~~Locat~~ing in a 'Silicon Valley' does not guarantee success for technology firms – they must also leverage knowledge and innovation globally.

In a time of global economic turbulence what determines whether or not firms succeed or fail? **Peng-Fei Li** *and* **Harald Bathelt** *take a close look at the role of clusters in fostering innovation and knowledge exchange across industries. After looking closely at clusters in Canada and China, the authors argue that to gain competitive advantage, firms need to tap into the growing global network of small, distributed knowledge pools, as well as building and maintaining close connections and interactions between their subsidiaries and headquarters.*

In China and Canada, Shenzhen and Waterloo share the same nickname. Both are frequently viewed as their country's "Silicon Valley". Despite this shared name, there are fundamental differences between the two, which can be illustrated by the development of their leading firms. Let's use the local weather of the two cities as a metaphor to describe the current situation.

Mid-January 2014 – it is snowy in Waterloo with a temperature of -3 $^\circ$C. Blackberry, after laying off 4500 employees in recent months, is still struggling for survival. In contrast, Shenzhen is sunny with +15 $^\circ$C. Huawei, one of its leading technology firms, continues to become stronger after doubling the size of its Ottawa research facility that is now linked to over 20 global research centers. As students of industrial clusters in China and Canada, we cannot resist asking what can be learned from the stories of these two telecom giants and how this maybe be related to their local-global structures?

Apparently, the global economy has been in a state of turbulence for quite some time and successes or failures of firms are "teetering on a knife edge". 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, multinationals from emerging economies "rise like a phoenix" and make global competition less predictable. As a consequence, it is harder to tell where the next round of innovative ideas and new business practices will come from. And it becomes a huge challenge for business managers and regional policy-makers to foster successful innovation in an uncertain world.

SEG Electronics market Bao'an Shenzhen China Credit: DC Master (Creative Commons BY NC)
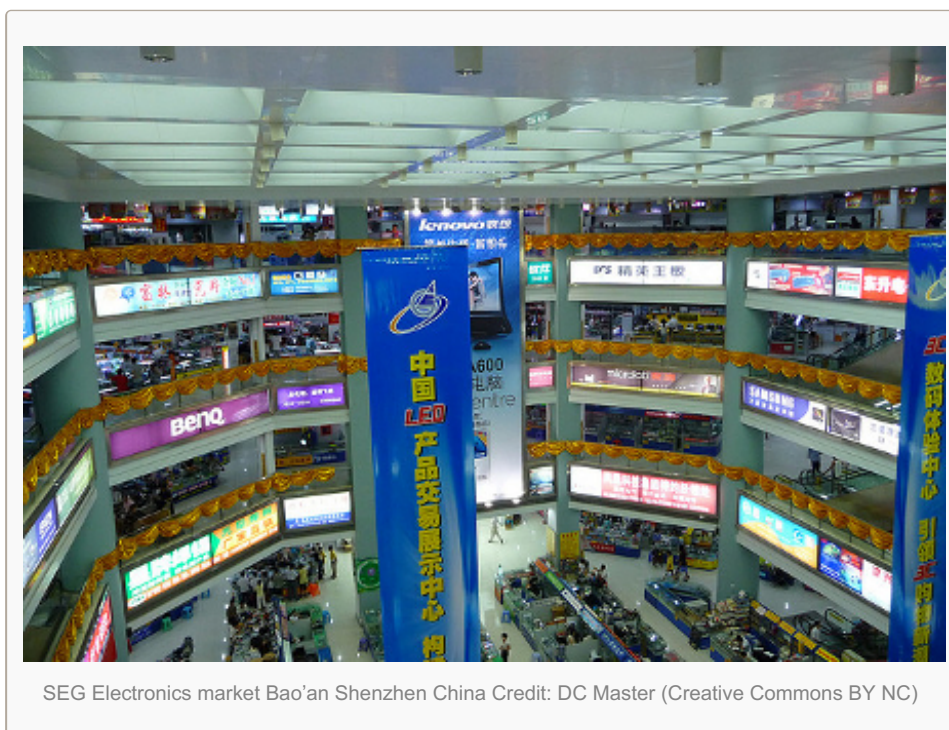
A conventional solution to this challenge would be to locate in one of the most dynamic sites of the industry, especially a leading cluster with talented minds, innovative firms and demanding customers. This would be a natural site because this is where one expects new ideas, technologies and solutions to be developed. For high-tech firms, the place to go to would thus be Silicon Valley. For fashion, it would be Paris or Milano; for finance, New York or London; for film making, Hollywood; and for ceramic tiles, Emilia-Romagna…

It is true: these places are still the "Mecca" in their respective industries. But, in recent years, new innovative clusters have developed elsewhere – in both developed and developing economies. For example, in high-tech industries, the likes of Bangalore, Shenzhen, Hsinchu, Dallas and Waterloo have all risen in the past 20 years. These clusters have grown out of varied contexts. New competitive firms from these regions have developed different understandings of industrial dynamics and accumulated different expertise in their fields. Driven by local innovators, many new industrial communities are being quickly transformed from knowledge-absorbing to knowledge-creating places. They are developing into new innovative clusters that are in the same general business, but have somewhat different areas of strengths and specialization. This is a novel trend that will have a distinct impact on the innovation strategies of firms, industries and regions.

Although many innovations have local origins, it is crucial in this turbulent age not to rely blindly on localized learning networks in a community or cluster – no matter how successful these may have been in the past. It is more important to search, mobilize and integrate new ideas, technologies and knowledge scattered at a global scale, sometimes integrating very distant places. This does not imply that entrepreneurs need to be omnipresent because, in each technology field, knowledge pools are distributed quite unevenly, with a limited number of key locations spread around the globe. In each industry, a "small world" of remarkable hotspots or innovative clusters exist, which continuously improve existing technologies and sporadically generate innovations that redefine the "rules of the game" in a global business context. To gain a global competitive advantage, firms and clusters need to tap into such knowledge pools and become insiders in these places. This suggests that we are 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".

Clusters as distinctive local industrial communities can be both places of opportunities and areas of challenges. Innovation-oriented firms often originate from successful clusters and already know how to interact in a creative environment. They will likely invest in similar clusters located elsewhere to benefit from the local learning milieus of these clusters. On the other hand, cost-squeezing firms may view clusters as places full of competitors, which drive up costs and risks of unintended knowledge spillovers, and consequently try to avoid such locations. We therefore expect that global cluster networks will develop around knowledge-based foreign direct investments (FDIs). In our study of 300 investment cases from Canada to China between 2006 and 2010, we find that firms from Canadian clusters are five times more likely to invest in similar Chinese clusters than firms from Canadian non-clusters.

Within cluster networks, knowledge does not flow in a linear way from one place to others, but is channeled in multi-directional ways among different sites – going back and forth involving feedback loops rather than simply spreading out. To leverage knowledge in global cluster networks, multinationals require both intra- and inter-organizational changes.

Internally, closer connections and interactions between subsidiaries and headquarters, as well as between different subsidiaries, become more significant for knowledge sharing and creation between clusters. Within multinational organizations, global training and learning infrastructures and transnational mobility of professionals become important strategic options. Beyond such arrangements, firms at the core of these networks need to turn into true learning organizations. According to Nohria and Ghoshal, these organizations operate as differentiated networks of global corporate units which are more automatous and horizontally linked, rather than bureaucratic hierarchies. In our analysis of FDI cluster networks between Canada and China, we find that most cluster-based investments are horizontally linked, as Canadian FDIs are generally engaged with similar kinds of activities in China, not exhibiting an international division of labor along global value chains.

Externally, the cluster subsidiaries of multinational firms become nodes in global cluster networks and take the lead in facilitating knowledge sharing processes between multinationals and local industrial communities. This is because they show both: geographical proximity with local competitors as well as organizational connections with distant units of the same multinational structure. Cluster-based FDI affiliates can tap into local knowledge pools, but also interact with the global organizational networks of their multinational corporations. Since learning is a mutual process, clusters also benefit from the existence of cross-cluster multinationals that create pipelines,

channeling external knowledge into local communities.

At this point, we may ask whether the idea of global cluster networks can shed some light on the different situations that Blackberry and Huawei are currently facing. While both are complex cases, our conception indeed offers some relevant explanation to understand their recent development. Although Blackberry used to be very successful internationally, it was always quite a local firm. Its research and even production facilities are strongly concentrated around its Waterloo/Toronto headquarter region – i.e. a fact that has

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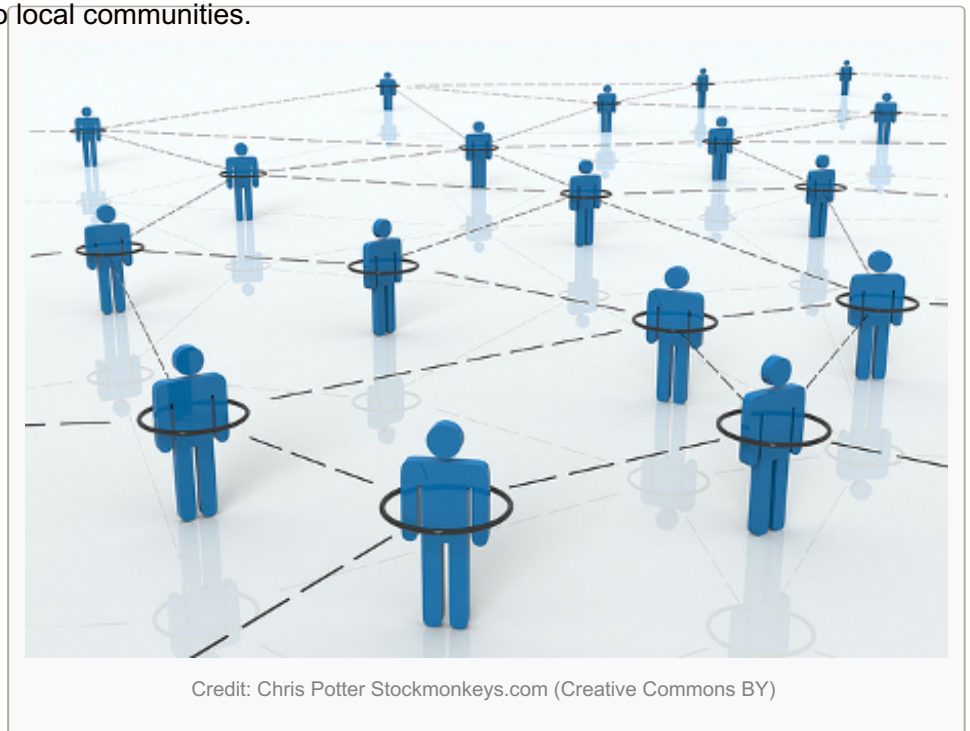
become the company's pride. To find talented engineers outside the local community was difficult but did not appear crucial, as the supply of local talent from one of Canada's leading tech universities was endless. Although there are many reasons for the decline of Blackberry, its isolation in a peripheral cluster, despite its initially highly innovative nature, contributed to growing bureaucracy and ignorance of fundamental changes in the smartphone industry.

Compared to Waterloo, Shenzhen is an IT cluster with a relatively weak local knowledge base, with no leading research university close-by. Turning this disadvantage into an advantage, Huawei adopted a global innovation strategy by establishing global research centers in many countries and thus tapping into varied knowledge pools. These centers are mostly located in innovative clusters. It is precisely the long-term engagement in such cluster networks that plays an important role for Huawei's success: being already 20 years in Silicon Valley, 15 years in Bangalore and Dallas and now 4 years in Ottawa. By being in major places of innovative ideas in the telecom world, Huawei has localized its research centers globally to match the strength of these embedded clusters. Through this, it has been able to integrate dynamic research nodes into a strong global knowledge network that constitutes the firm's success – now and probably also in the future.

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