

URBAN DENSITY, CREATIVITY, AND INNOVATION

May 2007

Brian Knudsen, Richard Florida, Gary Gates, and Kevin Stolarick

Excerpt of Pages 7-9

Innovation, Density, and Creativity:

In *The Economy of Cities*, Jacobs (1969) defines innovation as the process by which new work is added to old divisions of labor, thus creating new products, processes, or ideas, and thus also new divisions of labor. Feldman (2000, 373) adds that “innovation is the novel application of economically valuable knowledge”. In other words, innovation is a process of creating new, profitable products and ideas by combining observations or insights taken from elsewhere to the work one had previously been doing (Desrochers 2001, 378).

Innovations occur when individuals with high degrees of existing creativity or knowledge make new and novel combinations of this knowledge with new insights observed or learned through spillovers. Individuals require a high degree of existing expertise to engage in innovation for a number of reasons. First, an extensive and sophisticated knowledge of the initial work will provide insights into how to create “new combinations” when new observations arise through spillovers. Clearly, if one has a superficial knowledge of the initial work, it will be less obvious how to make interesting departures from that work or important additions to it. Cohen and Levinthal (1994) note how this phenomenon exists at the firm level, referring to a firm’s ability to leverage its installed base of expertise to sift through and take advantage of the signals it receives from the outside as the firm’s “absorptive capacity”. Additionally, Desrochers (2001, 376) adds that “...innovation ultimately depends to some degree on one person’s knowledge and skills”, while Lee (2001) has empirically documented the positive effects of high human capital workers on innovation. Thus, the ideas necessary for innovation are embodied in individuals with the creativity, know-how, and skills to engage in technological advance.

As described above, proximity is a key factor in this process of innovation. The geographic proximity of individuals possessing high levels of human capital, skills, expertise, or creative capabilities enables their interactions, and these interactions facilitate the spillovers necessary for innovation. To date, such a theory has not been sufficiently empirically tested in the literature except for in a recent paper using French data by Autant-Bernard (2001). However, our analysis differs from theirs in that we examine metropolitan-level population density as a specific conception of geographic proximity. Recent research from a variety of disciplines has begun to explore the relationship between forms of density and the production of new knowledge. For example, at the state level, Ciccone and Hall (1996) find that employment density increases average labor productivity, while Sedgely and Elmslie (2004) find a positive relationship between state population density and innovation. At the city level, Strumsky, Lobo, and Fleming (2005) positively link population density to metropolitan patenting, while Andersson, Quigley, and Wilhelmsson (2005) and working papers by Carlino, Chatterjee, and Hunt (2001, 2006) demonstrate the positive role of local employment density on innovation in Sweden and the U.S., respectively. We construct a novel composite measure of population density, arguing that it better describes the geographic closeness of people than previous conceptions of proximity and provides better intuition as to why the interactions between them occur.

Also, our approach differs from previous density research in that we consider the effect of a specific form of density, namely the density of “creative capital”¹. Since innovation is an inherently creative act and not only traceable to those who meet a certain educational threshold, we feel creative capital offers more precision than the use of education-based human capital measures. Highly creative and innovative people – like Bill Gates – are included in the creative class, whereas they would be excluded from human capital measures. Additionally, as discussed above, we make use of population density measures instead of more commonly employed employment density measures.

Innovation and growth are not singularly institutionally or firm focused, and our use of a broader population density measure is an attempt to capture that. Our central hypothesis is as follows: *High*

densities of creative capital leads to and makes frequent face-to-face interactions amongst them, thus facilitating “creative” spillovers, and subsequently innovations.

In summary, innovation occurs when a person possessing creativity combines her existing expertise with observations learned through spillovers. Such a spillover occurs when one individual’s creativity is transferred to another individual or firm. These creative spillovers are in part believed to arise due to frequent face-to-face interactions and communication between individuals. Furthermore, these interactions are made more frequent by population density². Also, the literature explains that geographical proximity (here conceived of as density) makes it more likely that the “tacit” (non-codified) knowledge essential to innovation and embodied in individuals will be shared through face-to-face contact. Gertler (2003, 79) explains that “tacit knowledge is a key determinant of the *geography* of innovative activity....[B]ecause it defies easy articulation and is best acquired experientially, [it] is difficult to exchange over long distances.”