

How urban social networks help to inspire creativity in American cities

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Cities are an important driver of economic growth – in the last twenty years 90 percent of new patent applications have come from cities. But what influences how inventive cities are? In new research which examines more than 300 US cities, [Stefano Breschi](#) and [Camilla Lenzi](#) find that the most inventive cities are those where people are more able to reach, collaborate, and form groups with others with inventive talents both in their city and across cities.



The fortunes of cities and their causes are definitively [back](#) in both academic and public policy agenda and debate. We're now an urban planet; according to the World Bank, the world's urban population ticked over into the majority in 2007. In the US, people living in urban settings account for more than 80 percent of the whole population. The hyper-accelerated pace of urbanization in recent times, in both advanced and developing economies, raises important questions about the economic performance of different settings and their ability to maintain and improve it over time. In short, it is increasingly crucial understanding why some cities prosper and others fall behind.

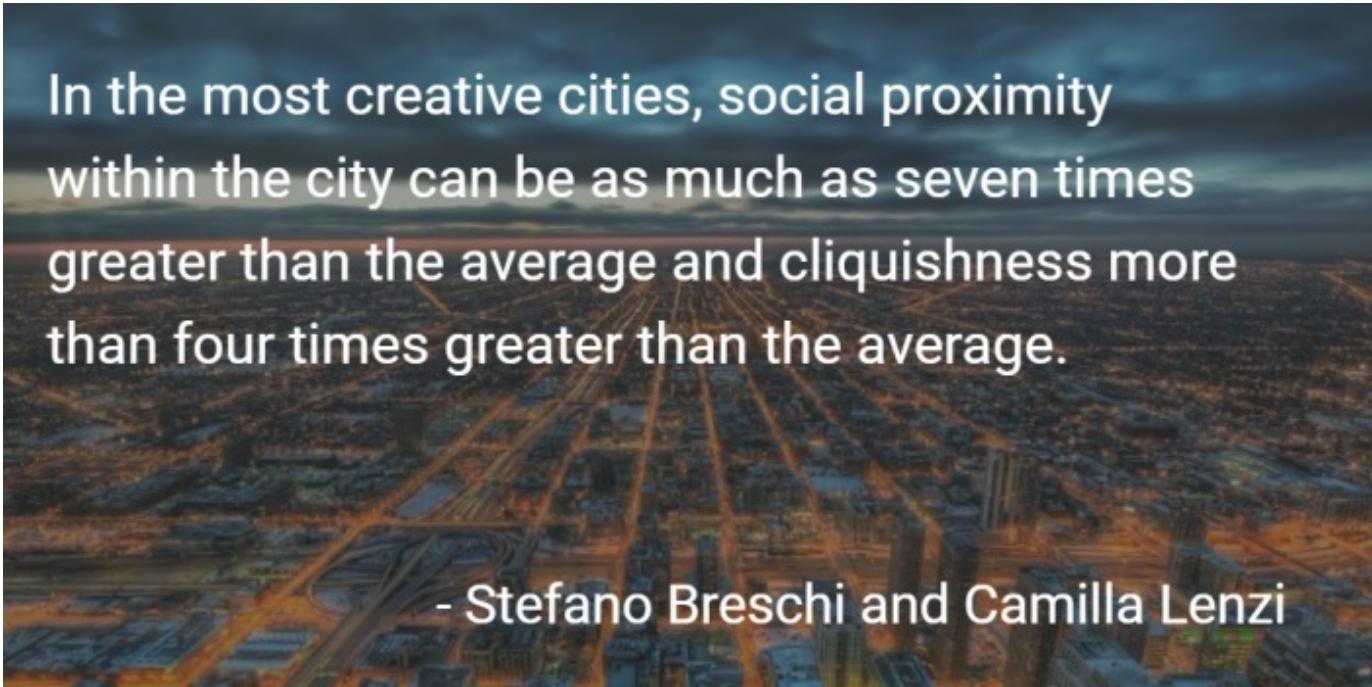


Economic theory and applied research have achieved a large consensus on role of new knowledge creation as the chief driver of economic success and competitiveness. How cities can ensure a superior capacity of new knowledge generation is then a compelling research issue and urban policy concern.

Inventive activity is also a predominantly urban phenomenon, especially in the US. In the last couple of decades, more than 90 percent of new patent applications in the US were from metropolitan areas, with almost half of them generated in the top 10 cities.

Economic literature has suggested that the spatial clustering of knowledge and innovation, and thus of creativity and economic performance, are mainly driven by the existence and the easier creation of a thick web of social interactions (formal as well as informal or serendipitous) in urban areas, which facilitate the transmission and exchange of knowledge relevant for creative projects. This network of relationships generates pervasive localized knowledge flows between individuals and firms and guarantees a fast diffusion of ideas at the local level, which in turn boosts the inventive productivity of all local actors. The key question then becomes which network characteristics can ensure the greatest flows of knowledge?

In recent [research](#), we tried to answer empirically to this question in a study of the inventive performance of 331 US cities (metropolitan statistical areas, MSA) by examining the co-invention network which links inventive talents within and across US cities.



In accordance with the economic geography and social network theory predictions, we looked at three specific properties considered as particularly desirable for knowledge creation and diffusion. First, the degree of **social proximity** of actors in the network within the city: this is high when an inventive individual can easily reach any other inventive talents within the city in a small number of hops or steps through her acquaintances. Second, the tendency of actors in the **network** to form tightly knit groups of creative talents that know and collaborate with each other, what is also known as cliquishness. Third, the **openness** of the network (and of its members) and its embeddedness into the global/national co-invention network, i.e. the proximity to inventive talents located in other cities. *Social proximity within and across cities* can facilitate the transfer and acquisition of knowledge (and its speed); *cliquishness* promotes trust, reciprocity and sense of belonging, which in turn stimulate socialization of knowledge and common and shared learning practices.

Table 1 provides evidence in this regard for the 20 most innovative cities in the US in terms of total number of patent applications at the European Patent Office. In particular, it reports four indicators of inventive productivity (namely, the total number of patent applications, the number of patent applications for 1000 employees in the private sector, the total number of inventors, and inventor density), and three indicators of the structure of co-invention relations, namely *social proximity within and across cities* and *cliquishness*.

Table 1 – Inventive productivity and social networks in the top 20 innovative US cities

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| Metropolitan statistical area | Total number of patents | Patents per 1000 employees | Total number of inventors | Inventor density | Social proximity within the city | Cliquishness within the city | Social proximity across cities |
|-------------------------------|-------------------------|----------------------------|---------------------------|------------------|----------------------------------|------------------------------|--------------------------------|
|-------------------------------|-------------------------|----------------------------|---------------------------|------------------|----------------------------------|------------------------------|--------------------------------|

| Metropolitan statistical area | Total number of patents | Patents per 1000 employees | Total number of inventors | Inventor density | Social proximity within the city | Cliquishness within the city | Social proximity across cities |
|---|--------------------------------|-----------------------------------|----------------------------------|-------------------------|---|-------------------------------------|---------------------------------------|
| New York-Newark-Edison, NY-NJ-PA | 4042 | 0.6 | 13608 | 2.023 | 4.886 | 0.403 | 6.678 |
| San Francisco-Oakland-Fremont, CA | 3230 | 1.962 | 8660 | 3.502 | 4.508 | 0.728 | 6.78 |
| Boston-Cambridge-Quincy, MA-NH | 2943 | 1.45 | 9633 | 2.747 | 3.604 | 0.839 | 6.246 |
| San Jose-Sunnyvale-Santa Clara, CA | 2670 | 3.458 | 9688 | 3.615 | 4.451 | 0.771 | 6.616 |
| San Diego-Carlsbad-San Marcos, CA | 2251 | 2.192 | 4837 | 1.152 | 3.804 | 0.406 | 6.616 |
| Philadelphia-Camden-Wilmington, PA-NJ-DE-MD | 2064 | 0.919 | 6971 | 1.506 | 4.493 | 0.504 | 6.839 |
| Minneapolis-St. Paul-Bloomington, MN-WI | 1953 | 1.357 | 6290 | 1.037 | 4.982 | 0.296 | 6.497 |
| Chicago-Naperville-Joliet, IL-IN-WI | 1862 | 0.523 | 7033 | 0.975 | 3.708 | 0.734 | 6.378 |
| Los Angeles-Long Beach-Santa Ana, CA | 1827 | 0.399 | 6747 | 1.391 | 2.665 | 0.508 | 5.779 |
| Houston-Baytown-Sugar Land, TX | 1539 | 0.724 | 3767 | 0.422 | 3.169 | 0.41 | 6.331 |

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- a. Patents and patents per worker are measured in 2009. The other variables are measured over the period 1995–1999.**
- b. Inventor density is the ratio between the total number of inventors active in a given MSA and the MSA land area measured in square miles.**
- c. Social proximity within the city is the average number of inventive talents each inventor may get in contact with within the city through co-invention collaborations.**
- d. Cliquishness within the city is the share of an inventor's partners within the city that are one another collaborators.**
- e. Social proximity across cities is the average number of inventive talents each inventor may get in contact with outside the city through co-invention collaborations.**

It is immediately apparent that the most inventive cities display indicators of social proximity within the city, across cities and cliquishness far greater than the average US city. In the most creative cities, social proximity within the city can be as much as seven times greater than the average and cliquishness more than four times greater than the average. Social proximity across cities is as well far greater than the average, up to 50 percent more.

How can cities evolve as to acquire such desirable properties of knowledge networks and, thus, eventually maintain or improve their superior capacity of new knowledge generation? Even if our research does not directly dig into this issue, recent economic literature highlights the importance of workers' mobility in directing the formation of socio-professional networks and its spatial reach and in improving the diffusion of knowledge within and across metropolitan boundaries. Speculatively, one could argue that the greater the intensity of workers moves across firms and in space, the higher the social proximity of inventive talents within and across cities. Business practices and public policies favoring job mobility might be then beneficial also in terms of enhanced social proximity, knowledge circulation and inventive creativity.

This article is based on the paper, 'Co-invention networks and inventive productivity in US cities', in the Journal of Urban Economics.

Featured [image](#): Chicago Credit: [Trey Ratcliff](#) (Flickr, [CC-BY-NC-SA-2.0](#))

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