

CESIS Electronic Working Paper Series

Paper No. 266

**The Rise of Skills:
Human Capital, the Creative Class and Regional
Development**

Charlotta Mellander

Richard Florida

March 2012

The Rise of Skills: Human Capital, the Creative Class and Regional Development

Charlotta Mellander and Richard Florida

Charlotta Mellander is Associate Professor in economics and Research Director of the Prosperity Institute of Scandinavia, Jönköping International Business School, charlotta.mellander@ihh.hj.se.

Richard Florida is a Professor of Business and Creativity at the Rotman School of Management at the University of Toronto, and the Director at the Martin Prosperity Institute (florida@rotman.utoronto.ca).

Abstract

The past couple of decades have seen what amounts to skills revolution in urban and regional economic research. From industrial location theory and Alfred Marshall's concern for agglomeration to more recent research on high-tech districts and industrial clusters firms and industries has been the dominant unit of analysis. But since the 1990s there has been a growing focus on skills. This broad research thrust includes studies of human capital; the creative class and occupational class more broadly; and physical, cognitive and social skills, among others. This research highlights the growing geographic divergence of skills across cities and metros and their effects on regional innovation, wages, incomes and development broadly. A growing literature notes the growing importance of place in organizing and mobilizing these skills. Studies have focused on the role of amenities, universities, diversity and other place-related factor in accounting for the growing divergence of skills across locations. This article summarizes the key lines of research that constitute the skills revolution in urban and regional research

Keywords: Human capital, creative class, regional development.

JEL classification: O15, O30

Introduction

A large and influential body of research on the role of skills in regional economic growth and development has emerged over the past decade or so. This work on skills has greatly expanded our understanding of the nature, role and mechanics of regional growth and development. This relatively recent line of research can be divided into two main thrusts – studies that focus on and measure human capital in terms of educational attainment and those that measure skills via occupations.

This work represents something of a break with an earlier focus on the role played by firms and industries. Classical location theory (e.g. Weber 1909; von Thünen 1926; Christaller 1933) emphasize the transportation costs and tradeoffs made by large industrial firms. Marshall long ago noted forces and factors that cause firms to agglomerate. Building on his work, economists have catalogued the factors including proximity to natural resources and transportation routes, shared inputs, knowledge spillovers and access to labor that lie behind such agglomerations or clusters. During the 1980s, economic geographers identified the rise of industrial districts and flexibly specialized industrial networks as alternatives to vertically integrated production by large firms (Piore and Sabel 1984; Christopherson and Storper 1986; Scott 1986). Porter (1990) identified four key reasons behind geographic clusters including factor conditions, demand conditions, related and supporting industries, and strategy, structure and rivalry. Others have noted the role of social factors such as social capital and trust as additional factors orienting geographic clusters (Saxenian 1994; Dei Ottati 1994).

Interest in skills and human capital dates back a long way. In his classic work on *The Wealth of Nations* (1776) Adam Smith identified the “acquired and useful abilities of all the inhabitants or members of the society” as something akin to a “fourth factor of production” (e.g. Samuelson and Nordhaus 2004) operating alongside land, labor and production, noting that: "The greatest improvement in the productive powers of labour, and the greater part of the

skill, dexterity, and judgment with which it is anywhere directed, or applied,” he wrote,” seem to have been the effects of the division of labour”(Smith 1776; book 1, p. 7). Still, until recently the great preponderance of economic and regional research has focused on the firm and firm location in order to understand geographical differences in economic performance.

Nearly a half century ago, however, Jane Jacobs (1961 1969) noted that what distinguished cities and propelled their economic growth and development was not firms, but the geographic clustering of diverse and talented in cities. In the mid-80s, Thompson (1986) called attention to the role of occupations in regional development, saying that we need to look beyond the products a city makes and instead examine the roles it plays and the skills it performs. This in turn will shift the emphasis from the industry perspective to more long-run power and potential of local (human) resources. Building on Jacobs, Lucas (1988) suggested that knowledge is embodied in human beings rather than in industries, and that human capital externalities that stem from a concentration of highly educated individuals are the key motivating force in economic growth and development. Over the past decade or so, a growing body of research has identified the growing concentration and geographic clustering of skill as the key factor in regional growth and development. This research has noted a growing divergence in the geographic location and concentration of skills and their increasing importance to regional innovation, productivity and growth. A debate has emerged over how best to measure skill. There is a long literature on the role of educational based human capital, at the regional as well as national levels, in economic performances. More recent research has shifted attention to occupation-based measures of skill and also to more discrete measures of occupational skill itself.

Some have also invoked the classic-chicken and egg question: what comes first they ask - firms or skills? In our view this is a misleading question. It can be better framed in terms of demand and supply, where firms comprise the demand for skill, with skills thus

functioning as supply. This is not so much a chicken and egg or either/ or question, but a question of how firms and skills interact to inform regional economic growth. The analog is of course producers and consumers, can one entangle which of these came first. They require each other.

This chapter focuses on the growing attention paid to and the importance of skills for regional economic development and growth. It summarizes the major thrusts and contributions of the field. In doing so, it distinguishes between education-based and occupational definitions of skills. It discusses the opportunity to link firms and skills – or industries and occupations – in order to gain more robust theories and empirical research on the key factors that shape regional economic growth and development.

The Firm/ Industry Focus in Regional Research

Historically, regional economists have focused on the firm as the unit of analysis (e.g. von Thünen 1926; Weber 1909; Christaller 1933; Ohlin 1933; Hoover 1937 1948; Lösch 1940). This also stems from a strong tradition built on the work by Marshall (1890), who argued that firms cluster to achieve the advantages of collocation, such as shared labor markets, shared inputs, risk minimization and knowledge spillovers. Hotelling (1929) showed how firms producing similar types of products and that don't compete based on price have incentives to collocate next to one another. This focus on the firm developed just as the economy was moving away from agriculture toward large industrial firms and heavy industry. This was a time when transportation costs were high and location decisions were heavily influenced by proximity to natural resources.

This was the backdrop for the focus on the firm, and in particular on the large firm as the dominant unit of analysis in urban economics, economic geography and regional science. Many studies focused on the location and site selection decisions by these firms and

later on the location choices of their branch plants. Vernon (1966) advanced a simple model of industrial location based on the product cycle – firms would decentralize production through branch plants once production processes became standardized. Others later focused on the growing international spatial division of labor informed by the location decisions and global reach of these multinational firms (Froebel et al. 1979; Massey 1984). There was little inclination to examine the role of human capital or occupations as most jobs were standardized. When labor was considered, it was mainly seen as a cost to minimize.

Post-Industrialism and the Knowledge Economy

This changed however with the shift from an industrial to post-industrial economy. Machlup (1962) and Drucker (1969 1993) described the rise of the “knowledge economy” and of “knowledge workers.” Bell (1973) identified the shift to a “post-industrial society” with a new class structure based on scientists, managers, administrators, and engineers. Andersson (1985b) emphasized the broader societal change from the manufacturing-based economy to the “C-society” based on creativity, communication, culture, and knowledge. Florida (1995) and Kenney and Florida(1993) identified the rise of new systems of industrial production, especially among Japanese firms, which gained competitive advantage by tapping the knowledge and intelligence of factory workers.

The 1980s saw increasing interest in the shift from vertically-integrated to flexibly specialized production systems (Piore and Sabel1984; Harvey1988), as well as later Storper (1994). This body of research identified the rise of networked production systems based on “flexible specialization”. As production standardization decreased, workers were enabled to have a wider range of expertise, which led to a continuous firm learning process.

This distinction between knowledge based production and more standardized goods production has several implications for regional development. First, standardized production

can take place almost anywhere, where labor and land rent are cheap, and the final product can thereafter be sent to the market place for consumption. In other words, production and consumption do not need to take place in the same location. Knowledge production, on the other hand, is most often related to service goods, where there is a need for producers and consumers to meet contemporaneously in the market place. Knowledge products are therefore in general more distance sensitive and more attached to the region where the economic activity is located (Quigley and Johansson 2004). Second, knowledge and creative workers not only function as producers of high value goods, they also consume them. Glaeser et al. (2001) describe how increased average incomes based on the re-allocation of labor into more productive sectors has changed the role of the regions. As incomes rise, people demand more normal and luxury goods, rather than necessity goods, and those will mainly be provided in bigger cities. Higher incomes also increase the opportunity cost of not working as well as the cost for commuting. Altogether, the increasing incomes and increased cost for commuting create stronger incentives to locate in cities.

The distinction between knowledge-based and standardized manufacturing industries can be problematic when industry data is being used. The same industry codes may imply very different functions and tasks, and those often come with a spatial fragmentation. Multinational companies often locate the labor-intense low-skilled functions in less developed, low-wage countries, but keep the more high-skilled functions in the western world. To best illustrate this, one needs to understand the occupational and educational structure within the growing creative and knowledge-based industry sectors compared to the one within more traditional sectors.

Human Capital

Most research on skills is organized around the construct of education based human capital. Human capital theory postulates that wages rise with the level of knowledge or skill (Becker 1964 1993) and a traditional Mincer (1974) equation suggests that wage is a function of hours worked, skills and education. Optimally, wage levels should be in proportion to the stock of human capital, since this affects the value of workers' marginal product. At the aggregated level, wages are thus set by the regional *supply and demand* for labor. Regional wage levels would thereby be directly related to regional labor productivity. In on a micro level this may be distributed unevenly. Two regions can reach the same wage levels based on (1) a homogenous labor force or (2) a labor force consistent of high and low knowledge labor that together reach the same result. But at the aggregate level, the regional wage level will reflect regional labor productivity. Wages can also be a function of a number of other factors, such as gender, immigration background, race etc. Becker (1957) also suggests that discrimination, e.g. based on factors such as race and gender, may disturb the relation to wages, and also decrease productivity, since people may be hired more based on individual traits than how suitable they are for the job.

A wide range of empirical studies have documented the role of human capital in national growth. Barro (1991 1997) as well as Mankiw, Romer and Weil (1992) have illustrated this empirically. Similar studies have also been done later on by for example de la Fuente and Domenech (2006) as well as Cohen and Soto (2007), still with similar results. However, the stream of research by regional economists, such as Harvard's Edward Glaeser with collaborators, has suggested that it is harder to estimate the human capital (educational effect) on economic growth for nations than for cities, since national growth to a larger extent will be affected by institutional differences as well (Glaeser et al. 2004). Another reason why cities may be a more appropriate level of analysis is that cities make up meaningful economic

units (Duranton 2004), while regional and national divisions otherwise tend to be more arbitrary and based on political decisions.

While human capital externalities affect regional productivity in cities, there are also more straightforward explanations to why we would expect a relation between higher levels of human capital and productivity. Human capital has become more unevenly distributed and concentrated over time. Berry and Glaeser (2005) have shown how human capital levels have become more and more concentrated over the last century, and how this is endogenous process where places with initially high values have increased their human capital levels more over time than other places that started off a lower position.

Ullman (1958) was one of the first to note the role of human capital for regional development. Ever since, considerable research has found significant relations between education levels and wages in cities and metropolitan areas. Rauch (1993) found that human capital intense cities are more productive and that an increase by one year in education increases productivity by three percent. Glaeser (2000) provides empirical evidence on the correlation between human capital and regional economic growth. Firms locate in areas of high human capital concentration to gain competitive advantages, rather than letting suppliers' and customers' geography alone dictate their location. Glaeser and Saiz (2003) find that skilled cities grow, relative to less skilled cities, through increases in productivity.

Occupations and the Creative Class

While the great preponderance of research on regional development uses human capital as a proxy for skill, a second approach has also emerged over the past decade which suggests that occupations may be a better proxy for skill. Thompson long ago suggested the

need to utilize occupational analysis in regional development research (Thompson 1983; Thompson and Thompson 1987). Feser (2003) later suggested that it is more important to focus on what regions do, rather than what they make in order to understand regional development, and that occupations then should be the natural unit of analysis.

Florida (2002a) used occupational analysis to divide the workforce into three main occupational classes – the Creative Class, Working Class and Service Class. Florida based his research on Bureau of Labor Statistics data on occupations. The creative class works with knowledge, the working class is engaged in physical work and the service class performs routine service. The creative class is divided into two sub-groups; the super-creative core (computer and math occupations; architecture and engineering; life, physical, and social science; education, training, and library positions; arts and design work; and entertainment, sports, and media occupations), and the creative professionals (management occupations, business and financial operations, legal positions, healthcare practitioners, technical occupations, and high-end sales and sales management).

This approach focuses on creativity itself and not education as a proxy for skill. Research in psychology has shown that creativity is a fundamental and intrinsic human capability. Where Marx (1906) and other classical economists looked at physical labor – in other words, the ability of humans to transform nature, create farms and build manufactured products – in reality is our underlying creativity which makes us different than other species. According to Sternberg (1999), this is what entrepreneurs, CEOs, artists, and technologists, as well as all children, have in common – our creative capacity. Amabile (1996) defines creativity as the development of new ideas – as embodied in products, practices, services, or procedures – that are potentially useful. In studies by Smith et al. (1984) creativity is separated from intelligence and education, and these three factors are regarded as both

substitutes and complements in the productive process carried out by individuals. In works by Csikszentmihalyi (1996 1997), Weisberg (1999), and Runco (2004), creativity is a necessary condition to adopt and react to the constant changes around us. On an individual level there is a close relation between creativity and productivity (Amabile 1983 1996), and creative people are even proven to be more happy in general, as well as more committed and self-actualizing (Csikszentmihalyi 1997). Personality and cognitive characteristics make some individuals more creative than others (Woodman et al. 1993; Amabile 1983 1996), and the level of creativity is often affected by the social and organizational context (Rasulzada 2007). Poincaré (1908) made comparisons between the creativity of a mathematician and an artist in his famous work *Mathematical Creation*. The mathematician is described as an artist, rather than a scientist. Halmos (1968) makes a comparison between the creativity in mathematics with the creativity within painting (page 380): “mathematics is never deductive in its creation” – “perhaps the closest analogy is between mathematics and painting...Almost every aspect of the life and of the art of a mathematician has its counterpart in painting. Sternberg (1999) notes that creativity is a common denominator across disparate fields: “If one wanted to select the best novelist, artist, entrepreneur, or even chief executive officer, one would most likely want someone who is creative.”

Florida (2003) identifies three types of creativity: (1) technological creativity or innovation, (2) economic creativity or entrepreneurship, and (3) artistic or cultural creativity. He argues that these three types are mutually dependent and that they simulate and reinforce one another. Kanter (1988) highlights that creativity also comes with costs. It is often an uncertain process that includes the risk for failure, stress and other negative effects. Creative ideas challenge established norms and bring disorder, which imply a risk since creative people tend to be met with resistance and skepticism. Kuhn (1962) extensively describes how difficult it is to change systematic beliefs and explain that the only reason science change is

because old scientists die. Boden (1997) remarks that similar conditions hold for e.g. arts, music and poetry, where the orthodoxy works as a constraint on the novelty and the individual expression. Keynes's (1932) noted the need for close interaction when novel ideas are introduced, in order to overcome the skepticism of the audience. Not only must new ideas be presented, they need to be accepted as well. Jacobs's (1969) saw cities as arenas for the generation of new ideas, and as ideal places for creative industries, whose production processes are related to higher risks, shorter life cycles and often unique products

The occupational approach differs from the more conventional human capital perspective in how skill is conceived and measured. The educational based human capital is purely supply based, in other words, the amount of knowledge offered at the labor market. On the other hand, it says very little about how this knowledge is being used. Creative class is a combination of supply and demand driven qualified labor. In order to be included in the creative class, you do not only have to have a certain amount of skill, knowledge or creativity to offer at the labor market – the labor market must also be willing to pay for that kind of skill.

While human capital and creative occupations overlap, they are not the same thing. Research based on micro data for the U.S., Canada, Sweden and Denmark, illuminates this difference. For the U.S. 35 percent of the labor force belong to the creative class, and 29 percent has a university degree. Out of everybody with a university degree, only 72 percent has a creative job, and out of all creative class workers only 59 percent has a university degree (Stolarick et al. 2010). Other research examined the differences between the occupational based creative class and educational based human capital for US metropolitan regions (Florida et al. 2008) and finds that human capital is more related to regional income levels, and while creative class is more linked to average wage levels, and also suggest that wages

are more place based than income. Incomes can be earned and transferred more easily from other places (and even globally) while wage structures relates to the industrial and occupational set up in the region where the wage is being earned. Mellander and Florida (2009) find that the creative class significantly outperforms human capital in order to explain regional wage levels in Sweden.

McGranahan and Wojan (2007) find that creative class is a strong explanatory factor not only in bigger cities, but also in rural areas. However, they suggest that the measure become even more powerful if education, training, and library positions, as well as healthcare practitioners are excluded in the measure. Gabe et al (2007) came to a similar conclusion. In a study of European regions, Andersen et al. (2010) find the creative class to be significantly related to regional economic performance. Boschma and Fritsch (2007) find that creative class is a stronger explanatory variable than education based human capital in relation to innovation and new firm formation, but that human capital is more strongly related to patenting (2009). Marlet and Van Woerken (2004) find that creative class outperforms human capital in order to explain regional wage levels in the Netherlands.

An important wave of recent studies has focused more on *skills* themselves. Rather than examining the occupation, there is instead a focus on the skills and knowledge required by that occupation. This research uses new data from the US Bureau of Labor Statistics O*NET data base which collects detailed information on the actual skill content of work for more than 800 individual occupations. Bacalod and Blum (2005) examined the association between four key skills – physical, motor, cognitive, and social skills – and found higher returns to cognitive and social skills, which in turn can help explain the decreased gender wage gap. A follow-on study (Bacalod et al. 2009) observed a connection between skill type, finding social and cognitive skills to be associated with larger cities and metros. Feser (2003) identified the

general knowledge requirements across occupations and the economic returns they generate. Feser also shows the need for an occupation-based analysis, where similarities and dissimilarities across occupations are taken into account and grouped in a more meaningful way, in order to understand regional development. Gabe (2009) differentiates between skill requirements and the returns they offer in private and public sectors. He also shows how spillover effects enhance earnings in metropolitan regions with higher shares of high-knowledge occupations. Scott (2009) examined the connection between skills and regional employment, finding the largest increases in regional employment to be associated with cognitive-intensive occupations, with substantial employment declines for occupations that depend on physical skills. Florida et al. (2011) define three skill sets – analytical, social, and physical – and note the increasing returns generated by analytical and social skills over time, and decreasing returns to physical skill. They reinforce the key findings of Bacalod et al. (2009) regarding the concentration of analytical and social skills in larger metros. They conduct regression analysis including factors for both high tech industry concentrations and education levels and find that analytical and social skills still are significantly associated with higher wage levels.

The Organizing Role of Place

If industrial production was organized in and around firms, knowledge-based or creative production is organized in cities. For decades, many assumed that advance in technology would underpin far-flung globalization enabling production to be broken apart and people to live virtually anywhere. Many proclaimed the end of geography, the death of distance, the decline of place and the flattening of the world (e.g. Friedman 2005). But that is only half the story. As Porter has notes, many predicted the rise of globalization and end of

place, and that confused many otherwise smart people (Business Week 2006). But the empirical facts are that more than half the world population lives in cities and urban areas, the highest at any point in history (UNFPA 2007). And the economic activity produced by the biggest metro areas account for a substantially greater economic value than their population size. The top ten metros, which house approximately 2.6 percent of the world's population, account for more than 20 percent of global economic activity (Florida et al. 2010). Glaser (2011) identifies cities as the world's key economic actors, indicating a triumph of the city. Cities not only make people and industries more productive, they even improve the conditions to the least well off. Glaeser et al. (2001) suggest that this is a result of the relatively lower cost of transportation of the *latest* ideas and information, which tend to be more time-sensitive and in a higher demand of face-to-face interaction and urban density. This is in line with Keynes (1932) who, in *Essays in Persuasion*, emphasized the need for didactics and persuasion in relation to creative processes. Not only should new and innovative ideas be presented, they need to overcome the skepticism of the audience, which in practice only can be made through close interaction.

As early as 1969, Jacobs leveled a fundamental critique of Adam Smith's notion of the division of labor captured in his famous pin factory example. Smith's story, she argued, emphasized efficiency. But the key to economic growth is innovation. Innovation, she continued, comes principally not from firms, but from cities which enable the constant combining and recombining of key inputs, including skilled people. While firms deepen and specialize the division of labor, cities, with their clustering force and combination and recombination of skilled individuals, give rise to new innovations and economic development.

Building on Jacobs' insight on cities (1961 1969), Lucas (1988) modeled the importance of investment in education for productivity, which rewarded him the Nobel Prize.

Lucas later said that Jane Jacobs was the one who should have received it for her contributions. Lucas also showed how collocation of skilled, talented, ambitious, and entrepreneurial people led to so called “human capital externalities”. Having many driven people in the same locale will lead to spontaneous interaction and activities where they learn from one another, without any specific cost related to it. Lucas formalized the role of dense urban areas which localize human capital and information, create knowledge spillovers, and become engines of economic growth. Cities reduce the cost of knowledge transfer, so ideas move more quickly, in turn giving rise to new knowledge more quickly.

Caves (2002) shows how creative industries are more likely to be organized as geographic clusters of creative individuals as opposed to vertically integrated firms. Creative industries have higher levels of uncertainty and production challenges due to multiplicative production functions, where every input is non-substitutable and therefore must be present in order to produce. Further, shorter life cycles and a constant need for re-invention demands a closer interaction between consumers and producers, as well as more new skill combinations for a faster generation of new ideas. For these reasons, creative industries tend to be organized flexibly in places rather than in vertically integrated firms.

Florida (2002 a, b, c) focuses on the characteristics of places that attract highly skilled individuals. Building on research by e.g. Rosen (1979) and Roback (1982) on migration across regions, Florida (2002a, b, c) suggests that in addition to the human capital externalities and productivity and innovation enhancing functions of places, they also act on the consumption preferences of skilled individuals. This reasoning is considerable advance over earlier theories that comparative advantage stems merely from business friendly environments, lower taxes, and lower overall firm costs. Clark et al. (2002) argues the regional winners will be those that maximize individuals’ utilities and not just their incomes.

Glaeser et al. (2001) also examined the factors that attract skilled labor to cities, and come to the conclusion that the most attractive cities are those that offer consumption rather than production. Cities with a diverse consumption of goods and services are more appealing than cities that do not. Glaeser et al. (2001) found that higher amenity cities attract more skilled labor and grow faster. This result is also in line with Florida et al. (2011a) who find that individuals who find their communities aesthetically appealing are more satisfied with their places, and that beauty is a stronger explanatory variable than for example job opportunities, housing markets, high quality public services, etc. Florida et al. (2011a, b) also illustrate how place-specific characteristics, such as the ability to meet and make friends, quality of public schools, and being able to get from one place to another without too much traffic, are significantly more related to community satisfaction and the likelihood of staying in a place, even more so than economic variables, such as the ability to get a job or perceived future economic conditions, or individual characteristics.

Florida argues that skill needs to be considered not as a stock but as a flow which is highly mobile. A key factor here is low barriers to entry also referred to as tolerance (Florida 2002a, c). Smart, talented people, whether in the form of human capital or creative class, are attracted to open and tolerant places where ideas will be accepted and can float freely between individuals. It will also improve the chances of a meritocracy based labor market, which is necessary for it to function efficiently, which Becker noted in the 1950s. Further, not only is openness and tolerance a condition for attracting talent, it is also a way of increasing the probability of turning new ideas into economic value. Jacobs (1961 1969) also showed how open and diverse places attract people of different backgrounds and how this can be linked to creativity and innovation, and in the end economic growth.

Research by Inglehart and his collaborators finds that openness is related to economic growth in studies covering more than sixty countries over four decades (Inglehart 1989 1997; Inglehart and Baker 2000; Inglehart and Norris 2003), According to Inglehart, the best indicator of national tolerance is openness to gay and lesbian people. Florida (2002a, c) used a similar variable, concentration of the same population group, to proxy for regional openness in the U.S. Florida et al. (2008) later used it in a multivariate context and found it a significant contributor in order to explain the distribution of both highly educated and the creative class across metropolitan areas.

Conclusions

This essay has traced the skills revolution in urban and regional research. The long sweep of urban economics, regional science and economic geography research has focused on the firm and industry as the key unit of analysis. But the past couple of decades have seen increasing concern for skills. The skills revolution is rooted in the changing nature of the economy – from an older industrial economy to a newer one based upon knowledge, innovation and skill. Research has focused on the role of human capital, the creative class and occupational classes and on skills themselves. The skills revolution has also informed increased concern for and understanding of how places operate. Research has focused on the role of amenities, universities, diversity and other characteristics of places in accounting for the dispersion, uneven location and geographic mobilization of skills.

We suggest it is time to get beyond the either/or focus on firms and skills, industries and places. Both are veritable flipside of the same analytic coin. The proverbial chick and egg problem is in our view a false dichotomy. Both firms and skills industries and places play a key role in and are required for regional development a complex iterative development process. An important task for future research is to bring these foci together.

With recent conceptual advances combined with the availability of micro-data on skills and firms, it is now time to bring the two together. An important line of future research needs to identify the ways firms and skills work together to structure regional growth and development. The skill revolution has been a powerful one, advancing our understanding of the importance of skills, their growing divergence over space, and the way they power regional growth and development as well as identifying the key aspects and functions of place. Future research promises even greater advances of how firms and skills come together to power innovation and growth. It is an exciting time to be working in this incredibly rich field.

References:

- Amabile, T (1983) *The Social Psychology of Creativity*. New York, Springer-Verlag
- Amabile, T (1996) *Creativity in Context*. Boulder, CO, Westview Press
- Andersen, K V, Bugge, M M, Hansen, H K, Isaksen, A, Raunio, M (2010). One size fits all? Applying the creative class thesis onto a Nordic context. *European Planning Studies* 18(10): 1591-1609
- Andersson, Å E (1985a) *Creativity and Regional Development*. Papers of the Regional Science Association 56: 5-20
- Andersson, Å E (1985b) *Creativity – The Future of Metropolitan Regions*. Stockholm, Prisma
- Bacolod, M, Blum, B (2005) *Two Sides of the Same Coin: U.S. “Residual” Inequality and the Gender Gap*. University of Toronto working paper
- Bacolod, M, Blum, B, Strange, W (2009) Skills in the City. *Journal of Urban Economics* 65:136-153
- Barro, R J (1991) Economic Growth in a Cross Section of Countries. *Quarterly Journal of Economics* 106(2): 407-443
- Barro, R J (1997) *Determinants of Economic Growth: A Cross-Country Empirical Study*, Cambridge, MA: The MIT Press
- Becker, G (1957) *The Economics of Discrimination*. Chicago, Chicago University Press
- Becker, G (1964) *Human Capital*. New York, Columbia University Press for the National Bureau of Economic Research
- Becker, G (1993) *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago, The University Press of Chicago
- Bell, D (1973) *The Coming of Post-Industrial Society: A Venture in Social Forecasting*. New York, NY, Basic Books
- Berry, C R, Glaeser, E L (2005) *The Divergence of Human Capital Levels Across Cities*. NBER Working Paper No. 11617 September 2005
- Boden, M (1997) *The Constraints of Knowledge*. In Andersson, Å E, Sahlin, N-E (eds), *The Complexity of Creativity*, Dordrecht: Kluwer Academic Publishers
- Boschma R A, Fritsch M, (2007) *Creative class and regional growth – empirical evidence from eight European countries*. Jena Economic Research Papers 2007-066
- Business Week (2006) Q&A with Michael Porter, August 21, available at: www.businessweek.com/magazine/content/06_34/b3998460.htm

- Caves, R E (2000) *Creative Industries*. Cambridge, MA, Harvard University Press
- Christopherson, S, Storper, M (1986) The City as a Studio, the World as Back Lot: The Impact of Vertical Disintegration On the Location of and the Motion Picture Industry. *Environment and Planning D: Society and Space* 4 305-320
- Clark, T N, Lloyd, R, Wong, K K, Jain, P (2002) Amenities Drive Urban Growth. *Journal of Urban Affairs* 24(5): 493-515
- Christaller, W (1933), *Die zentralen Orte in Süddeutschland*, Gustav Fisher, Jena, (English translation Baskin, CW (1967), Englewood Cliffs, NJ)
- Cohen, D, Soto, M (2007) Growth and Human Capital: Good Data, Good Results. *Journal of Economic Growth* 12(1): 51-76
- Csikszentmihalyi, M (1996) *Creativity: Flows and the psychology of discovery and invention*. New York: Harper Collins
- Csikszentmihalyi, M (1997) Happiness and Creativity. *The Futurist* 31: 8-12
- De La Fuente, A, Doménech, R (2006) Human Capital in Growth Regressions: How Much Difference Does Data Quality Make? *Journal of the European Economic Association* 4(1): 1-36
- Dei Ottati, G (1994) Trust, interlinking transactions and credit in the industrial district. *Cambridge Journal of Economics* 18(6): 427-448
- Drucker, P (1969) *The Age of Discontinuity: Guidelines to Our Changing Society*. New York: Harper and Row
- Drucker, P (1993), *Post-Capitalist Society*. New York, NY: HarperCollins.
- Duranton, G (2007) Human Capital Externalities in Cities: Identification and Policy Issues. In Arnott, R J, McMillen, D P , (eds) *A Companion to Urban Economics* Oxford, UK: Blackwell Publishing Ltd
- Feser, E J (2003) What Regions Do Rather than Make: A Proposed Set of Knowledge-based Occupation Clusters. *Urban Studies* 40(10): 1937-1958
- Florida, R, Kenney, M (1993) *Beyond Mass Production: The Japanese System and its Transfer to the United States*. New York NY: Oxford University Press.
- Florida, R (1995) Toward the Learning Region. *Futures* 27(5): 527-536
- Florida, R (2002a) *The Rise of the Creative Class*. New York, Basic Books.
- Florida, R (2002b) The Economic Geography of Talent. *Annals of the Association of American Geographers* 92(4): 743-755

- Florida, R (2002c) Bohemia and economic geography. *Journal of Economic Geography* 2: 55-71
- Florida, R (2003) Entrepreneurship, Creativity and Regional Development. In Hart, D (ed) *The Emergence of Entrepreneurship Policy: Governance, Start-Ups, and Growth in the U.S. Knowledge Economy*, Cambridge, MA: Cambridge University Press
- Florida, R, Mellander, C, Stolarick, K (2008) Inside the Black Box of Regional Development. *Journal of Economic Geography* 8: 615-649
- Florida, R, Mellander, C (2010) There Goes the Metro: How and Why Artists, Bohemians and Gays Affect Housing Values. *Journal of Economic Geography* 2: 167-188
- Florida, R, Mellander, C, Gulden, T (2010) Global Metropolis: Assessing Economic Activity in Urban Centers Based on Nighttime Satellite Images. *Professional Geographer* (forthcoming) available online:
<http://www.tandfonline.com/doi/abs/10.1080/00330124.2011.583590#preview>
- Florida, R, Mellander, C, Stolarick, K (2011a) Beautiful Places: The Role of Perceived Aesthetic Beauty in Community Satisfaction. *Regional Studies* 45(1): 33-48
- Florida, R, Mellander, C, Stolarick, K (2011b) Here to Stay: The Effects of Community Satisfaction on the Decision to Stay. *Spatial Economic Analysis* 6(1): 5-24
- Friedman, T (2005) *The world is flat: a brief history of the twenty-first century*. New York, Farrar, Straus and Giroux
- Froebel, F, Heinrichs, J, Krey, O (1979) *The New International Division of Labor*. Cambridge, UK, Cambridge University Press.
- Gabe, T, Colby, K, Bell, K (2007) Creative Occupations, Earnings, and the U.S. Rural-Urban Wage Gap. *Canadian Journal of Regional Science* 30(3)
- Gabe, T (2009) Knowledge and Earnings. *Journal of Regional Science* 1-19.
- Glaeser, E L (1998) Are Cities Dying?. *Journal of Economic Perspectives* 12(2): 139-160
- Glaeser, E L (1999) Learning in Cities. *Journal of Urban Economics* 46: 254-277
- Glaeser, E L (2000) The new economics of urban and regional growth. In Gordon, C, Meric, G, Feldman, M (eds), *The Oxford handbook of economic geography*, 83-98, Oxford: Oxford University Press
- Glaeser, E L, Kolko, J, Saiz, A (2001) Consumer City. *Journal of Economic Geography* 1:27-50
- Glaeser, E L, Saiz, A (2003) The Rise of the Skilled City. NBER Working Papers no 10191, National Bureau of Economic Research, Inc.

- Glaeser, E L, La Porta, R, Lopez-de-Silanes, F Shleifer, A (2004) Do Institutions Cause Growth?. *Journal of Economic Growth* 9(3): 271-303
- Glaeser, E L (2011) *Triumph of the City*. New York, Penguin Books
- Halmos, P (1968) Mathematics as a Creative Art. *American Scientist* 56: 375-389
- Hoover, E M (1937) *Location Theory and the Shoe and Leather Industries*. Harvard University Press, Cambridge, MA
- Hoover, E M (1948) *The Location of Economic Activity*. New York, McGraw Hill Book Company
- Inglehart, R (1989) *Culture Shifts in Advanced Industrial Society*. Princeton, Princeton University Press
- Inglehart, R (1997) *Modernization and Post-Modernization*. Princeton, Princeton University Press
- Inglehart, R, Baker, W (2000) Modernization, Cultural Change and the Persistence of Traditional Values. *American Sociological Review* 65:19-51
- Inglehart, R, Norris, P (2003) *Rising Tide*. New York and Cambridge, Cambridge University Press
- Inglehart, R, Welzel, C (2005) *Modernization, Cultural Change and Democracy*. New York and Cambridge, Cambridge University Press
- Jacobs, J (1961) *The Death and Life of Great American Cities*. New York, NY, Random House
- Jacobs, J (1969) *The Economies of Cities*. New York, Random House
- Kanter, R M (1988) When a Thousand Flowers Bloom: Structural, Collective and Social Conditions for Innovation in Organizations. *Research in Organizational Behaviour* 10: 123-167
- Keynes, J M (1932) *Essays in Persuasion*. New York, Harcourt Brace
- Kuhn, T S (1962) *The Structure of Scientific Revolution*. Chicago, University of Chicago Press
- Lucas, R (1988) On the Mechanics of Economic Development. *Journal of Monetary Economics* 22: 3-42
- Lösch, A (1940), *Die Räumliche Ordnung der Wirtschaft*, Gustav Fischer, Jena. English translation (1954): *The economics of location*, New Haven, Yale University Press, Connecticut.

- Machlup, F (1962) *The Production and Distribution of Knowledge in the United States*. Princeton, NJ, Princeton University Press
- Mankiw, N G, Romer, D, Weil, D (1992) A Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics* 152: 407-37
- Marlet, G, van Woerkens, C (2004) *Skills and Creativity in a Cross-section of Dutch Cities*, Discussion Paper Series 04–29, Tjalling C. Koopmans Research Institute
- Marx, K (1906), *Capital*. New York, NY, Modern Library
- Massey, D (1984) *Spatial Divisions of Labor: Social Structures and the Geography of Production*. New York, Methuen
- McGranahan, D, Wojan, T (2007) Recasting the Creative Class to Examine Growth Processes in Rural and Urban Counties. *Regional Studies* 41(2): 197-216
- Mellander, C, Florida, R (2009) Creativity, Talent, and Regional Wages in Sweden, *Annals of Regional Science*, 46:3: 637-660.
- Mincer, J (1974) *Schooling, Experience and Earnings*. New York, Columbia University Press for the National Bureau of Economic Research
- Ohlin, B (1933) *Interregional and International Trade*. Cambridge, MA, Harvard University Press
- Piore, MJ Sabel, C F (1984) *The Second Industrial Divide: Possibilities for Prosperity*. New York, NY, Basic Books.
- Poincaré, H (1908) *Mathematical Discovery*, in (ed) Poincaré, H., *Science and Methods*, Paris (Dover reprint).
- Porter, M E (1990) *The Competitive Advantage of Nations*. New York, Free press
- Putnam, R (2000) *Bowling Alone: The Collapse and Revival of American Community*. New York, Simon and Schuster
- Quigley, J, Johansson, B (2004) Agglomeration and Networks in Spatial Economies. *Papers of Regional Science* 83: 165-176
- Rauch, J (1993) Productivity Gains from Geographic Concentration of Human Capital: Evidence from the Cities. *Journal of Urban Economics* 34: 380-400
- Razulzada, F (2007) *Organizational Creativity and Psychological Well-Being*, Dissertation in Psychology, Lund University.
- Roback, J (1982) Wages, Rents, and the Quality of Life. *The Journal of Political Economy* 90(6): 1257-1278

- Rosen, S (1979) Wage-based indexes of urban quality of life. In Mieszkowski, P, Straszheim, M (eds) *Current Issues in Urban Economics*, Baltimore: Johns Hopkins University.
- Samuelson, P A, Nordhaus, W D (2004) *Economics*, 18th ed. New York, McGrawHill.
- Saxenian, A (1994) *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Cambridge, MA, Harvard University Press
- Scott, A J (1986) High Tech Industry and Territorial Development: The Rise of the Orange County Complex, 1955-1984. *Urban Geography* 7: 3-45
- Scott, A J (2009) Human capital resources and requirements across the metropolitan hierarchy of the USA. *Journal of Economic Geography* 9: 207-226
- Smith, A (1776) *The Wealth of Nations*. New York, Random House (2000)
- Smith, G, Carlsson, I, Danielsson, A. (1984) *Experimental Examinations of Creativity*. Lund University
- Sternberg, R J, Lubart, T I (1999) The Concept of Creativity: Prospects and Paradigms. In Sternberg, R J (ed) *Handbook of Creativity*, New York: Cambridge University Press
- Stolarick, K, King, K, Mellander, C, Vaarst Andersen, K (2010) *Occupational and Industrial Distribution in Denmark: A Comparison with the United States, Canada, and Sweden*, Martin Prosperity Institute Working Paper Serie, Available at: <http://research.martinprosperity.org/2010/10/occupational-and-industrial-distribution-in-denmark-a-comparison-with-the-united-states-canada-and-sweden/>
- Storper, M (1994), 'The transition to flexible specialisation in the US film industry: external economies, the division of labour and the crossing of industrial divides', in A. Amin (ed.), *Post-Fordism: A Reader*, Hoboken, NJ: Wiley-Blackwell, pp. 195–226
- Thompson, W R (1986) Cities in Transition, in Widner, R. and Wolfgang, M. (eds), *Revitalizing the Industrial City*. *The Annals of the American Academy of Political and Social Science* 488: 18-34
- Thompson, W R, Thompson, P, R (1987) National Industries and Local Occupational Strength: The Cross-Hairs of Targeting. *Urban Studies* 24: 547-560
- Ullman, E L (1958) Regional development and the geography of concentration. *Papers and proceedings of the Regional Science Association* 4:179-98
- UNFPA Report (2007) *State of World Population 2007, Unleashing the Potential of Urban Growth*, UN, available at; <http://www.unfpa.org/swp/2007/english/introduction.html>
- Vernon, R (1966) *International Investment and International Trade in the Product Cycle*. *The Quarterly Journal of Economics* 2: 190-207
- Von Thünen, J H (1826), *Der isolierte Staat*, Translated by Wartenberg, C. (1966) *Isolated state*, Ed. Hall, P. Oxford, New York, Pergamon Press

Weber, A (1909) "Über den Standort der Industrien, Teil I: Reine Theorie des Standorts" , J.C.B. Mohr, Tübingen, (English ed. by C.J. Friedrichs, Univ. Chicago Press, 1929)

Woodman, R W, Sawyer, J E, Griffin, R W (1993) Toward a Theory of Organizational Creativity. *Academy of Management Review* 18: 293-321