaps a new organization of multinational corporations. We refer to this new architecture of globalized learning as “global cluster networks.”¹⁰

The underlying research to this report has been designed in order to systematically unravel the networks of innovative clusters linked through investments between Canada and China, and to investigate the role of multinational firms in facilitating knowledge generation between the two countries. Particularly, this report addresses the following questions: First, do FDIs from Canada to China connect innovation centres and clusters in both countries, and what kinds of cities, regions, and industries are linked through global cluster networks? Second, we examine how Canadian firms facilitate transnational knowledge sharing within investment communities in China. Third, we use these findings to draw policy implications for international collaboration between the two countries.

This report is organized into five sections: Section 2 analyzes the development of Canadian businesses in China and highlights different structures of trade and investments between the two countries. After an introduction of the data and methodology, Section 3 depicts the spatial patterns of Canadian investments in China across industries and confirms the existence of global cluster networks. Section 4 turns to the process of how these cluster networks are established, and investigates the different stages of knowledge integration and generation of Canadian firms in China. The final section concludes and draws policy implications.

¹⁰ Bathelt, H., and P-F. Li. 2014. Global cluster networks – foreign direct investment flows from Canada to China. *Journal of Economic Geography*. 14(1): 45–71.

CANADA-CHINA BUSINESS ENGAGEMENT

This section presents an overview of economic development processes in China and foreign involvement in these processes, and characterizes current trade and investment profiles between Canada and China.

CHINESE ECONOMIC DEVELOPMENT AND CANADIAN INVOLVEMENT

The economic rise of China that started almost 40 years ago has ultimately changed the landscape of global economic and political power in fundamental ways.¹¹ Through its gradual transition into a market economy in the 1980s, China initially attracted a wave of investments in labour-intensive industries from Hong Kong and Taiwan. In the 1990s, an almost unlimited supply of disciplined labour, available space, and efficient upgrading of infrastructure made China the most popular destination for investments across all industries. Through trade and investments, major developed economies have established strong economic link-

¹¹ In this report, “China” refers to the economic context of “mainland China.”

ages with the largest emerging economy since that period.¹²

With an unprecedented flow of global investments and unparalleled growth of domestic industries, China quickly turned from an agricultural economy into the world’s industrial powerhouse that manufactures everything consumers use in their daily lives. Before 2000, the Chinese economy generally followed a model of low-cost production. The domestic market, although developing quickly, was still not quite on par with large, developed economies. Foreign investments in traditional manufacturing industries and infrastructure construction became crucial drivers of economic development in China at that time. In the context of China’s integration into the global economy, it is not surprising that major investors in China originated from the world’s strong manufacturing economies, particularly Japan, Germany, and the United States. Canada, a country blessed with tremendous amounts

¹² Brandt, L., and T.G. Rawski. 2008. China’s great economic transformation. China’s great economic transformation. Edited by L. Brandt and T.G. Rawski. Cambridge: Cambridge University Press.

of natural resources, took much less notice of the emerging giant.

It is interesting to note that Canada, as a country, had an unusually positive and very friendly image among the population in China, compared with other developed economies that had been at war with the country in earlier times. This was particularly related to the role of Norman Bethune, a Canadian doctor who – although less well known in Canada – was widely respected and has long been memorialized throughout China for his contribution to the Communist party in the war against fascist Japan.¹³ Just based on Bethune’s historical role, a Canadian could easily receive special hospitality on a visit to China during the 1990s. Yet, such initial ties did not spur economic interaction. The Canadian business community only started investing in China in the mid-1990s when large Canadian firms, such as Sun Life Financial, Magna, Manulife, and Bombardier began entering the country.¹⁴

After two decades of industrialization, China has changed substantially in its course of economic development during the 2000s. While low-cost production is still characteristic of many Chinese firms, increasing labour, land, and material costs in recent years have brought major challenges to the Chinese economy. In major coastal cities, living costs, particularly housing costs, have multiplied over the past 10 years. The booming housing market has led to a steep increase in property prices in Beijing and Shanghai, which are now noticeably higher than property prices in Toronto and Vancouver. Under these circumstances, low-cost manufacturing industries are struggling to survive

13 Stewart, R., and S. Stewart. 2012. *Phoenix: The life of Norman Bethune*. Montreal, Kingston: McGill-Queen’s University Press.

14 Sun Life Financial set up a representative office in Beijing in 1995; Magna and Manulife arrived in China in 1996 by acquisition and joint venture, respectively; and Bombardier established a joint venture in Changchun in 1997.

in these metropolitan areas. One response of some manufacturing firms has been to relocate production facilities to inland provinces, or even to other nearby Southeast Asian economies. As a result, economic growth rates in western China have surpassed the values in coastal areas since 2007. The results of these changes are spatial convergence processes in economic development, supported through economic policy programs by the central government. The ‘westernization’ of China’s economic growth has also had substantial implications for FDIs, including those from Canada. Due to this regional economic transformation, cities in western China, such as Chengdu and Chongqing, are now among the preferred destinations for investments of foreign firms.

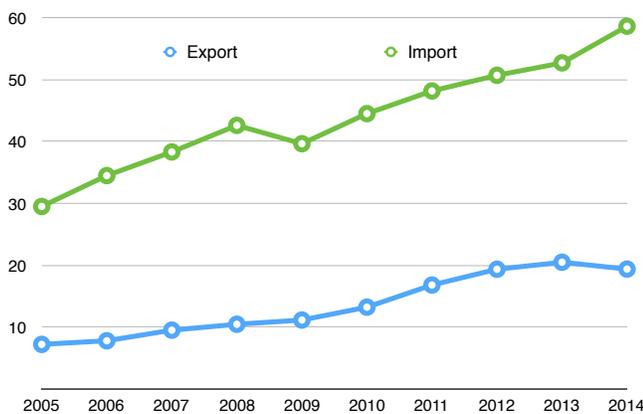
Other responses to the increasingly costly business environment in China have been to upgrade processes from low-cost production to higher-value-added activities within global value chains. Related to such shifts, Chinese firms have become important players in global competition in many fields, particularly in telecommunications, e-commerce, new energy sources, railway equipment, and aerospace. Crucially, such upgrading is based on innovation activities and the development of advanced technologies, and less on cost advantages. Multinational firms from China, such as Huawei, ZTE, and Lenovo Group, have expanded to major markets worldwide, including Canada.¹⁵ Along with the strengthening of innovative capabilities, China has also developed into an important marketplace for the global business community. With slowing economic growth in North America and Europe since the financial crisis, the still fast-growing Chinese market has gained more and more significance for the development of transnational firms. In many product groups, such as automobiles, smartphones, and commercial airplanes, China is already the largest market in the world.¹⁶ As a result of all of

15 Si and Liefner op. cit.

16 Cliff, R., C.J. Ohlandt, and D. Yang. 2011. Ready for

these shifts, the rationales for FDIs in the country have fundamentally changed. Knowledge and markets, rather than costs, have become key for firms investing in China. It is within this new Chinese economy that we have identified and investigated the development of networks between innovative Canadian and Chinese clusters, based on transnational investments.

Figure 1: Canada's trade with China, \$ billion, 2005-2014



Data source: Canada. Industry Canada,¹⁷ authors' calculations

ECONOMIC LINKAGES BETWEEN CHINA AND CANADA

Trade

China is Canada's second-largest trade partner behind the United States, which dominates Canada's external economic connections. As Figure 1 shows, both Canada's imports and exports with

China have increased steadily over the past decade. In terms of exports, however, Canada still overwhelmingly relies on the American market, which was the destination of an astonishing 76 percent of all Canadian exports in 2014. China, the second-largest market for Canadian firms, only accounted for 4.3 percent of Canadian exports with a value of \$19B.¹⁸ When looking at imports to Canada, the United States is again responsible for the lion's share with 52 percent. China is the second-largest importer to Canada with a share of 11 percent of all imports, or \$58B. Between 2005 and 2014, Canada's trade deficit with China doubled from \$20B to \$40B, suggesting that Canadian imports from China have grown much faster than Canadian exports to China. Because of the steady growth of the Chinese economy in recent years, both as a producer and as a market, it can be expected that Canada's trade with China will continue to increase.¹⁹ Future trends regarding Canada's trade deficit with China, however, are unclear at this point.

Figure 2 depicts the structure of trade between Canada and China, and provides evidence of a structural imbalance. Accordingly, Canada's exports to China are dominated by natural resources. Specifically, pulp, oilseed, wood, non-ferrous metals, and iron accounted for nearly half of Canada's exports to China in 2014. However, on the import side, China primarily shipped manufactured products to Canada in 2014, particularly computer and peripheral equipment, telecommunication equipment, women's clothing, toys, and audio and video equipment. While this is a natural trade pattern

takeoff: China's advancing aerospace industry. Santa Monica: Rand Corporation. Retrieved from <http://www.rand.org/pubs/monographs/MG1100.html>; Alba, D. May 5, 2015.

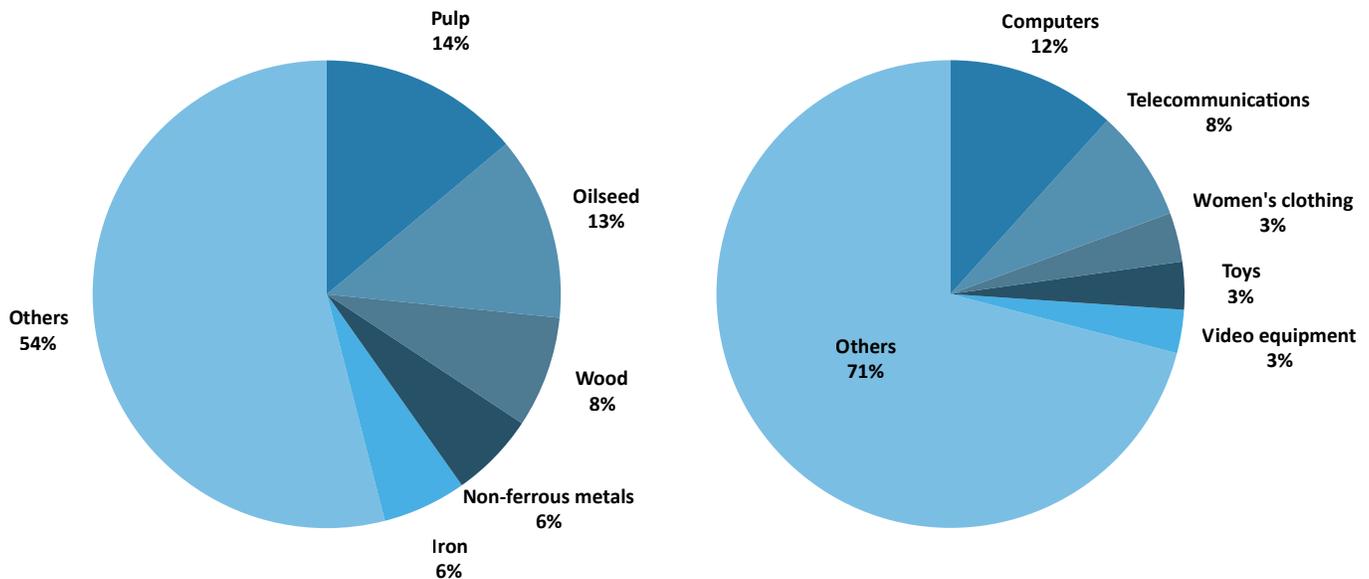
China's massive smartphone market is finally slowing down. Wired. Retrieved from <http://www.wired.com/2015/05/china-smartphone-market-slowdown/>

¹⁷ Canada. Industry Canada. 2015. Trade data online. Ottawa: Industry Canada. Retrieved from <https://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/home>

¹⁸ All values in this report are measured in Canadian dollars.

¹⁹ See, for example, Tiagi, R., and L. Zhou. 2009. Canada's economic relations with China. Vancouver: Fraser Institute Studies in Chinese Economic Policy. Retrieved from <https://www.fraserinstitute.org/sites/default/files/EconomicRelationswithChina.pdf>; Chen, V.Z. 2011. Benchmarking Canada-China economic relations. Issues in Canada-China relations. Edited by P.B. Porter and T. Adams. Toronto: Canadian International Council. Retrieved from <http://ssrn.com/abstract=1721993>

Figure 2: Major Canadian exports to China (left) and Canadian imports from China (right) by product group, percentage according to value 2014



Data source: Canada. Industry Canada²⁰, authors' calculations

based on the comparative advantages of the two countries, usually it is a developing country that imports finished products from a developed economy in return for raw materials. This imbalance in trade patterns is specific to Canada and also exists between Canada and the United States.

Investments

As indicated before, Canadian firms' investments in China are a relatively recent phenomenon. Figure 3 shows the investment trends between the two countries, which illustrates this very clearly. It indicates that investment activities between the two countries were negligible before 2005, in both directions, with annual investments below \$1B. Only since 2005, when China entered a new path of economic growth, have investments between

the two countries picked up. As shown in the blue columns in Figure 3, Canadian investments in China have slowly increased over the past decade but have clearly slowed down due to the global financial crisis between 2008 and 2011. In 2014, Canadian firms invested \$6.8B in China. This is still relatively small when compared with the overall investments in China from other advanced economies.

In the other direction, China's investments in Canada – although fewer in terms of the number of cases – have grown much faster. Since 2005, these investments have grown quickly and steadily with hardly any interruptions during the financial crisis. In 2014, Chinese firms invested \$25B in Canada, almost four times as much as Canadian firms in China.

²⁰ Canada. Industry Canada op. cit.

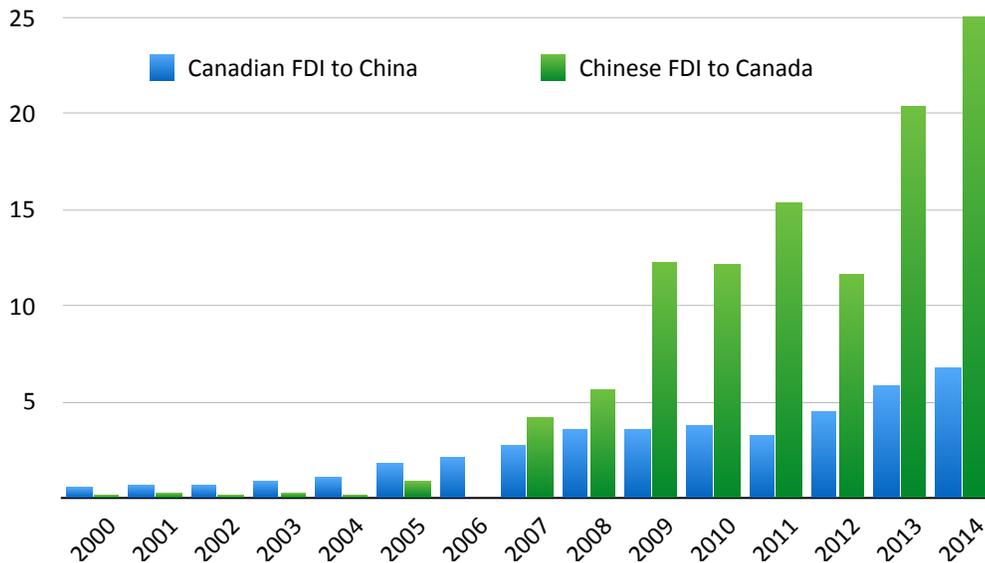


Figure 3 :
FDIs between
Canada and China,
\$ billion,
2000-2014

Note: Investment data from China to Canada for 2006 are not available.

Data source: Canada. Statistics Canada²¹, authors' calculations

Since disaggregated investment data for individual industries between the two countries is not available, we established an investment database from the investment news archives of the Asia Pacific Foundation of Canada by collecting information for individual industries from 2006 until mid-2015. The aggregate results of this analysis are displayed in Figure 4, which shows the investment activities of major industries based on the number of investments.

Although computed from the number of cases – instead of from the value of investments – Figure 4 provides a good proxy for the investment patterns across industries between the two countries for two reasons:

First, we checked the investment patterns between the two countries using data from different years. Despite some differences in the share of each industry, the basic patterns across industries have

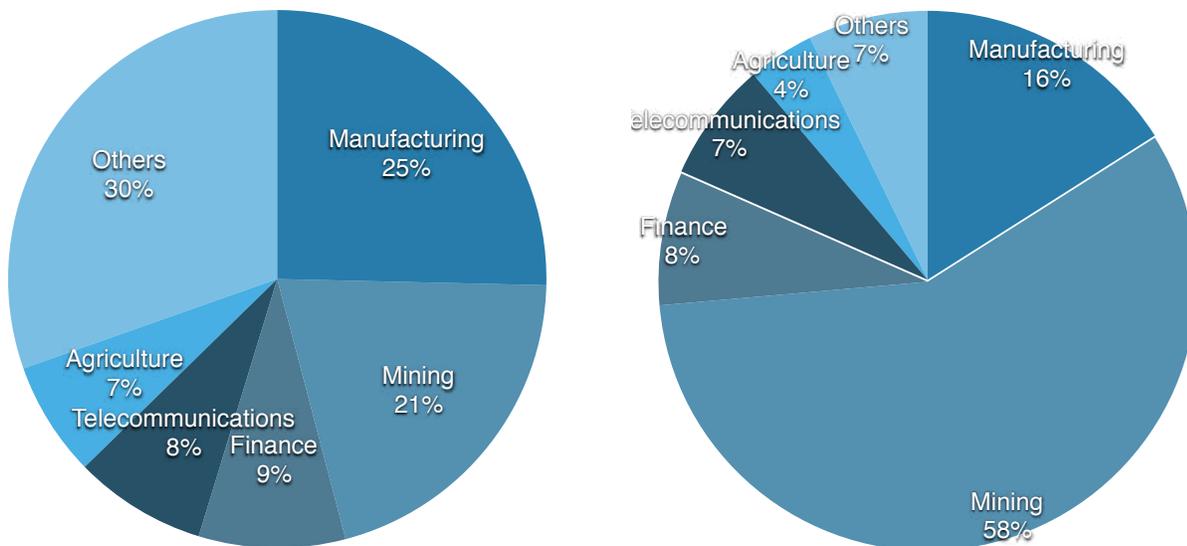
21 Canada. Statistics Canada. 2015. Table 376-0051 International investment position, Canadian direct investment abroad and foreign direct investment in Canada, by country. Ottawa: Statistics Canada. Retrieved from <http://www.statcan.gc.ca/eng/nea/hr2012/data/publications/tables/bop/tab376-0051>

remained fairly stable. Despite fluctuations in the size of investments over the years, the structure of investments across industries, as depicted in Figure 4, has been consistent throughout.

Second, major industries of investments depicted in Figure 4 resonate well with observations regarding the investment communities between the two countries. In the direction from Canada to China, major sectors of investments are manufacturing, mining, finance, and telecommunications. These four industries accounted for 62 percent of all cases of Canadian investments in China between 2006 and 2015. Many of the investments are associated with leading firms in the Canadian economy. In manufacturing, Bombardier established six joint ventures and seven wholly-foreign-owned enterprises throughout China, with about 4,000 employees. Another leading manufacturing firm, Magna, has invested substantially in the country, with 28 production operations and nine product development, engineering, and sales centres.²² In

22 McClearn, M. June 2, 2014. How Magna International quietly became a powerhouse in China. Canadian Business. Retrieved from <http://www.canadianbusiness.com/lists-and-rankings/best-stocks/investor-500-magna-china/>

Figure 4 : Canadian investments in China (left) and Chinese investments in Canada (right) by major industries, percentage according to number of cases, 2006-2015



Data source: Investment cases compiled from the news archives of the Asia Pacific Foundation of Canada (<http://www.asiapacific.ca/news>), authors' calculations

mining, lead firms such as Teck Resources have established their presence in the booming Chinese market and received access to important resources. Canadian investments in the past decade have also included producer services and high-tech industries. In finance, for instance, the largest Canadian banks and insurers, including RBC, CIBC, BMO, Manulife, and Sun Life Financial, have become active and established local presences in Beijing, Shanghai, and other major Chinese cities. In telecommunications, Celestica is a significant case with facilities in Shanghai, Suzhou, and Dongguan. While these large industry players have played an important role in investment activities in China, more and more small and medium-sized firms from many different manufacturing and service sectors have also made investments in China in recent years.

In the opposite direction from China to Canada, investments are also primarily carried out in the

mining, manufacturing, finance, and telecommunications industries. The most obvious difference of sectoral investment patterns between the two countries can be found in mining. Although Canadian mining investments in China are also important, they account for the lion's share (58 percent) of all investment cases of Chinese firms in Canada. The acquisition of Nexen by China National Offshore Oil Corporation in 2013 is perhaps the most famous and controversial case in this category. The high average costs of investments in mining help to explain why the overall value of Chinese investments in Canada is much higher than that of Canadian firms in China, even though the number of Canadian investment cases is much larger. Investments in Canadian manufacturing activities include innovative Chinese firms, such as Hisense, that have expanded their business to Canada in recent years. In finance, the Bank of China has had a presence in Canada for more than 20 years and has lately been followed by other major

Chinese banks.^{23, 24} Even in high technology, the case of Huawei in Ottawa's telecommunications industry demonstrates how Chinese technology firms are now setting up research and development activities abroad. Besides these large firms, investments of small and medium-sized Chinese firms, especially privately owned businesses, have been growing rapidly in recent years, including investments in agriculture and tourism.

It is revealing to compare the structure of investments in Figure 4 with the structure of trade in Figure 2, since the two diagrams differ fundamentally. In terms of trade, the overall patterns are shaped by the comparative advantages of the two countries, reflecting the richness of natural resources in Canada and the strengths of manufacturing capabilities in China. Yet, these comparative advantages do not explain the investment patterns. Here, competitive strengths, rather than comparative advantages, are key. This explains why China and Canada are both strong in mining, manufacturing, finance, and telecommunications investments, as these are sectors in which both have been able to build internationally competitive industries that are often concentrated in certain agglomerations or clusters (as discussed in Section 3). In other words, these are the industries where Canada and China both display clear strengths in innovation and knowledge creation. In mining, for example, Canada and China are both strong in geophysical research and mining engineering technologies.

23 For instance, the Industrial and Commercial Bank of China expanded to Canada in 2010 by acquiring the operations of The Bank of East Asia; the Agriculture Bank of China opened a representative office in Vancouver in 2012; and the China Construction Bank established its first Canadian branch in Toronto in 2014. Given the decision to establish a yuan trade centre in Toronto, it can be expected that trade and investment activities between both countries will grow quickly in the future.

24 Robertson, G. September 28, 2011. Two Asian banks seek growth in Canada. *The Globe and Mail*. Retrieved from <http://www.theglobeandmail.com/report-on-business/two-asian-banks-seek-growth-in-canada/article595862/>

Related to these activities, Toronto has become the largest financial market in this field and, holding to this strength, Canadian banks remained remarkably stable during the global financial crisis. Vice versa, major Chinese banks are now the largest banks worldwide in terms of assets, and Shanghai and Beijing have become major magnets in the finance industry, attracting hundreds of foreign banks.²⁵ In manufacturing industries, China's growth has probably been strongest and has led to the emergence of globally innovative firms that make investments around the world. In Canada, although manufacturing only encompasses a small part of the economy, some of the most innovative firms are in automobile and aerospace manufacturing, such as Bombardier, Linamar, Magna, and Pratt & Whitney Canada. Similarly, Waterloo and Ottawa have developed into important agglomerations of information technology and telecommunications innovation in Canada, and Shenzhen has become the new mecca of high-tech growth in China.

Figure 4 already suggests that the investment patterns generate linkages between innovative industries in the two countries. The next section will present more specific evidence to support this conclusion. Since innovation activities are often strongly embedded in local industry agglomerations, clusters, or urban knowledge pools, the next step of our analysis specifically examines the investment patterns at the urban/regional level, and investigates what kinds of innovative cities or clusters are connected through investments between Canada and China.

25 Elliott, D. 2011. Building a global financial center in Shanghai: Observations from other centers. Washington, DC: Brookings Institution. Retrieved from http://www.brookings.edu/~media/research/files/papers/2011/6/10-shanghai-financial-center-elliott/0610_shanghai_financial_center_elliott.pdf

INVESTMENT LINKAGES AND CLUSTER NETWORKS

This section first describes the process of how clusters in Canada and China are detected, and then investigates investment linkages and cluster networks of Canadian firms in China, differentiated by major industries.

DETECTING CLUSTERS IN CANADA AND CHINA

In investigating the wider investment linkages and cluster networks between Canada and China, we first compiled an investment database for the period between 2006 and 2015, based on news archives of the Asia Pacific Foundation of Canada (<http://www.asiapacific.ca/news>). For each investment case, this archive contains a brief description of the firms, their locations, and the destinations of their investments. In many of the cases identified in this research, the descriptions of the investments were incomplete and required additional research to add new data. After completing the database, the next step was to standardize the geographical and industrial information. Geographically, we coded both the origins and destinations of each invest-

ment according to census metropolitan areas and census agglomerations in Canada, and according to statistical cities in China. In terms of the industrial denomination, we coded each investment case according to the North American Industry Classification System (NAICS) in Canada and the China Industry Classification System (CICS) in China. We traced each investment case to four- or six-digit NAICS codes in Canada and comparable three- or four-digit CICS codes in China.

The next step in our analysis was to determine whether an investment case was located in a cluster area. For this purpose, we used Canadian and Chinese industrial data at the metropolitan level because this is the spatial scale at which we can expect local cluster settings to emerge, according to the literature on clusters and innovation. In Canada, we used the Canadian business patterns data for 2006, which cover all registered business establishments in the country, to detect clusters.²⁶ In China, we similarly accessed industrial data at the city

26 Canada. Statistics Canada. 2006. Canadian business patterns December 2006. Ottawa: Statistics Canada.

level from the 2004 economic census and the 2005 *China City Statistical Yearbook*.²⁷ Using industrial data at the same geographical level in almost the same period enabled us to define clusters that are comparable in both countries. By using data prior to the investment decisions to identify clusters, we were able to detect the impact of clusters on investment decisions and to exclude cases of clusters that only developed after the fact.

Following these considerations, we adopted a standard procedure to define clusters in the two countries.²⁸ This procedure involved three stages of calculation:

First, for each source and target city-region of an investment case we identified the respective industry's four- or six-digit NAICS code in Canada and its three- or four-digit CICS code in China. We then calculated location quotients (LQs) for these local industries based on the number of establishments and the number of employees. If LQs of establishments and employees were both larger than 1, we regarded these local industries as industrial agglomerations. The reason to use LQs for both establishments and employees was to rule out extreme cases of agglomerations that were characterized by either (i) many very small firms but low total employment, or (ii) high overall employment based on only a few very large firms. The agglomerations identified in this process encompassed industrial communities with an above-average concentration of both firms and employees.

In the second step, we combined the agglomerated industries with technologically related subsectors (at the three- or four-digit industry code level) in

the respective city-regions in order to construct coherent local industry groups with potentially strong internal transaction and knowledge linkages.

The third step of the cluster identification process involved the recalculation of the establishment and employment LQs for these aggregated industry groups. If these local industry groups surpassed a critical mass in terms of their size (more than 100 establishments and more than 5,000 employees) and, at the same time, showed a high level of agglomeration (with LQs for establishments and employees both greater than 1), we identified the local industry groups as 'clusters.'²⁹ The identified clusters represent local industrial communities with a high level of agglomeration and a remarkable size of potentially interconnected firms that form an ideal basis for innovation and knowledge-generation dynamics.

INVESTMENT-BASED CLUSTER NETWORKS

Based on this methodology, we were able to identify the cluster or non-cluster characteristics at the origins and destinations of each investment case, and were thus able to map investment linkages and cluster networks. Table 1 summarizes the patterns of investments of Canadian firms in China in terms of cluster and non-cluster origins and destinations. The rows of Table 1 indicate whether or not an investment case originates from a cluster area. Similarly, the columns show whether or not this investment is directed to a cluster or non-cluster area. The table consists of similarly structured parts for different time periods and different industries.

Table 1 helps us to identify cluster networks and

²⁹ Strictly speaking, these are still potential clusters since we were not able to access data to verify local linkages.

²⁷ China. National Bureau of Statistics of China. 2004. Economic census. Beijing: National Bureau of Statistics of China; China. National Bureau of Statistics of China. 2005. China city statistical yearbook. Beijing: National Bureau of Statistics of China.

²⁸ Bathelt and Li op. cit.

can be read as follows: When considering all investment cases across all industries from 2006 to 2015 (Table 1a), 83 of 142 Canadian firms that were based in cluster areas (58.5 percent) decided to set up a foreign affiliate in a similar cluster area in China, whereas 59 of the cluster-based firms (41.5 percent) decided to locate their Chinese affiliates in a non-cluster area. In contrast, of the 337 Canadian investments from non-cluster areas, only 51 firms (15.1 percent) established branches in Chinese clusters. The bulk of the 286 Canadian non-cluster firms (84.9 percent) set up their Chinese operations outside of cluster areas. A standard statistical test, the chi-square test, shows a high significance level ($\chi^2=93.0$; $df=1$; $p<0.001$), indicating that there is a strong association between the cluster status of Canadian firms and the cluster status of their respective Chinese affiliates. In other words, the majority of firms located in a Canadian cluster tend to establish investment affiliates that are also located in a cluster in China, while Canadian non-cluster firms overwhelmingly locate their investments in Chinese non-cluster areas. Specifically, Canadian firms from clusters are almost four times more likely to invest in Chinese clusters than those from non-cluster areas. This is an important observation of Canadian investment patterns in China. Canadian firms from clusters invest in similar cluster areas in China with high levels of industrial specialization and agglomeration, and thus create transnational networks across innovative communities and cities between the two countries.

Table 1: Canadian investment patterns in China across clusters and non-clusters, 2006-2015

a All industries, 2006-2015		Destination	
Origin		Cluster	Non-cluster
Cluster	83	59	
Non-cluster	51	286	
Chi-square	93.0***		
Number of cases	479		

b All industries, 2006-2009		Destination	
Origin		Cluster	Non-cluster
Cluster	45	15	
Non-cluster	28	168	
Chi-square	83.1***		
Number of cases	256		

c All industries, 2010-2015		Destination	
Origin		Cluster	Non-cluster
Cluster	38	44	
Non-cluster	23	118	
Chi-square	23.5***		
Number of cases	223		

d Manufacturing, 2006-2015		Destination	
Origin		Cluster	Non-cluster
Cluster	22	21	
Non-cluster	16	67	
Chi-square	13.67***		
Number of cases	126		

e Telecommunications, 2006-2015		Destination	
Origin		Cluster	Non-cluster
Cluster	24	0	
Non-cluster	5	2	
Chi-square	7.33***		
Number of cases	31		

f Finance, 2006-2015		Destination	
Origin		Cluster	Non-cluster
Cluster	17	7	
Non-cluster	5	13	
Chi-square	7.64***		
Number of cases	42		

g Mining, 2006-2015		Destination	
Origin		Cluster	Non-cluster
Cluster	2	3	
Non-cluster	3	89	
Chi-square	13.09***		
Number of cases	97		

Notes: *** $p<0.001$. Compared with our earlier study, Beijing, which was already close to the cut-off criteria, was here identified as a finance cluster.³⁰ The respective data were adjusted for the entire time period. Data source: Investment cases compiled from news archives of the Asia Pacific Foundation of Canada (<http://www.asiapacific.ca/news>), authors' calculations

30 Bathelt and Li op. cit.

In the various subparts of Table 1, the patterns of investment activities across clusters are further explored. Subparts b and c disaggregate the investment patterns before and after the peak of the financial crisis in 2009. Accordingly, investments before the financial crisis show an even stronger pattern of Canadian cluster firms investing in Chinese clusters, while Canadian non-cluster firms consistently connect with non-cluster areas in China over the entire time period. Between 2006 and 2009, 75.0 percent of firms (45 of 60) from Canadian clusters invested in Chinese clusters, while only 14.3 percent of non-cluster firms (28 of 196) chose cluster areas in China (Table 1b). In other words, Canadian firms from clusters were, in this time period, almost five times more likely to invest in Chinese clusters than their counterparts from non-cluster areas.

In the period from 2010 to 2015, after the peak of the financial crisis, changes in the investment patterns can be observed. Of the 82 Canadian firms from clusters, only 46.3 percent chose Chinese clusters for their investment affiliates (Table 1c). And of the Canadian firms from non-cluster areas, 16.3 percent (23 of 141) located their investments in Chinese clusters. Although Canadian firms from clusters were still about three times more likely to choose clusters in China than those from non-cluster areas, the tendency towards establishing cluster networks has become weaker. What we find is that a smaller proportion of investments from Canadian clusters are directed to Chinese clusters. Several explanations may help understand this shift. First, it could be that investments across clusters are most sensitive to macroeconomic changes and may have thus been cancelled or delayed. A second explanation could be that since large Canadian firms already invested in China in early years, new investments could complement already-existing cluster networks by creating other types of connections. Small and medium-sized firms, on the other hand, may be less aware of the advantages of

cluster locations or be less informed in their location decisions. Third, it could also be that other knowledge-rich locations might render similar advantages to cluster locations, suggesting that the fundamental rationales behind such locational choices could be similar. Fully understanding the significance of this shift, however, requires further investigation. Investment trends clearly need to be monitored more closely because, normally, innovation benefits from investments in clusters would be expected to be much greater than those from non-cluster areas. Since there is a growing discussion about the supposedly weak innovation performance of Canadian firms in general, this should be investigated with care.³¹

Parts d through g of Table 1 further analyze investment patterns between Canada and China according to different industries. Parts d through f show similar patterns of cluster connections for manufacturing, telecommunications, and finance: 51.2 percent (22 of 43), 100 percent (24 of 24), and 70.8 percent (17 of 24) of the investments from firms in Canadian manufacturing, telecommunications, and finance clusters, respectively, chose to establish affiliates in similar Chinese clusters. The chi-square tests for these industries ($\chi^2=13.67$, $df=1$, $p<0.001$ for manufacturing; $\chi^2=7.33$, $df=1$, $p<0.001$ for telecommunications; $\chi^2=7.64$, $df=1$, $p<0.001$ for finance) all support the overall observation that Canadian investments in China lead to connections between similarly structured innovative clusters in the two countries. It is important to note that, in all these industries, Canadian firms outside of clusters are much more likely to direct their investments to non-cluster contexts in China. Resource-based mining firms clearly follow a different rationale in their locational choices, as shown in Table 1g. The pattern of mining investments from Canada to China includes few linkages that draw connections between clusters. Most mining investments

³¹ Council of Canadian Academies op. cit.

establish linkages between non-cluster areas at both ends. It needs to be emphasized, however, that investment connections between non-cluster areas are a typical characteristic that can also be identified across other industries.

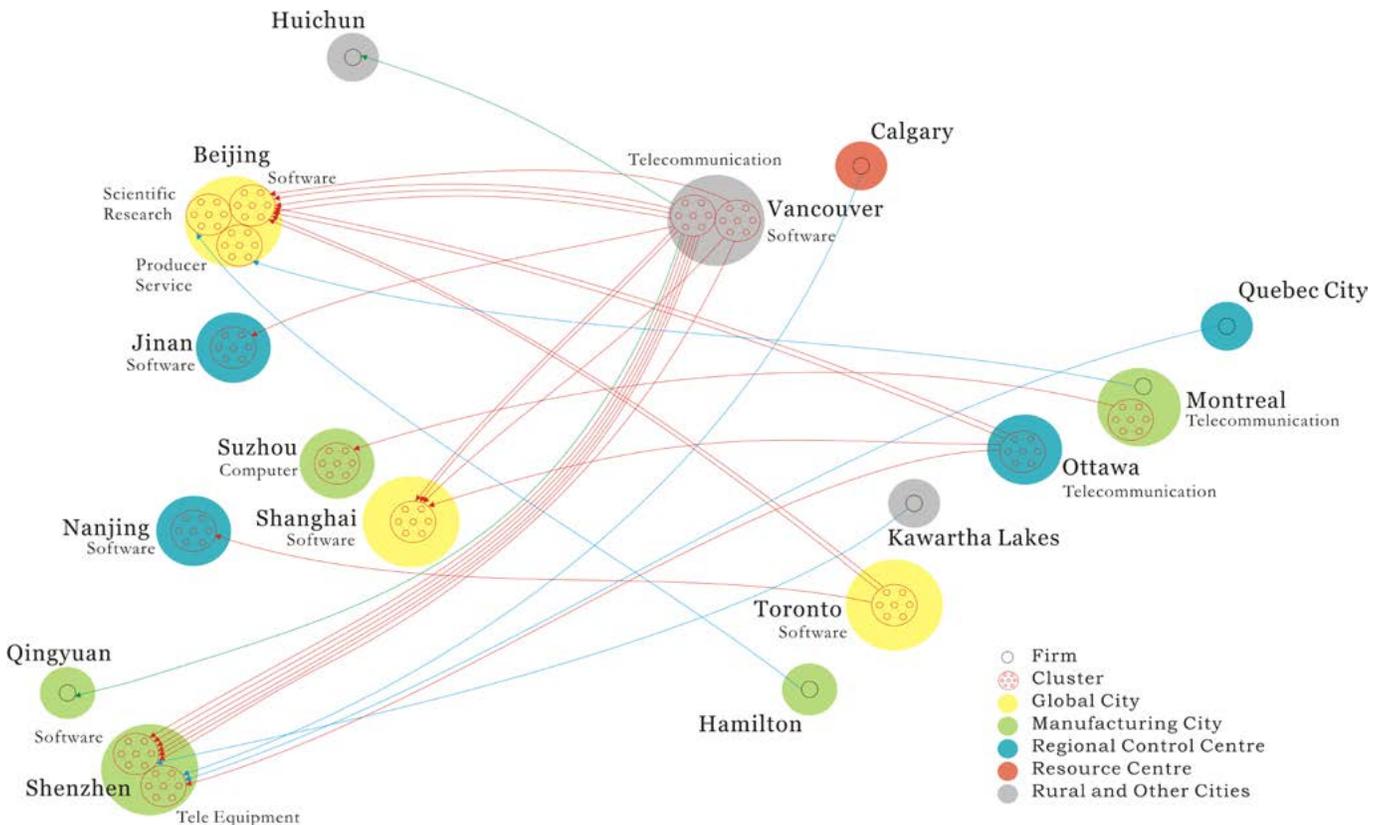
More detailed analyses of investment linkages and cluster networks can be undertaken when mapping the information behind Table 1 on a case-by-case basis. The respective maps are shown in Figures 5 through 8, according to different industries, types of city-regions, as well as cluster and non-cluster areas between the two countries. Figure 5 visualizes the investment network between clusters and city-region types in the telecommunications industry. It shows that Canadian telecommunications investments in China largely connect the innovative

telecommunication clusters in Vancouver and Ottawa with their Chinese counterparts in Shenzhen and Beijing, generating powerful cluster networks in the industry between both countries.

Canada and China also have strong auto parts sectors, particularly in Ontario and the Yangtze River Delta region. Consistent with these agglomerations of the auto parts industry in both countries, Figure 6 reveals noticeable investments between these regions – for instance, from cities in southern Ontario to the Yangtze river delta region.

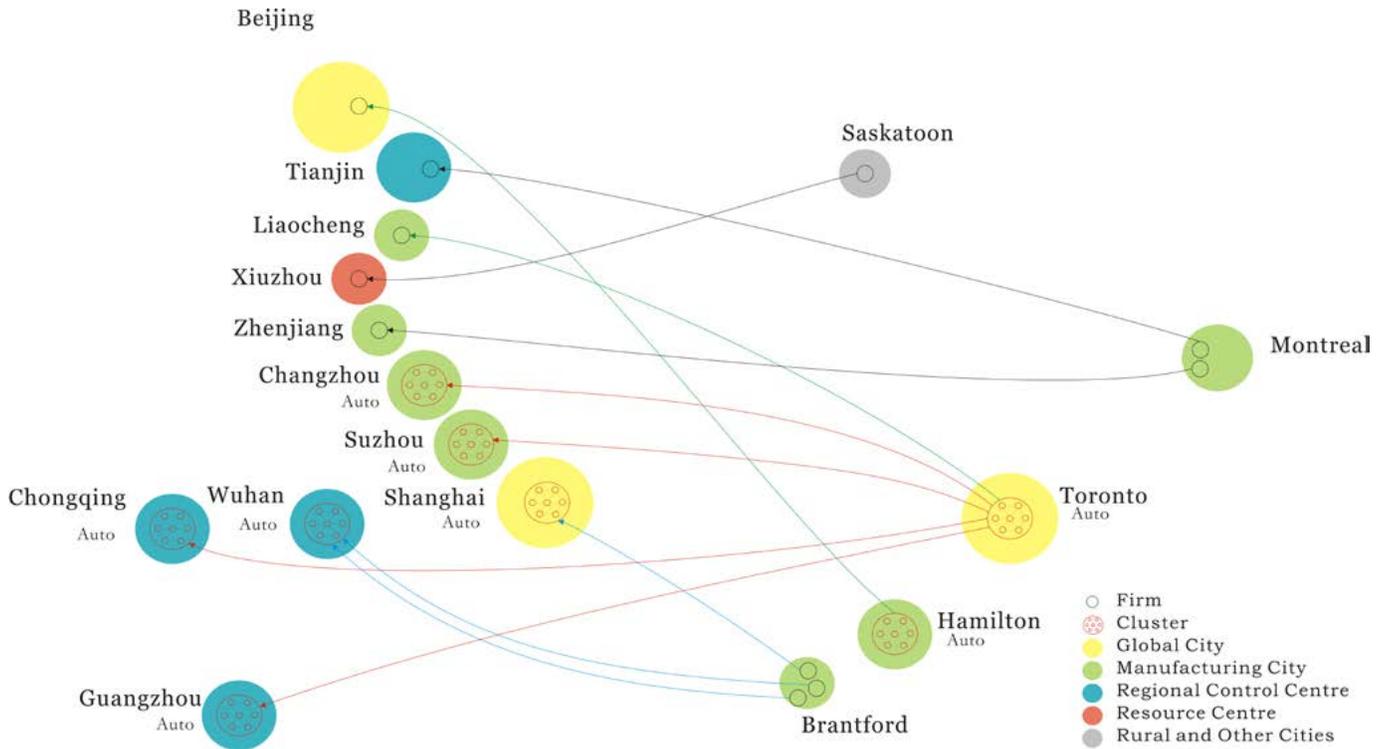
In finance, Toronto, Beijing, and Shanghai are widely accepted as important global cities that host clusters of banks, insurance companies, securities firms, and investment funds that have commanding

Figure 5: Patterns of Canadian telecommunications investments in China, 2006-2015



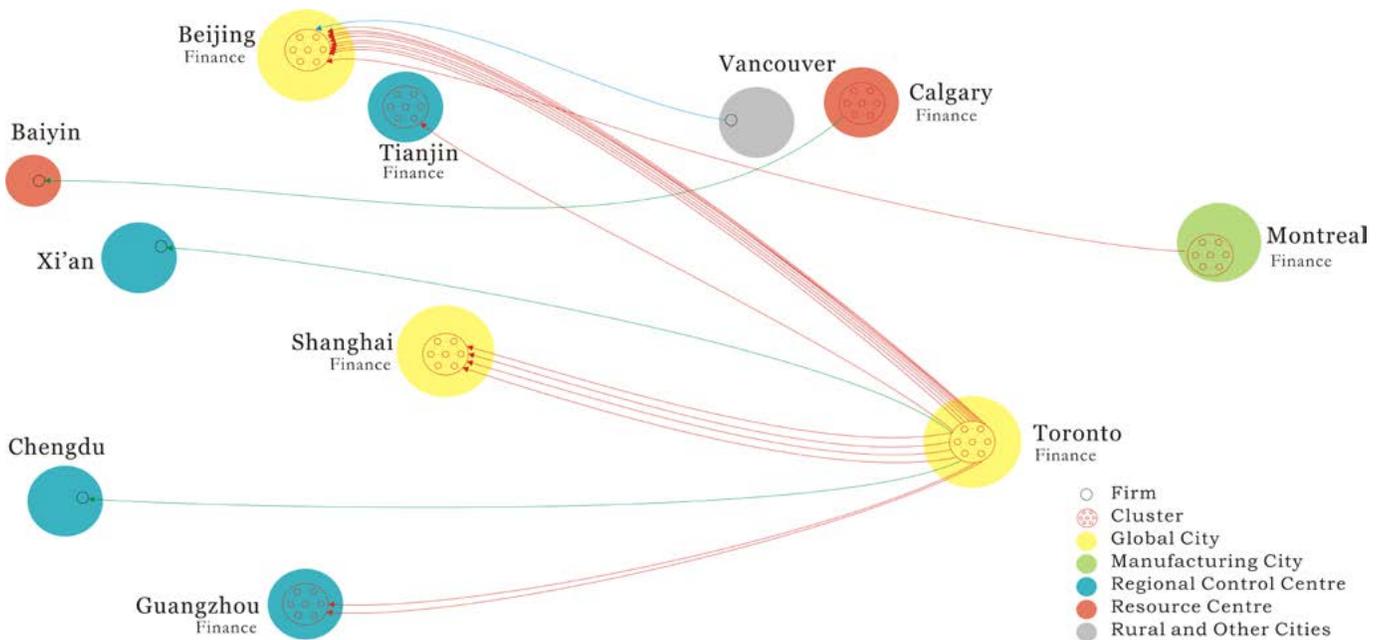
Data source: Investment cases compiled from the news archives of the Asia Pacific Foundation of Canada (<http://www.asiapacific.ca/news>), authors' calculations

Figure 6 : Patterns of Canadian auto parts investments in China, 2006-2015



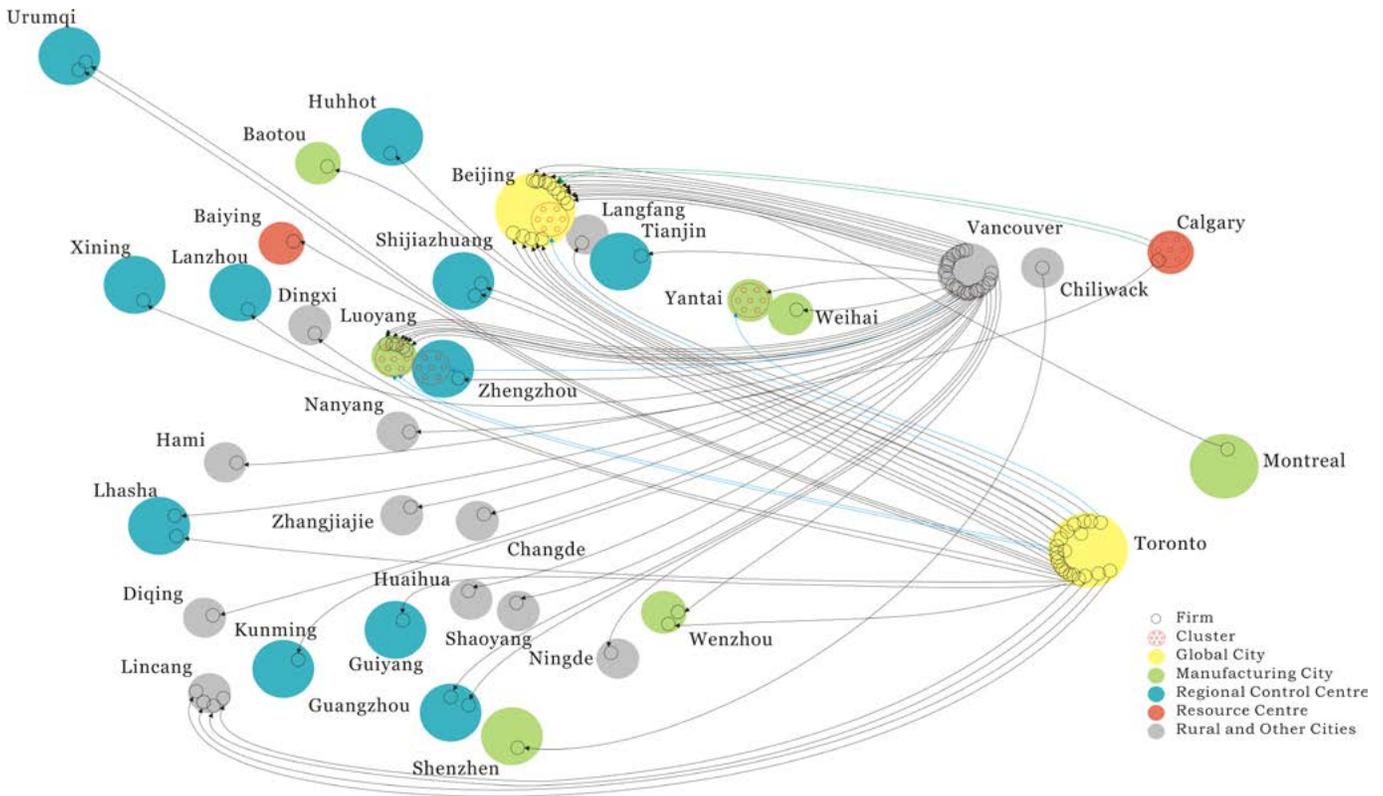
Data source: Investment cases compiled from the news archives of the Asia Pacific Foundation of Canada (<http://www.asiapacific.ca/news>), authors' calculations

Figure 7 : Patterns of Canadian financial investments in China, 2006-2015



Data source: Investment cases compiled from the news archives of the Asia Pacific Foundation of Canada (<http://www.asiapacific.ca/news>), authors' calculations

Figure 8 : Patterns of Canadian mining investments in China, 2006-2015



Data source: Investment cases compiled from news archives of the Asia Pacific Foundation of Canada (<http://www.asiapacific.ca/news>), authors' calculations

power in the global economy.³² In terms of Canadian financial investments in China, Figure 7 clearly illustrates that these knowledge pools are closely connected through investment linkages. Canadian investments in the finance sector are mainly directed from Ontario to the Yangtze River Delta.

Finally, as mentioned before, investment decisions

32 Toronto, Beijing, and Shanghai are among the top 20 global cities ranked by Foreign Policy, A.T. Kearney, and the Chicago Council on Global Affairs (available from: <http://www.foreignpolicy.com/node/373401>) and Citi Private Bank and Knight Frank (available from: https://www.privatebank.citibank.com/ann_2010.03.23.htm), and are classified as “alpha cities” (available from: <http://www.lboro.ac.uk/gawc/world2010t.html>).

in the mining industry have different patterns. The driving forces behind these investments are primarily related to resource acquisition or access, and are less knowledge-oriented. Corresponding to these different rationales, Figure 8 shows different patterns of investments. On the Canadian side, most firms are large mining enterprises with headquarters in Toronto and Vancouver and extended national networks of affiliates, often closely associated with resource locations. In terms of their destinations in China, Canadian investments are quite widespread, including large parts of western China, which are characterized by an abundance of natural resource deposits. Further confirming Table 1g, Figure 8 exhibits no patterns of cluster networks in mining investments from Canada to China.

PROCESS OF ESTABLISHING CANADA-CHINA KNOWLEDGE NETWORKS

In general, our research findings suggest that Canada and China have matching localized knowledge pools in their economies that form specific clusters and hotspots of innovative knowledge. These include industries such as telecommunications, finance, and automobiles.³³ Especially large, established Canadian firms have extended their national corporate networks towards China across these knowledge pools.³⁴ As indicated in the previous section, firms from Canadian clusters have set up investment affiliates in similar clusters in China to extend their knowledge networks to new institutional and market contexts and access complementary knowledge.³⁵ Vice versa, non-cluster firms have preferred non-cluster locations in China for their investment affiliates.

The process of establishing knowledge networks in China is a cumulative, experience-based process

33 Spencer, G.M., T. Vinodrai, M.S. Gertler, et al. 2010. Do clusters make a difference? Defining and assessing their economic performance. *Regional Studies*. 44(6): 697–715.

34 Li, P.-F., and H. Bathelt. 2015. *Location strategy in cluster networks*. Toronto: University of Toronto.

35 Bathelt and Li op. cit.

that proceeds in a number of consecutive stages. In this research, we were able to identify four distinct stages towards knowledge creation. The information presented in this section draws from over 70 one-hour interviews conducted in 2014/15 in a cross-sectional survey of headquarters and investment affiliates of Canadian firms in manufacturing, finance, producer services, and mining. In addition, interviews were conducted with business associations, government organizations, and services that support or guide such investments. Interviews were concentrated in the regions of Shanghai, Beijing, and Guangzhou in China, and Toronto and Vancouver in Canada, and focused on establishing and maintaining linkages and knowledge networks in investment processes.

The four stages identified in the investment process can be characterized as follows: In the initial stage of knowledge localization, Canadian firms search investment opportunities and locations within China and make a location decision. In the second stage of knowledge facilitation, firms establish local affiliates and embed them within the corresponding Chinese region, city-region, or cluster by

linking them with local business partners. In the third stage, firms integrate knowledge networks in China into their corporate networks in Canada. The final stage comprises the process of how transnational knowledge networks are mobilized between Canada and China to generate new knowledge. In the following subsections, the characteristics of each of these stages are summarized based on the interviews conducted.

STAGE 1: KNOWLEDGE LOCALIZATION

After the decision has been made to establish an investment affiliate in China, the question arises as to where to locate this facility. At this stage, the primary urban/regional centre for corporate activities is chosen that becomes the crucial reference point for further investment decisions and corporate activities later on. In terms of the location factors that influence this stage, low production costs in China, especially related to low wage levels, no longer play a dominant role in the rationale of Canadian firms.³⁶ Nonetheless, our interviews revealed that most firms operated at production costs in China that were substantially lower than in comparative Canadian locations. It appears that increases in wage levels in Chinese regions since the 2000s have led to a situation in which cost-driven investments now prefer to move to other countries in South and Southeast Asia. In general, investment decisions of Canadian firms are clearly market-driven and aim to access knowledge assets that enable them to better understand the Chinese market. In industries such as mining, access to resource reservoirs is still the dominant driver behind investments; even then, however,

36 Hejazi, W., and A.E. Safarian. 2001. *Canada and foreign direct investment: A study of determinants*. Toronto: University of Toronto Press; Wang, B. 2008. "Canadian firms in China: Home and host country factors." Doctoral dissertation. University of British Columbia.

location decisions are influenced by access to relational and knowledge assets in the host economy. For instance, mining firms open important offices in the vicinity of clusters of government activities and engineering expertise. Many other firms, ranging from automobile suppliers to law firms, have followed pre-existing clients when establishing affiliates in China. Their locations were often largely predefined from the outset and close to concentrations of their user industries. At the same time, all these firms intensively looked for new clients and aimed to access relevant knowledge pools in the country. While these location factors generally coincide with those in Dunning's eclectic model of multinational investments, central findings of this research emphasizing the crucial importance of knowledge and the stages of knowledge generation go beyond that model.³⁷ Overwhelmingly, our research suggests that Canadian firms' location decisions are strongly shaped by the search for complementary knowledge pools.³⁸

According to the interviews conducted, three primary groups of transnational investments of Canadian firms can be identified: First, there are now a sizable number of manufacturing investments in China. Many of these are among the oldest Canadian investments in industries such as automobiles and pharmaceuticals/chemicals. There are also a limited number of more recent investments in high-tech manufacturing. The second group of investments consists of resource-oriented establishments,

37 Dunning, J.H. 1977. *Trade, location of economic activity and the MNE: A search for an eclectic approach*. The international allocation of economic activity. Edited by B. Ohlin, P.O. Hesselborn, and P.M. Wijkman. London: Macmillan; Dunning, J.H. 1998. *Location and the multinational enterprise: A neglected factor?* *Journal of International Business Studies*. 29(1): 45–66.

38 While government regulations sometimes had an impact on location decisions or enforced joint-venture projects with Chinese partners, as in parts of the finance and chemical industries, the impact of such legislation has weakened over time and none of the firms in our sample indicated that they were affected by such regulations.

especially in mining and also in agriculture. The third group encompasses high-end service investments in banking, insurance, architecture, tourism, and information technologies. In an overwhelming number of cases, the macro-locations of the investment projects in China were relatively clear from the very beginning, usually defined by agglomerations of similar or related (e.g., user) industries. While firms in our sample generally did not use specialized consulting services when making their macro-location decisions in China, their decisions were often shaped or biased by pre-existing contacts. For instance, locational choices often followed the suggestions of transnational professionals who were part of the workforce and had specific knowledge of the situation in China, or were driven by the leads of existing partners or clients. In a notable number of cases, even family ties and friend networks influenced location decisions of investment affiliates.

The results from our interviews suggest that location decisions tend to be more informed if firms already have prior FDIs in China and other emerging markets and benefit from the experiences acquired during these processes. Such firms specifically mentioned that they search for metropolitan locations that are characterized by large, skilled labour markets, broad urban service offerings, and related knowledge networks. Almost all firms in our sample had clear ideas about how to conduct their location decisions from the outset and which Chinese region to target.

STAGE 2: KNOWLEDGE FACILITATION

Knowledge facilitation is often a crucial stage in the investment process because it is at this stage that firms generate initial linkages in China and embed themselves into the new institutional context.

In general, we found in our interviews that established multinational firms have been able to draw from prior investment experience when establishing knowledge linkages in the new environment. They benefit from pre-existing internal capabilities when entering the Chinese market and establishing local operations. Nonetheless, these firms also rely on collaborations – in particular with private facilitators such as consulting firms, law firms, and banks – when establishing these initial linkages. Small and medium-sized firms usually have little experience in establishing foreign affiliates and rely on limited contacts in the Chinese market. They face enormous risk and great uncertainty when making the decision to establish operations in China. As a consequence, they need the support of a network of public – especially government – organizations and business associations, as well as private facilitators that assist them in managing legal issues, hiring employees, or finding reliable local partners. There are three types of facilitators that play a crucial and complementary role in this process: public, private, and individual facilitators.

First, we found that public facilitators play a crucial role for many investments when establishing and embedding operations in China. As listed in Table 2, these facilitators consist of federal and provincial organizations, such as the Canadian Embassy, regional consulates, trade delegations, or Export Development Canada. Additionally, this group of facilitators includes business associations, such as the Canadian Chamber of Commerce, the Canada China Business Council, or Canadian Manufacturers and Exporters. Public facilitators often provide crucial support in the early stages of investment decisions. They act as generalists with overview knowledge of issues such as immigration and other legal questions. When specific questions arise, these organizations make referrals to experienced, often local, private facilitators, such as lawyers, human resource experts, and other consultants. Their most important role appears to

Table 2: Crucial public facilitators for Canadian firms in the Canada-China business community

Name of facilitator	Location	Primary funding base	Usual time of involvement	Primary knowledge provided	Primary role	Activities organized
Canadian Embassy/consulates http://www.canadainternational.gc.ca/china-chine/offices-bureaux	Embassy in Beijing; consulates in Shanghai, Guangzhou, Chongqing, and Hong Kong	Publicly funded	The entire investment period, particularly before investment decisions are made and when trouble arises in the process	General information about location; market inquiries; reference to private facilitators for special knowledge	Representing Canada's interests in China; providing public support to Canadian firms in China	Delegations and trade missions
Trade representative offices of Canadian provinces in China for example, http://www.albertacanada.com/china	Alberta (Beijing, Shanghai, Hong Kong); Quebec (Beijing, Shanghai, Hong Kong); British Columbia (Beijing, Shanghai, Guangzhou, Hong Kong); Ontario (Shanghai, Beijing, Chongqing)	Publicly funded	The entire investment period, particularly before investment decisions are made	General information about location; market inquiries; reference to private facilitators for special knowledge	Promoting trade; supporting provincial firms' expansion in China; attracting Chinese investments; provincial branding	Delegations and trade missions
Export Development Canada http://www.edc.ca	Headquartered in Ottawa since 1944; offices throughout Canada; representations in Shanghai and Beijing	State-owned enterprise	Early stages of engagement in China	Financial services (e.g., credit, insurance)	Promoting trade by providing insurance and financial services to Canadian exporters and investors and their international buyers (focus on small-business solutions)	Business seminars; trade missions
Canada China Business Council http://www.ccbc.com	Headquartered in Toronto; established in 1978; offices in Vancouver, Montreal, Calgary, Beijing, and Shanghai	Funded by membership	Before and after investment decisions have been made	Contacts for investments and business operations	Promoting bilateral business, trade, and investments between China and Canada; providing transnational networking opportunities	Business roundtables; general meetings; industrial conferences; lobby work
Canadian Chamber of Commerce in China http://www.cancham.asia	Shanghai and Hong Kong	Funded by membership	After presence in China has been established	Contacts for business operations	Providing a platform for developing business contacts in eastern and southern China	Delegations and trade missions; community events; business seminars
Canadian Manufacturers & Exporters http://www.cme-mec.ca	Headquartered in Ottawa; offices in Toronto and Calgary	Funded by membership	During early stages of engagement in China	Export-related knowledge	Political engagement; organization of delegations	Delegations and trade missions; lobby work
Asia Pacific Foundation of Canada http://www.asiapacific.ca	Headquartered in Vancouver; office in Toronto	Funded by government and private sector	Less directly involved in investments	Policy recommendations	Bridging connections with Asia in business, government, and academia	Research seminars; public conferences

be in linking firms with local partners or with other foreign affiliates. They support social networking, although this is not their primary task, and facilitate knowledge flows by organizing social/business events that bring together firms that can potentially collaborate. Sometimes, public facilitators are not involved from the very beginning and only become aware of an investment at a later point, such as when problems arise. In these cases, they also operate as a crucial source of knowledge for conflict resolution between Canadian and Chinese firms. While our research provided clear evidence of the importance of public facilitators, concerns arise from the fact that some of these organizations had to downsize or refocus their activities due to severe budgetary pressures. Also, as public organizations, these facilitators cannot get directly involved in private investment decisions, which restricts their roles in transnational business communities. For example, trade officers at the Embassy and consulates can help investors by making referrals to business services, but to avoid conflicts of interest they are not allowed to give preference to specific private facilitators.

Second, private facilitators, such as bankers, accountants, consultants, or lawyers, also play an important role in the process of establishing and embedding new affiliates in the new business context. They have often known their clients prior to their decision to move into China and have connections with the headquarter region. Banks play a particularly important role in the very early discussion of investments, and they become the starting point for the process, during which they provide referrals to related businesses. The role of private facilitators is to provide specialized knowledge on specific aspects of the investment, based on a contractual relationship. They undertake knowledge brokerage as a business and provide transaction-based support that is more specialized and less far-reaching than that of public facilitators. At the same time, their support goes beyond their areas of

expertise as they try to develop long-term business relations and generate stable, long-term linkages with their clients. For instance, they provide their clients with free services by connecting Canadian firms to other specialized facilitation services and forwarding existing organizational linkages with Chinese facilitators. By providing these additional services, they aim to establish organizational trust and, along with increasing personal commitments, some general level of personal trust. The consequence of this process is that existing facilitator networks are reproduced globally and, at the same time, are extended in a stepwise manner.

Third, aside from and parallel to these organizational links with public and private facilitators, individuals often play a crucial role during the knowledge-facilitation stage. Such individual facilitators are especially common in the case of small and medium-sized firms, but are not limited to such firms. They include transnational professionals, friends, or family members and involve strong trust relationships. Especially in the early investment stages, smaller and even larger firms often rely on one key person who prepares and fundamentally influences investment decisions. This may be a transnational manager – someone with an international educational background and experience in establishing local presence in another country – hired to establish a transnational network. At other times (not untypical in the Canadian context), this may be a long-time employee of Chinese background whose intercultural knowledge can be utilized during the investment process. In the former case, such facilitation is often based on professional trust in the capabilities of the manager, while personal trust may be the driving force in the latter case. Sometimes, even family or friendship ties operate as a basis for knowledge facilitation to guarantee close co-ordination between the home and host market operations.³⁹ Especially in the case

³⁹ Bathelt, H., and S. Henn. 2014. The geographies of knowledge transfers over distance: Toward a typology.

of smaller firms, close personal ties are not uncommon and serve as a mechanism to reduce uncertainties. In general, individual facilitators often have a strong impact on the investment process and the establishment of knowledge networks. They are often strongly involved in the decision-making at this stage, bridge connections to their personal networks, become affiliate directors, and are crucially responsible in mobilizing local knowledge and linking it with Canadian operations.

While the rationale for the utilization of personal networks is understandable, the results of such facilitation are not always optimal – reliance on individual judgments can be risky if the individuals are not as knowledgeable about the Chinese context as they appear, or if their decision-making capabilities are limited, as indicated in behavioural approaches of location decision-making.⁴⁰ A number of interviewees in our sample indicated that this can become a real problem when it is too late to reverse prior decisions, such as the original choice of location or business model.

Overall, the linkages that develop at this stage become manifest in a distinct knowledge facilitation structure. Since the number of Canadian FDIs is limited, and since these investments are supported by a relatively small group of public and private facilitators, overlapping facilitation networks are generated that are focused on a distinct group of cities at both ends (i.e., Toronto/Vancouver and Shanghai/Beijing). This generates direct and indirect linkages between the facilitators and the Canadian investors, leading to a distinct community of knowledge facilitators with close cross-organizational and personal ties, as well as trust relationships. A few very active facilitators in

the respective organizations are linked to a large part of the Canadian business community in China and play a crucial role for knowledge facilitation, even though they may not always be top decision-makers in their respective organizations.

STAGE 3: KNOWLEDGE INTEGRATION

How knowledge integration proceeds and what kinds of knowledge networks are eventually established, of course, depends on the type of investment.⁴¹ Brownfield investments and joint ventures of Canadian firms, for instance, occur in collaboration with Chinese partner firms and may involve these firms' pre-existing business relations, which can be used to quickly generate extended local knowledge networks without having to establish new relations from scratch. In contrast, greenfield investments – the investment type of most Canadian engagements – do not involve existing business relations. This may not always be a disadvantage, however, since the locational choices do not depend on existing sites, and business relations do not need to engage potentially weak partners. Indeed, firms' greenfield investments may be directed to industrial agglomerations where firms can find the most advanced potential business partners. At the stage of knowledge integration, Canadian firms have become embedded in the host economy and extend local supplier, client, and competitor linkages to integrate knowledge into their operations.

Since most Canadian investments are greenfield investments, crucial technologies are originally sourced through internal corporate networks from other sites and remain under the control of the headquarter location. Even at a later stage, this

Environment and Planning A. 46(6): 1403–1424.

40 See, for example, Pred, A.R. 1967. Behaviour and location: Foundations for a geographic and dynamic location theory: Part 1. Lund studies in geography series, Series B, No. 27. Lund: Royal University of Lund.

41 Vermeulen, F., and H. Barkema. 2001. Learning through acquisitions. *Academy of Management Journal*. 44(3): 457–476.

link is viewed as being critical, and many affiliates maintain tight, sometimes exclusive, technological linkages with their headquarters. This is a widespread practice in traditional manufacturing industries. It results from a strategy to protect the firms' sensitive technologies, but it also limits the potential for technology transfers and local adaptations. Such practices are less typical, however, in knowledge-intensive services. Aside from crucial technology linkages, many suppliers at the Chinese locations are domestic firms, often in nearby locations. Initially, partners include other foreign investment affiliates but, over time, many Chinese suppliers and, increasingly, also providers of knowledge services are included in the partner networks. New suppliers are usually found in a stepwise procedure, as described by Lorenz in other contexts.⁴² In this process, individual transnational facilitators are sometimes crucial in finding and linking up with reliable suppliers and service providers. These individuals use their intercultural knowledge to translate between Chinese and Canadian corporate contexts and are sometimes able to mobilize personal relations or friend networks to find appropriate partners. While this has apparently been successful in many cases, in a few cases we found that less-capable facilitators created inefficient knowledge linkages and put the entire investment at risk.

Local client linkages are usually a major incentive for investment projects in the first place. Often, Canadian affiliates have important relationships with close-by international clients from the outset or rely on prior trade linkages with Chinese partners. This is what often guides their location decisions. If such pre-existing client relations do not exist, firms are usually drawn to strong knowledge bases in their industry and associated agglomerations. Canadian firms are aware that the nature of client

relationships in China differs from their experiences in the North American market in terms of how these relationships are established and maintained. They are aware that cultural differences, or differences in practices, tastes, and preferences, may be substantial. Because of these differences, the firms interviewed unanimously emphasized that they need to have a physical presence in the Chinese market to better understand local clients and their needs, and to integrate this knowledge into product and service adaptations.

Because of the focus on complementary knowledge pools and industry agglomerations, Canadian firms' locational choices are not fundamentally different from those of other foreign multinational firms. In their Chinese host regions, many affiliates therefore face strong competition by firms with similar competencies and product offerings. This includes international competitors that have chosen these locations for similar reasons, but also a growing number of local competitors. Often, such competition is highly localized and close by. As a consequence, these agglomerations of firms naturally attract other related businesses and develop into specialized labour markets with strong local talent pools. While this is an important advantage for Canadian investment affiliates in hiring qualified labour and integrating market- and technology-related local knowledge, it also comes with increased risk of unintended knowledge transfers as non-compete regulations are not enforceable. While accelerated knowledge transfers through intensive job-hopping can be quite beneficial to initiate knowledge integration when entering the market as a newcomer, they become a burden when trying to maintain a market position and engage in cumulative learning processes, as personnel may change jobs easily, even when offered only moderate wage increases.

⁴² Lorenz, E. 1999. Trust, contract and economic cooperation. *Cambridge Journal of Economics*. 23(3): 301–315.

STAGE 4: KNOWLEDGE GENERATION

The final stage of knowledge generation is characterized by an advanced structure that systematically combines local knowledge with corporate knowledge pools. It goes along with the establishment of local research and development capacities in the Chinese host region, led by the goal to develop new products targeted to the local/domestic market. This may, at a later stage, even involve knowledge transfers in a transnational structure to support innovation processes in other regions and countries of the organization.⁴³ The general assumption behind this stage-model of the establishment of knowledge networks is that firms become increasingly part of their host markets, act like local/domestic firms, and eventually also become exporters of products, knowledge, or technologies at their host locations. Ideally, this goes hand in hand with a process of integrating different functions at these localities – from assembly and manufacturing through research and development. While not all firms follow these stages exactly, it turned out during the interviews that many Canadian firms are not yet engaged in knowledge-creation activities in the Chinese market. In comparison, it appears that firms from other countries seem to have more extensive local knowledge linkages than Canadian firms. Most of our interviewees agreed with this. Our research provides evidence that most Canadian firms engaged in China prefer a low-risk strategy in their business approach there. This is most obvious with some of the oldest Canadian manufacturing investments that still focus on internal corporate networks and research capabilities at home for the development of new technologies.

43 Dicken, P. 2011. *Global shift: Mapping the changing contours of the world economy*. New York: Guilford Press; Bathelt, H., and J. Glückler. 2012. *Wirtschaftsgeographie: Ökonomische Beziehungen in räumlicher Perspektive [Economic geography: Economic relations in a spatial perspective]*. 3rd ed. Stuttgart: UTB – Ulmer.

At the same time, the overall picture of Canadian investments is changing quickly, especially as knowledge-intensive services are becoming more fully integrated at their Chinese locations. In the first place, most firms strive for knowledge integration and the local development or adjustment of products. Local presence and engagement in the Chinese economy seems to be expected, and is viewed by most firms as a precondition to finding local customers. Local presence in the host economy is viewed as a proof of commitment, makes it easier to find local partners – especially clients – and becomes important to fully understand local user needs. It is this local presence that enables Canadian firms to acquire the specific knowledge they need in order to customize their products. Overall, we found that Canadian affiliates approach the stage of knowledge creation in different ways:

Type 1. Manufacturing firms, especially larger ones, often focus on knowledge transfer that is unilateral in nature. Firms develop new technologies at their home base, transfer these technologies to their Chinese affiliates, and apply them or sell them at their host locations. Research activities in these cases remain strictly focused on their Canadian locations and remain under tight control of their headquarters. Consequently, local development activities are limited to relatively simple adaptations.

Type 2. Smaller niche producers often appear to go a step further and engage in multilateral knowledge circulation. They systematically acquire feedback from local users and transfer this knowledge back to their home locations, where it leads to changes in the knowledge reservoir and feeds into innovation processes. Adaptations of these new products and services are then undertaken at the host locations and introduced in the Chinese market.

Type 3. Only a few firms in areas of information technology and producer services have adopted

a different research and development model that involves reflexive knowledge-generation processes and the leveraging of different knowledge expertise transnationally. They establish a structure that systematically brings together differently specialized local knowledge pools and leads to adaptations at each location. In the end, this structure supports the development of decentralized global knowledge portfolios. Canadian firms that are in the process of establishing such a structure are characterized by extremely close personal relations (usually family or friend networks) that put them in a position to safeguard these structures.

CONCLUSIONS AND RECOMMENDATIONS

Canada-China business relations are quickly developing as foreign direct investments have grown since the early 2000s. The global financial crisis, however, has caused this development to slow down, and investments in manufacturing have notably flattened since 2009. Generally, when making investment decisions in China, most Canadian businesses appear risk-averse and rather careful – possibly too much so at times. The unpredictable days of uncontrolled thefts of ideas and intellectual property in China are a stereotype of the past. Practices have changed and new legislation has been put into place. The country is quickly developing, and Canadian firms need to strengthen their knowledge-creation capacities in China to benefit from this development. To support this, up-to-date knowledge about the Chinese economy has to be provided to Canadian firms, local linkages have to be facilitated, and inter-firm exchanges of experiences and expertise for early-stage investors need to be fostered. Although we find that existing Canadian firms from clusters often make thoughtful decisions in investing in similar clusters in China to connect and strengthen their knowledge

assets, the overall involvement of Canadian businesses in China is still limited, compared with other developed economies. It appears necessary that successful Canadian firms in China actively engage with the Canadian business community to mobilize more investments in the highly dynamic markets of the emerging economic giant. In addition, policy efforts and support programs have to address the needs of Canadian firms already present in China that intend to expand their Chinese activities. In particular, the following policy recommendations can be derived from this research project:

(1) Nurture individual facilitators. Establishing global knowledge pipelines is a collective enterprise that usually extends beyond the capabilities of individual firms. Knowledge facilitation helps to provide access to the Chinese market and bridges the transition to a new cultural, institutional, and economic environment. Transnational knowledge facilitators establish linkages across local communities in Canada and China; yet, these linkages often depend on a limited number of individuals linking large parts of the investment community. These facilitators establish crucial linkages

for firms and can quickly mobilize new linkages between them. They are key in the early, as well as later, investment stages. Thus, strong efforts should be made to, first, nurture more such facilitators and, second, provide opportunities to update their skills.

(2) Strengthen public facilitators. The role of Canadian government agencies and organizations, such as consulates and the Embassy, is also important in supporting Canadian investors in China. While it appears that these agencies' financial resources have been under pressure in the past decade, there is a need to, first, strengthen these agencies and, second, better market the services they can render to Canadian investors. Firms are often not aware of potential federal and provincial support when they initially enter the Chinese market. Most agencies seem to be struggling with a shortage of personnel. With a modest increase in the workforce, a novel, more personalized approach to maintaining ongoing relations with Canadian investors could be adopted. Although business associations such as the Canadian Chamber of Commerce in China (CanCham) and the Canada China Business Council already aim to orchestrate networks between firms, their role in facilitating transnational investments is restricted by their budgets. There also appears to be some rivalry and little communication or co-operation between some public facilitators in the Canadian transnational business community. CanCham, for instance, appears to be not well-linked with government and business organizations in Canada – something that should be a 'no-brainer.' Overall, more efforts should be made to strengthen public facilitators in supporting Canadian investments in China.

(3) Broaden contact systems. Many Canadian firms rely strongly on individual facilitators who have extended knowledge networks across the investment communities and the institutional and cultural divides in both countries. These indi-

viduals generate trust within corporate networks, reduce uncertainties in cross-border operations, and gain extended decision-making power in transnational matters. While this is positive overall, it can sometimes become a problem when individual competencies do not match up with these responsibilities. To avoid potential problems, firms should make a distinct move to broaden their competence and decision-making base over time. For example, Germany has an extended network of contact and support options for German investors in China. Canada should strive to learn from such structures and establish an effective system of agencies, contacts, and events.

(4) Upgrade knowledge networks. In our research about the establishment of knowledge networks by Canadian businesses in China, we found that few Canadian firms have made the transition from stage 3 (knowledge integration) to stage 4 (knowledge generation). To reach this stage, it may be helpful to systematically draw from experiences of those international leaders that have established sophisticated knowledge-creation platforms in China, such as Siemens from Germany or General Electric from the United States.

(5) Embrace the Chinese economy. Although not the focus of this report, our research has shown that Chinese investments in Canada are still at a very early stage. However, these investments are growing quickly. While Canada has a very good reputation in China, as emphasized earlier in this report, Canadian provincial and federal agencies have been relatively slow in reaching out to the developing investment community in China. There is an increasing body of evidence on Chinese outward investments in the world.⁴⁴ This work and other research about Chinese culture and busi-

⁴⁴ See, for example, Asia Pacific Foundation of Canada op. cit.; Lian, L., and H. Ma. 2011. Overview of outward FDI flows of China. *International Business Research*. 4(3): 103–107; Si and Liefner op. cit.

ness practices should make Canadian businesses aware of business opportunities in cross-country investments. Canadian firms should realize that China today is less relevant as an investment target for gaining cost advantages than it is for accessing market and knowledge-creation opportunities that can generate future growth for the Canadian economy. Especially as parts of the Canadian manufacturing sector have stagnated or shrunk since the late 1990s, this could open up options to generate new growth. Within Canada – although there are sometimes concerns with respect to Chinese investments in the country, particularly those with strong government linkages – it is important to recognize that greater, not fewer, opportunities for growth in the Canadian economy are created by Chinese investments.⁴⁵ There also has to be awareness that future linkages will be developed by private, rather than state-owned, enterprises from China. In fact, Canadian investments in China and Chinese investments in Canada have to be viewed as two complementary processes. For example, it becomes very effective for Canadian firms, especially small and medium-sized firms, to enter China if they can benefit from linkages that develop after being introduced to Chinese domestic investors. Examples are investment delegations to China co-ordinated by Nexen.

(6) Maximize immigrant advantages. Overall, it is surprising how slow Canadian investors have often been to establish business linkages and knowledge networks with China, given the large communities of ethnic Chinese and Sino-Canadians who have in-depth knowledge of institutional and cultural specifics in both countries and who could operate as efficient “boundary spanners” in cross-border investments.⁴⁶ It appears that there

is a lot of potential to actively involve immigrant communities in linking the Canadian and Chinese economies that has yet to be mobilized.

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45 Woo, Y.P. 2015. Chinese lessons: State-owned enterprises and the regulation of foreign investment in Canada. *China Economic Journal*. 7(1): 21–38.

46 See, for example, Coe, N.M., and T.G. Bunnell. 2003. “Spatializing” knowledge communities: Towards a

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