Regional Competitiveness: Theories and Methodologies for Empirical Analysis

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Abstract

A significant forum of scholarly and practitioner-based research has developed in recent years that has sought both to theorize upon and empirically measure the competitiveness of regions. However, the disparate and fragmented nature of this work has led to the lack of a substantive theoretical foundation underpinning the various analyses and measurement methodologies employed. The aim of this paper is to place the regional competitiveness discourse within the context of theories of economic growth, and more particularly, those concerning regional economic growth. It is argued that regional competitiveness models are usually implicitly constructed in the lineage of endogenous growth frameworks, whereby deliberate investments in factors such as human capital and knowledge are considered to be key drivers of growth differentials. This leads to the suggestion that regional competitiveness can be usefully defined as the capacity and capability of regions to achieve economic growth relative to other regions at a similar overall stage of economic development, which will usually be within their own nation or continental bloc. The paper further assesses future avenues for theoretical and methodological exploration, highlighting the role of institutions, resilience and, well-being in understanding how the competitiveness of regions influences their long-term evolution.

Keywords: Competitiveness, regions, economic growth, knowledge, innovation

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The notion of the *competitiveness of places* such as regions, cities, or nations remains an area of contested theoretical debate, with some arguing that firms, and not places, *compete* for resources and markets. Nevertheless, a significant forum of scholarly and practitioner-based research has developed in recent years that has sought both to theorize upon and empirically measure the competitiveness of places, in particular, at the subnational regional level. However, the somewhat disparate and fragmented nature of this work has led to the lack of a substantive theoretical foundation underpinning the various analyses and measurement methodologies employed.

The aim of this paper is to place the subnational regional competitiveness discourse within the context of theories of economic growth and, more particularly, those concerning regional economic growth. The

key question the paper seeks to address is how the concept of regional competitiveness and models related to its measurement can be situated within more traditional concepts and models that seek to understand and determine the means through which economic development occurs across regions. To achieve this, the paper contains a critique of a range of literature of both a theoretical and methodological nature in order to frame a more concrete conceptualization of regional competitiveness. It is argued that regional competitiveness models are usually implicitly constructed in the lineage of endogenous growth frameworks, whereby deliberate investments in factors such as human capital and knowledge are considered to be key drivers of growth differentials. Further, most regional competitiveness measurement analyses encompass the variables commonly considered to be the primary explanatory factors within growth models. This leads to the suggestion that regional competitiveness can be usefully defined as the capacity and capability of regions to achieve economic growth relative to other regions at a similar overall stage of economic development, which will usually be within their own nation or continental bloc.

The above aims are addressed in the following manner: (a) the paper first presents an understanding of the concept of regional competitiveness based on the extant literature; (b) it then seeks to theorize a link between regional competitiveness and regional economic growth; (c) following this is a discussion of methods and measurements of regional competitiveness, leading to the suggestion that certain measurement models have implicitly sought to connect regional competitiveness with the factors underlying future regional growth; and (d) the final part of the paper assesses the future avenues for theoretical and methodological exploration and the challenges that may be encountered, such as the use of competitiveness models in providing an understanding of the efficiency of regional economic systems, as manifested by interorganizational factors such as networks and clusters, in investing in knowledge-based resources through which improved capabilities and outcomes emerge. Furthermore, the recent global economic crisis highlights that regional competitiveness also has an important exogenous dimension relating to the efficiency with which regional economic systems are able to adapt to shocks, especially those occurring within global and national economic systems. To this extent, the paper indicates how notions such as regional resilience and well-being are important in understanding the wider perspective concerning how the competitiveness of regions affects their long-term evolution. In particular, it is acknowledged that whilst measures such as increasing output per capita are crucial in terms of improving competitiveness, this must not be at the expense of societal welfare.

Regional Competitiveness: The Concept

The importance of the concept of competitiveness has increased rapidly in recent years, with the issues surrounding it becoming, at the same time, more empirically refined and theoretically complex (Huggins & Izushi, 2011; Porter, 1990, 2000). It was the seminal work of Porter (1990) that first defined national competitiveness as an outcome of a nation's ability to innovate in order to achieve, or maintain, an advantageous position over other nations in a number of key industrial sectors. Following Porter's (1990) early studies linking national competitiveness to productivity and, principally, a nation's ability to innovate, attention has turned to competitiveness at a more regional level. From this spatial perspective, Porter's (2000) major contribution was to take a micro level understanding of the conditions determining firm competitiveness, such as the capacity to innovate, and apply it to the territorial unit, be it city, region, or nation. It is Porter's (2000) notion of the microeconomic determinants of prosperity and wealth generation, as opposed to determinants related to monetary exchange rates and the like, that is at the heart of the concept of regional competitiveness.

Regions are increasingly considered to be an important source of economic development and organization in a globalized economy (Amin, 1999; Cooke, 1997; Malecki, 2007; Scott, 1995; Werker & Athreye, 2004). The focus on regions reflects the growing consensus that they are the primary spatial units that compete to attract investment, and it is at the regional level that knowledge is circulated and transferred, resulting in agglomerations, or clusters, of industrial and service sector enterprises. In general, regions are increasingly considered an important source of economic development and organization in a globalized economy (Malecki, 2007). The competitiveness of regions generally refers to the presence of conditions that enable firms to compete in their chosen markets and that enable the value these firms generate to be captured within a particular region (Begg, 1999; Huggins, 2003). Regional competitiveness, therefore, is considered to consist of the capability of a particular region to attract and maintain firms with stable or rising market shares in an activity, while maintaining stable or increasing standards of living for those who participate in it (Storper, 1997). Given this, competitiveness may vary across geographic space, as regions develop at different rates depending on the drivers of growth (Audretsch & Keilbach, 2004).

While the competitiveness of regions is intrinsically bound to their economic performance, there exists a growing consensus that competitiveness is best measured in terms of the assets of the regional business environment (Malecki, 2004, 2007). These include the level of human capital, the degree of innovative capacity, and the quality of the local infrastructure – all of which affect the propensity to achieve competitive advantage in leading-edge and growing sectors of activity. The influence these assets and other externalities can have on firm competitiveness, such as the ability of regions to attract creative and innovative people or provide high-quality cultural facilities, are all important features of regional competitive advantage (Kitson, Martin, & Tyler, 2004). In other words, competitiveness is increasingly concerned with creativity, knowledge, and environmental conditions, rather than being purely based on accumulated wealth (Huggins, 2003).

As Martin (2005) outlined, concern with competitiveness filtered down to the regional, urban, and local levels, particularly the role of regionally based policy interventions, to help improve the competitiveness of regions and city-regions. In many advanced nations, these interventions form part of a strategic framework to improve productive and innovative performance. From this policy perspective, the key drivers of regional competitiveness are usually considered to consist of the enhancement of knowledge and creativity through *clusters* (Porter, 1998) or networks (Huggins & Izushi, 2007) of firms and complementary organizations. Implicit is the contention that regional competitiveness is best promoted through bottom-up activity focused on the enhancement of local systems. This perspective resembles the views of the endogenous school of regional development, wherein places act as an organizational form of coordination facilitating sustainable competitive advantage (Courlet & Soulage, 1995; Garofoli, 2002; Lawson & Lorenz, 1999; Maillat, 1998).

Despite these developments, both the concept and the measurement of competitiveness at a regional level remain contested areas of analysis, with some suggesting that "competitiveness league tables are inevitably seductive for regional development agencies and the media keen to absorb 'quick and dirty' comparative measures of regional economic performance" (Bristow, 2005, p. 294). In conceptualizing regional competitiveness, it is crucial to distinguish it from the concept of *competition*. Certainly, by writing in terms of competitiveness, one inevitably invites the reader to think in terms of head-to-head conflict. Yet, the concept of competitiveness at the national or regional level is only *competitive* in the sense that it refers to the presence of conditions that will enable firms to compete in local, national, and international markets. Regions compete in trying to provide the best platform for operating at high levels of productivity, but this is very different from the kind of direct competition undertaken by firms. It is the zero-sum conceptualization of regional competitiveness which often leads to the premise that there must inevitably be both winners and losers (Bristow, 2005).

Malecki (2004) usefully distinguished between *low road* and *high road* competition. As he pointed out, regions may compete on the basis of low wages, docile labor, and low taxes, but such low road competition will simply perpetuate an inability to upgrade to an economic base of higher skill and higher wages. Conversely, competition on the high road involving, for example, *knowledge* policies aimed at promoting entrepreneurship and knowledge-based economic development, can lead to positive-sum outcomes that bring benefits to all local economic and social activities (Leborgne & Lipietz, 1988; Malecki, 2004). In general, regional development concerns the upgrading of the economic, institutional, and social base, with entrepreneurship that is able to unlock wealth being a prime source of development (Amin, 1999). Consequently, entrepreneurship is central to regional economic growth (Audretsch & Keilbach, 2004; Malecki, 2007).

Spatial economics which does not incorporate entrepreneurship factors may fail to understand and identify key sources of regional development (Andersson, 2005), with regions that are open and creative able to attract human capital and enjoy more dynamic entrepreneurship (Benneworth, 2004; Lee, Florida, & Acs, 2004). In a competitive environment, entrepreneurs will be alert to opportunities and contribute to regional economic growth (Audretsch & Keilbach, 2004). However, changes in levels of entrepreneurship and contributions to regional economic development will take time to emerge, and as such, any effects are only seen in the long term (Huggins & Johnston, 2009; Huggins & Williams, 2009). Alternatively, regions can be uncompetitive and lack entrepreneurial dynamism because they lack the key strengths which make leading regions prosper and develop (Benneworth & Charles, 2005; Chaston, 2009; Huggins, 1997; Huggins & Johnston, 2009; Huggins & Williams, 2011; Lagendijk & Lorentzen, 2007; North & Smallbone, 2000; Virkkala, 2007).

Krugman (2003), a renowned skeptic of the competitiveness concept (e.g., Krugman, 1994), has in more recent years suggested that the competitiveness of a region is based on its ability to provide sufficiently attractive wages and/or employment prospects and a return on capital. For regions, therefore, it is important that competitiveness not only leads to increasing market shares in a particular industry but also raises, or at least maintains, the standard of living, as this should be the end goal of competitive activity (Aiginger, 2006;

Storper, 1997). Camagni (2002) further argued that the concept of regional competitiveness is *theoretically sound*, due to the role territories play in providing competitive *environmental* tools to firms and in processes of knowledge accumulation.

Regional Growth and Competitiveness

Some commentators have suggested that although policy makers everywhere are appropriating the term regional competitiveness, it remains "complex and contentious" and "we are far from a consensus on what is meant by the term" (Kitson et al., 2004, p. 992). Nevertheless, the regional entrepreneurial, knowledge, and innovation capacity of regions are generally considered to be key factors underpinning the future economic development and growth trajectory of regions. It is this link, therefore, between the knowledge, entrepreneurial, and innovation bases of regions and their growth capacity and capability that is at the heart of the concept of competitiveness. In this respect, regional competitiveness concepts are strongly tied to the lineage of Schumpeterian theory (Schumpeter, 1934) – or *Schumpeter's competitiveness*, as it has been termed (Beugelsdijk & Maseland, 2011) – as well as more contemporary theories relating to the endogenous nature of economic growth.

Both competitiveness and endogenous growth theory are rooted in the notion that the sources of high rates of economic performance and subsequent growth stem from the role that the production, distribution, and use of knowledge play within and across economies (Antonelli, Patrucco, & Quatraro, 2011; Grossman & Helpman, 1994; Harris, 2001; Ibert, 2007; Vaz & Nijkamp, 2009; Zucker, Darby, Furner, Liu, & Hongyan, 2007). The knowledge-based economy is generally considered to consist of the sphere and nexus of activities and resources centered on, and geared toward, innovation (Romer, 2007). The innovation systems literature, in particular, pinpoints the flow of knowledge across organizations as a crucial factor for effective innovation (Andersson & Karlsson, 2007; Cooke, 2004; Cooke et al., 2011; Freeman, 1987, 1994; Harris, 2011; Lundvall, 2010).

Echoing the key tenets of regional competitiveness, endogenous growth theory further stresses that knowledge is a key driver of productivity and economic growth, which departs from the traditional emphasis on the accumulation of physical capital (Aghion & Howitt, 1997; Lucas, 1988; Romer, 1986, 1990). Theorists of economic development have increasingly drawn upon models of endogenous growth to better understand the factors underpinning such development. Endogenous growth theory generally assumes that economic growth is at least partly a function of stocks of knowledge in the form of human capital or the outcomes of research and development (R&D) activities. The use of the term *endogenous* is recognition that economic growth is influenced by the use of *investment resources* generated by economies themselves, rather than the exogenous factors associated with traditional growth models. These early models are rooted in the work of Solow (1956, 1957) and Swan (1956), which focused on physical capital and the supply of labor as the key sources of growth (Andersson & Karlsson, 2007).

At the regional level, it is generally recognized that there is a need to better understand the mechanisms underlying regional growth patterns (Andersson & Karlsson, 2007; Capello & Nijkamp, 2009; Stimson, Stough, & Nijkamp, 2011). As indicated above, economic growth rates are increasingly considered to be dependent on endogenous factors with most treatments commonly assuming that economic growth is partly a function of either stocks of human capital, as proposed by Lucas (1988), or R&D, as proposed in Romer's (1986) model. Romer (1986), for instance, specified a model of long-run growth in which knowledge is assumed to be an input into production that has increasing marginal productivity. Adapting Romer's (1986) model to the regional context, it can be proposed that the output of a region (r) is a function not only of physical capital and labor, but also the stock of results from expenditure on R&D:

$$Y_r = A(R)\,F(K_r, R_r, L_r);$$

where:

Y - economic output,
A - current global state of knowledge,
K - physical capital,
R - stock of results from expenditure on R&D,
L - supply of labor.

In the Lucas (1988) model, it is investment in human capital (H) that largely determines the output of a region (r):

$$Y_r = A(H)\,F(K_r, H_r).$$

This model makes clear that endogenous growth is considered to be driven by technological change arising from intentional investment decisions made by profit-maximizing agents, with the stock of human and knowledge capital – and investments in such capital – determining the rate of growth (Ha & Howitt, 2007; Romer, 1990). In this respect, regional competitiveness models possess many similarities, with the key difference being that output measures are transferred to the right-hand side of the equation – see, for example, the equations developed by Aiginger (2006) below – with the left-hand side being a measure of overall competitiveness. This makes logical sense as endogenous growth models are seeking to explain the factors underlying past output growth. Competitiveness models, on the other hand, are seeking to measure the capacity and capability for future output growth, with factors used to explain this encompassing the explanatory factors adopted by growth theorists as well as current rates of output and productivity.

In relation to competitiveness and endogenous growth theories, knowledge refers to the cumulative stock of information and skills concerned with connecting new ideas with commercial values, developing new products and processes, and, therefore, doing business in a new way. This may be called *knowledge for innovation* or *innovative knowledge*. Whereas innovation is a process, knowledge consists of the recipes and the ingredients to be processed. Therefore, as illustrated by Figure 1, the relationships between the concepts of knowledge, innovation, and competitiveness are closely associated and interlinked.

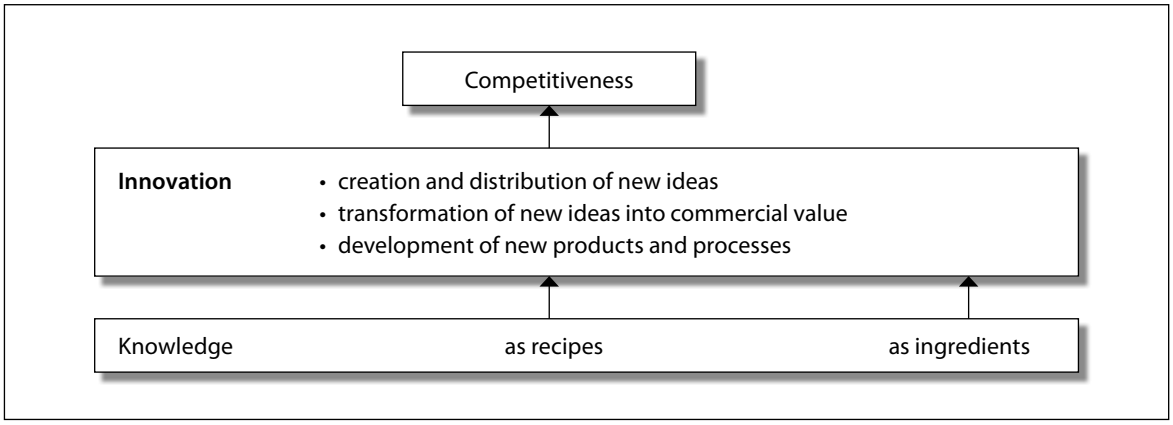

Figure 1. Relationship between competitiveness, innovation, and knowledge.

For Porter (1998), the localized productivity advantages of agglomeration, such as access to specialized inputs, employees, information, and institutions, will encourage firms to cluster and reinforce clusters over time as new firms become attracted by the same advantages of concentration. Many of the factors that increase current productivity will also encourage innovation within the cluster and, therefore, increase the productivity growth of firms. For example, access to specialized information via personal relationships will, over time, provide localized advantages for firms in perceiving new technological opportunities and new buyer needs. Therefore, as traditional forms of advantage become nullified, competitive advantage lying outside companies – i.e., in the business environment in which they are located – increases in importance.

With advances in telecommunications and information technologies allowing the instantaneous transfer of information, regardless of location, it might appear logical to consider that geography would become increasingly less important in economic analysis. In fact, in a number of ways, the reverse is true (Porter, 1990). Although it has become possible for firms and individuals to source work far more widely, the geographic concentration of related resources and industries, in particular of knowledge-intensive activities, remains one of the most striking features of any nation or region, especially in the most advanced economies. Furthermore, although the historic factors influencing location, such as proximity to inputs and markets, are being undercut, the ability to source from anywhere is, paradoxically, increasing the importance of local competitive advantage; in many respects, globalization is reinforcing localization.

Fundamentally, a key driver of regional growth consists of the capability of organizations in a region to access and subsequently utilize appropriate economically beneficial knowledge. According to Storper (1997), "the status of the region is now not merely as a locus of true externalities, but – for the lucky regions – as a site of important stocks of relational assets" (p. 44). These relational assets in the form of the network capital of firms and other organizations (Huggins, 2010a; Huggins & Johnston, 2010; Huggins, Johnston, & Thompson, 2012) and the social capital of individuals (Cantner, Conti, & Meder, 2009; Hauser, Tappeiner, & Walde, 2007; Lorenzen, 2007; Tappeiner, Hauser, & Walde, 2008; Tura & Harmaakorpi, 2005; Walter, Lechner, & Kellermanns, 2007) distinguish Storper's (1997) *lucky* from *unlucky* regions, as well as forming part of the territorial capital of regions, which includes not only relational assets but the wider set of natural, human, and organizational assets underpinning regional competitiveness (Camagni & Capello, 2010; Camagni & Capello, 2012; Capello, Caragliu, & Nijkamp, 2011; Foss & Nielsen, 2012).

Measurement and Methodologies

The development of regional competitiveness indices stems from the initial establishment of composite indices of the national sources and outputs of competitiveness, such as the *Global Competitiveness Report* (World Economic Forum, 2012) and *World Competitiveness Yearbook* (Institute for Management Development [IMD], 2012), which combine a number of variables to produce a single composite competitiveness measure. There are a number of approaches to creating indices, including those that look into a single aspect of an economy and produce a single index. When economists analyze the economic performance of nations and regions, the most typical approach is to take a certain economic variable as a proxy for the degree to which economies are knowledge based. One example is the work of Michael Porter and colleagues in establishing an innovation index, whereby the number of patents granted acts as a proxy for the nation's *innovativeness* (Furman, Porter, & Stern, 2002; Porter & Stern, 1999). Although this approach has advantages in the operational ease of benchmarking, the choice of the variable leaves much room for subjectivity concerning the relationship between the variable and the extent of the knowledge base of an economy.

A second approach is one that looks into more than one aspect of an economy and produces an index for each of these aspects. By examining more than one aspect of an economy in understanding and defining the extent of the knowledge base, this approach avoids the assumption that a single variable represents a measure of the knowledge base (Castellacci & Archibugi, 2008). An example is the Organisation for Economic Co-operation and Development (OECD)'s (1999) *Science, Technology, and Industry Scoreboard*. This approach provides a range of perspectives to look into the knowledge base of an economy but does not provide a single benchmark index.

A third approach is one that investigates more than one aspect of an economy and produces a single composite benchmark index. Studies taking this approach vary in the way in which they aggregate subindices, derived from different aspects of an economy, into a single composite index. For example, the *Milken Institute's New Economy Index* (DeVol, 1999) measures U.S. states across a dozen aspects and produces a single composite index by taking a mean of the scores for those original indices. Similarly, the *Metropolitan New Economy Index* (Atkinson & Gottlieb, 2001) uses a set of weights that vary but are arbitrarily set.

The *World Competitiveness Yearbook*, published annually by the IMD (2012), analyzes the competitiveness of nations based on both quantitative and qualitative data (consisting of an annual survey of executives within each nation), which are classified into subfactors. Each subfactor, independent of the number of criteria it contains, has the same weight in the composite index produced. The quantitative criteria represent a weight of two thirds in the overall composite, whereas the qualitative data represent a weight of one third. These examples indicate some subjectivity or arbitrariness in arriving at weightings used in the aggregation.

Some studies attempt to avoid this by employing more complex methods for the calculation of weights. An example is the World Economic Forum's (2012) *Global Competitiveness Report*. The report employs both quantitative (one third of variables) and qualitative data (two thirds of variables) and classifies them into nine factors (institutions, infrastructure, macroeconomy, health and primary education, higher education and training, market efficiency, technological readiness, business sophistication, and innovation). The weight given to each factor varies across countries as a function of their overall level of economic development.

Building on measurement work at the national level, Aiginger (2006) offered two different perspectives on the definition of competitiveness in order to try to reduce some of the confusion in conceptualizing and

measuring competitiveness. The first type of competitiveness he described as outcome competitiveness, where competitiveness is measured as a form of welfare function.

$Competitiveness \equiv W(Y, S, E)$;

where:

Y - income per capita,
S - social and distributional indicators,
E - ecological indicators.

The second type of competitiveness is described as process competitiveness, which is related to the production function linking inputs to output (generally in terms of income per capita), with inputs including a wider range than just physical capital and labor.

$Competitiveness = F(K, L, TFP, C, I, T)$;

where:

K - physical capital,
L - labor,
TFP - total factor productivity representing technical progress,
C - capabilities,
I - institutional effects,
T - trust.

Although national level competitiveness indices provide a useful analytical tool, they fail to tell the full story regarding subnational trends with different industries tending to cluster in particular regions leading to performance gaps across regions. In response, a large number of alternative measures of regional competitiveness have been developed, with a rapid increase in the use of regional competitiveness benchmarking exercises to monitor differentials in competitive performance and economic development trajectories across regions (Huggins, 2010b). Regional competitiveness benchmarking exercises have become increasingly popular within the sphere of regional policy making, with such popularity linked to notions concerning the means by which regions are able to learn (Morgan, 1997), particularly through methods based on comparison (Rose, 1993) or monitoring (Sabel, 1996). Regional economic development, competitiveness, and innovation policies, and the manner in which such policies are implemented, form part of the institutional architecture through which regions *learn* (Asheim, 1996; Morgan, 1997). Establishing such policies is itself a process undertaken by regional stakeholders to facilitate regional learning (Rutten & Boekema, 2007).

Regional competitiveness benchmarking is becoming a feature of this policymaking and facilitated-learning process, which seeks to understand regional contexts and promote improved regional competitiveness outcomes (Huggins, 2010b). The main purpose of regional benchmarking is to ascertain how certain regions, or a particular region, are performing based on an identified set of metrics representing a particular set of regional characteristics. To date, most regional benchmarking exercises undertaken in Europe and especially North America have been restricted to comparing regions within a particular continental bloc or nation (e.g., Atkinson & Correa, 2007; Atkinson & Gottlieb, 2001; DeVol, 1999; DeVol, Bedroussian, & Kim, 2007; DeVol, Koepp, & Ki, 2004; Dijkstra, Annoni, & Kozovska, 2011; Florida, 2002; Fox & Treuhaft, 2006; Hollanders, 2007; Parkinson, Hutchins, Simmie, Clark, & Verdonk, 2004; Wong, 2002). These regional benchmarking exercises have usually either explicitly or implicitly sought to incorporate the input factors associated with process competitiveness, output factors measuring output competitiveness, and outcome factors associated with the welfare of the population (Huggins, 2003).

Figure 2 highlights the fundamental model underlying regional competitiveness models. The purpose of this model is to understand the relationship between the main determinants of regional competitiveness and to integrate them to understand competitiveness differences across regions. Regional competitiveness inputs are principally the factors of production that produce goods and services and drive economic activity and outputs, consisting of the human capital factors at the heart of endogenous growth theories, as well as factors such as the availability of physical and financial capital. Inputs are not an end in themselves; they provide the means to achieve outputs and long-term outcomes. Measured on their own, inputs only provide limited

insight on the economic performance of a region unless linked to the analysis of outputs. They are important because of what they help to cause or generate. Regional competitiveness outputs are the direct results that yield from inputs, while competitiveness outcomes are the long-term result of competitiveness in the form of rising living standards characterized by falling unemployment and rising real incomes.

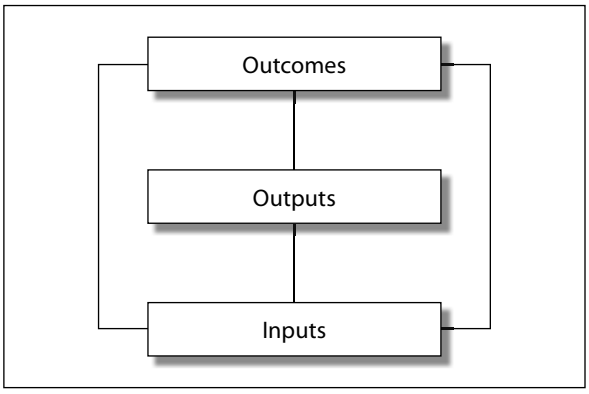

Figure 2. Three-factor regional competitiveness framework.

One example of the use of this approach, the *UK Competitiveness Index* (UKCI), draws on a similar technique to construct a single index that reflects, as fully as possible, the measurable criteria constituting regional and local competitiveness across the United Kingdom (Huggins, 2003; Huggins & Thompson, 2010). Whilst recognizing the potential limitation of drawing upon single composite index measures, in particular its implicit *universalism* (Bristow, 2005; Lall, 2001), such an approach does go some way towards reflecting the link between regional economic performance and innovative firm-level behavior. The index is made up of three groups of data relating to the core model identified above: input factors, output factors, and outcome factors. These different factors link to the outcome and process competitiveness discussed by Aiginger (2006). The input factors are measures of the resources that are available within the economy of a particular region, including research and development expenditure, economic activity rates, business start-up rates, number of businesses, human capital as measured by educational qualifications, and the proportion of knowledge-based businesses.

These measures are mostly associated with the potential of a region to continue to compete and, therefore, primarily concern process competitiveness (Aiginger, 2006). The second group consists of factors relating to outputs. These include gross value added per capita, exports per head of population, imports per head of population, proportion of exporting companies, productivity (output per hour worked), and employment rates. To capture favorable outcomes for the population of a region, a third group of factors is also included, that is, those relating to outcomes: gross weekly pay (median) and unemployment rates. Both these latter two factors are more strongly associated with outcome competitiveness (Aiginger, 2006). Given the uncertainty relating to the exact relationship between the three sets of factors, the overall index weights the three factor indices equally.

Although most regional competitiveness benchmarking exercises have been restricted to comparing regions within a particular continental bloc or nation, one initiative that has sought a global approach is the *World Knowledge Competitiveness Index* (WKCI), the first edition of which was published in 2002. The WKCI is the first composite and relative measure of the knowledge economies of the globe's best performing regions (Huggins, Izushi, & Liu, 2003; Huggins et al., 2004; Huggins & Izushi, 2002; Huggins, Izushi, & Davies, 2005; Huggins, Izushi, Davies, & Shougui, 2008). It represents an integrated and overall benchmark of the knowledge capacity, capability, and sustainability of each region, and the extent to which this knowledge is translated into economic value and transferred into the wealth of the citizens of each region. Therefore, the WKCI is explicitly tied to the theoretical discourse stemming from endogenous growth theory, with knowledge and human capital at the centre of its analysis.

The WKCI is designed to address the growing attention that regions have attracted as an economic unit of analysis, with firms increasingly locating their functions in select regions within the global space. It is widely recognized that economic divides across regions are usually related to the different industries located, and functions performed, in these regions, as well as differences in their supporting environments (Huggins &

Izushi, 2007). Such supporting environments consist of, for example, universities and research establishments, business and producer service providers, and information and communication technologies (ICT) infrastructure.

The approach adopted by the WKCI acknowledges that although the competitive advantage of firms can arise from size and position within their industry, alongside their physical assets (Porter, 1980), the pattern of competition in advanced economies has increasingly come to favor those firms that can mobilize knowledge and technological skills to create novelty in their products (Prahalad & Hamel, 1990). Along with this, the mode by which knowledge is produced has shifted from traditional linear processes of innovation to more complex incremental and iterative chain-link models based on the interactions between knowledge actors (Kline & Rosenberg, 1986; Rothwell, 1994).

The evolving characteristics associated with the new models of knowledge production include the following: (a) the number and types of sites where innovation occurs are rising rapidly; (b) the stock of knowledge is in part an outcome of the intensity of interaction between knowledge actors; (c) the pattern and dynamics of these interactions are constantly shifting, reflecting ever-changing contexts of knowledge requirements; and (d) the density of interactions is increasing rapidly, as is the number of knowledge actors (Chesbrough, 2003; Florida, 2002). The links between knowledge creation and diffusion processes, through individuals, organizations, and systems of institutions and organizations, are clearly required to be understood as fully as possible as knowledge becomes the key value creator in modern economies.

Given the apparent linkage, therefore, between competitiveness and knowledge, it appears logical to test whether the distribution of knowledge and the capacity of the knowledge economy are unequal across regions at the global level, which is the task the WKCI sets itself. Through the construction of a composite competitiveness index based on a series of knowledge-based input factors and relevant output and outcome factors, the WKCI is able to identify the relative capacity and capability to achieve long-term growth. In this sense, the regional competitiveness measured by the WKCI can be defined as the capacity and capability of regions to achieve economic growth relative to other regions at similar of overall stage of economic development, which are usually within their own nation or continental bloc. Traditionally, the WKCI has been headed by leading regions in the United States of America such as Silicon Valley, Boston, and San Francisco, but these are now being increasingly challenged by fast-growing regions from emerging economies in China. The WKCI has further identified significant changes in the combination of the sources of competitiveness, arising from the relocation of knowledge-based activities to emerging economies, such as the shift of ICT and computer manufacturing to Chinese regions, and the spread of institutions for knowledge creation and protection to a wider range of industries (Huggins & Izushi, 2009, 2013).

Future Developments: Institutions, Resilience, and Well-Being

Clearly, there is considerable variation in the economic competitiveness of regions within and across many nations. In the United Kingdom, for instance, this is manifested in the north-south divide, whereby regions in the southern half of the nation, in particular London, South East England, and Eastern England, are the nation's core economic drivers, while more northern regions suffer from higher unemployment rates and lower income levels (Huggins, 2003; Huggins & Thompson, 2010). Uncompetitive regions usually lag in terms of headline indicators such as economic output per capita and employment levels, as well as knowledge-based indicators such as innovation, patenting, and the proportion of knowledge-intensive firms (Huggins & Izushi, 2007; Huggins & Johnston, 2009; Huggins & Thompson, 2010; Kitson et al., 2004; Malecki, 2007). However, higher income and competitiveness may not necessarily result in higher well-being.

Although all regions generally seek greater competitiveness, there are different routes to achieving this (Huggins & Thompson, 2010; Kitson et al., 2004; Malecki, 2007). Some of these routes are likely to be more attractive for some regions than others. However, whether regions are truly free to choose their economic development paths, or whether past history dictates the future potential of an economy is another question. The evolutionary school of economic geography suggests that regional development is likely to be determined, at least to some extent, by past histories (Boschma, 2004; Boschma & Frenken, 2006; Bristow, 2005; Huggins, 2010b; Martin & Sunley, 2006). Potentially, regions that are tightly bound in their structures and networks may not be able to move to alternative development paths, so when hit by exogenous shocks, they will be unable to escape from a declining competitiveness spiral (Huggins & Izushi, 2007; Martin & Sunley, 2006). These factors have ramifications for regions, especially in the long term, as activities taken to increase competitiveness may have hidden costs in terms of the welfare of the population, which may compromise

future competitiveness, particularly if key workers cannot be retained (Florida, Mellander, & Stolarick, 2011; Mellander, Florida, & Stolarick, 2011).

The evolutionary nature of regional economic development may limit a region's ability to move away from industries associated with providing a low contribution to regional competitiveness. Research at the national level suggests that a key means of escaping a downward evolutionary trajectory is through the development of the efficient institutions that facilitate effective economic development (Acemoglu, Johnson, & Robinson, 2005; Acemoglu & Robinson, 2012; North, 1990, 2005). Institutions consist of the underlying *rules of the game* relating to factors such as the incentive to save, invest, and embrace competition, innovation and technological development, property rights, markets, unbiased systems of law and regulation, and provision of public services (Acemoglu & Robinson, 2012). Whilst some of these institutions are fixed across nations, such as law, regulation, and property rights, others, such as the embracement of competition and innovation, are clearly subject to regional differentiation.

In a series of works, Rodríguez-Pose, Storper, and their colleagues (Farole, Rodríguez-Pose, & Storper, 2011; Rodríguez-Pose, 2013; Rodríguez-Pose & Storper, 2006; Storper, 2005, 2008; Storper, Lavinas, & Mercado-Célis, 2007) have developed the framework of community – which appears to represent a spatially localized notion of institutions – and society – which conversely represents spatially broader institutions – in order to better place institutionalist approaches central to regional economic development, in the process highlighting the importance of the geographical context in examining institutional models of growth. Both community and society are considered to influence economic development through the expectations and incentives provided to economic agents (Farole et al., 2011). However, as the authors acknowledge, how these effects vary across regions and localities is little understood, excepting that community and society effects are likely to reinforce one another (Farole et al., 2011).

To be effective, institutions have to take account of regional contextual factors, with complementary institutions developing through repeated interactions. These may limit the directions in which a regional economy can develop in the future. Choices that push a region towards the development of a particular set of institutions over another may influence regional competitiveness in the long term. These institutions may limit future economic development to following certain paths that include a range of negative externalities that harm well-being. As Storper and Scott (2009) put it when seeking to identify where city growth comes from, "our own argument is that the key to this question can be found in the spatial logic of productive activity and that individual choices about residential location are profoundly shaped by the possibilities and constraints created by this situation" (p. 148). Therefore, the functioning of a region becomes a dynamic trait, rather than a static one, with the competitiveness of a region to some extent being mediated by an *external chances* element (Veenhoven, 2009), whereby a region's resources and institutions determine their environmental fit. Furthermore, *internal chances* (Veenhoven, 2009), through flexible well-suited institutions, ensure that a region maintains its external chances, through the ability to adapt and create the resilience required to endure external shocks.

For Simmie and Martin (2010), it is avoiding rigidities from interconnectedness within a region that best ensures its resilience. For instance, regions in advanced national economies with heritages of heavy industry may struggle to adapt to external shocks, and where competitiveness is lost, these regions may still place more reliance on development opportunities where negative externalities, such as those related to the environment, are more prevalent. This is more likely to be the case where economic resilience is low and regions struggle to adjust. One explanation for the differing levels of resilience displayed across regions concerns the extent to which a strong regional system of innovation is present (Christopherson, Michie, & Tyler, 2010) which, like competitiveness, is likely to be underpinned by an embedded, vibrant, and generally innovative and entrepreneurial economy (Aoyama, 2009; Audretsch & Thurik, 2001; Wennekers & Thurik, 1999).

In the sphere of economics, resilience is seen as the ability to return to equilibrium or move between equilibria, but the social sciences have tended to link the term more to adaptability and evolutionary economics. From a policy perspective, the latter view is likely to be of more use as resilience is not restricted to the capability to rebound from a shock, but also considers the actions taken in the lead up to the shock and how this influences the ability to rebound. Another perspective views resilience as the capability to withstand shocks. This can be determined by the sensitivity to a shock, with those economies that are less influenced by shocks being more likely to recover (Simmie & Martin, 2010). This means that resilience effectively has three properties in the socioecological context of regional economies: the extent to which change can be experienced without the loss of structure, the degree to which an economy can reorganize, and the degree to

which it can create and sustain a capacity to learn and adapt (Begley & Tan, 2001; Hudson, 2010; Thornton, 1999; Thornton, Ribeiro-Soriano, & Urbano, 2011). Of course, it would be wrong to consider the resilience of regional economies in isolation, since the extent to which resilience develops and changes is likely to be influenced by the actions of neighboring economies and factors such as national policies (Bristow, 2010; Christopherson et al., 2010).

A key challenge in examining regional resilience is that such resilience can only be put to the test in periods of difficulty. This means that future economic success cannot be based on current success. To address this, Martin and Sunley (2011) conceptualized resilience through an adaptive cycle model, and although economies may benefit from increased knowledge flows and accumulation as connectedness increases (Garofoli, 2002), connectedness where it progresses too far can lead to collective lock-in (Ter Wal & Boschma, 2011). It is important, therefore, that sufficient adaptability and flexibility are retained; otherwise, there is a danger that highly specialized regional economies can enter a release phase where firms are rapidly lost from the economy (Peterson, 2000).

The work on resilience is useful in contemplating the future development of research on regional competitiveness. In particular, in order to better understand the nature of regional economic systems and their competitive performance, especially when exposed to external shocks, it would seem useful to add institutions to the fundamental competitiveness model presented in Figure 2. More specifically, as shown by Figure 3, it would seem appropriate to consider the institutions that facilitate or impede the inputs of regional economic systems to be effectively transferred in to high value outcomes. Similarly, there is a need to consider how institutions enable the transfer of economic outputs into high-grade outcomes, as manifested by regional standards of living. Institutions also play a role in ensuring that the wealth underpinning standards of living replenishes the inputs of the regional economic system.

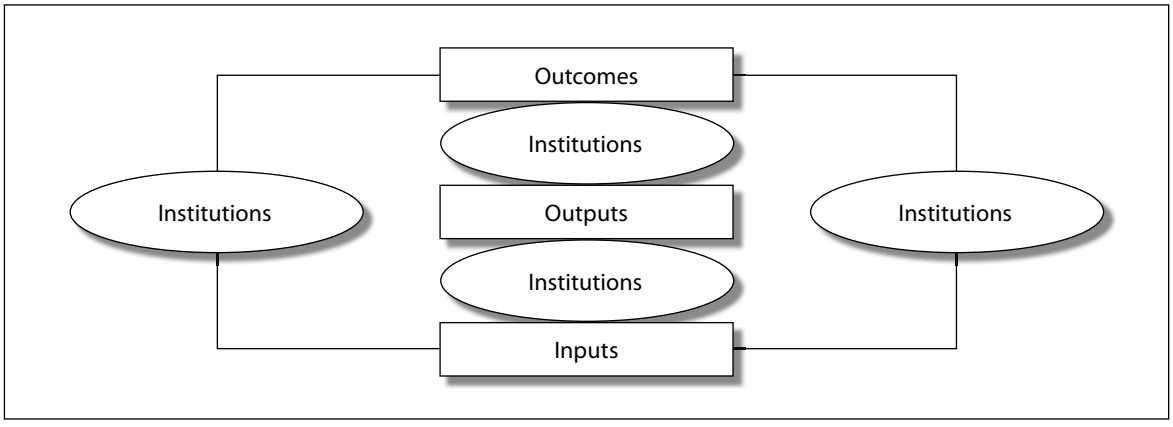

Figure 3. Addressing the role of institutions in the regional competitiveness framework.

Institutional enablers are the conditions and factors that determine the perceived potential for competitiveness, by creating an environment that is conducive for firms. These enablers principally encompass the institutions that support economic actors in a region to take advantage of perceived opportunities. Regions with institutions conducive to enabling economic development are likely to increase their competitive advantage by attracting investment, skills, and talent. Some examples include effective rule of law which allows commercial activity to be efficient, ease of doing business, government initiatives, and ultimately, the perceptions of businesses and individuals in a region.

The ultimate aim of regional policymaking should be to increase the well-being of the population residing within these regions (Easterlin, 1974; Huggins & Thompson, 2012). It is not, though, always evident that policymaking related to achieving competitiveness improvements fully considers the extent of the outcomes related to such policies, especially with regard to issues of well-being. This means that whilst increasing output per capita is important in terms of improving competitiveness, this must not be at the expense of a population's welfare. For instance, it is possible to improve productivity, a key measure of competitiveness, by cutting back on labor inputs and competing on price through lower remuneration; however, the end effect of this may be reduced standards of living. Although a number of alternative measures of regional competitiveness have been developed, often attempting to incorporate outcome factors such as average wages and

levels of unemployment (see for reviews, Huggins, 2010b; Martin, 2005), they do not encapsulate the broader measures of the well-being of the citizens residing in a particular region.

Emerging research is beginning to examine the link between competitiveness and well-being, with the results suggesting that, in general, higher levels of regional and local competitiveness are associated with generally higher levels of well-being (Huggins & Thompson, 2012). Regions with relatively low competitiveness are more likely to suffer from negative externalities, which are also associated with lower levels of well-being. This means that when seeking to maximize the well-being and welfare of a region's population, competitiveness measures are a reasonable guide to the extent of success. In general, the key features of the well-being of places have a strong symbiotic association with the prevailing socioeconomic business culture, defined as encompassing competitiveness-related traits such as entrepreneurship, innovation, risk taking, and more generally, collective aspirations, motivations, and opportunity development. However, whether or not these relationships are necessarily sustainable in an evolutionary sense is not clear (Huggins & Thompson, 2012).

Finally, from a policymaking perspective, it is crucial that future formulations pay more attention to the dynamic link between competitiveness and well-being at the regional level. Economic development, social cohesion, welfare, and environmental policies must become better integrated if they are to build sustainable local communities. Policymakers have for many years recognized the link between social and community development and economic development, and most development strategies at a regional level provide an understanding of how policy initiatives related to improving social inclusion can facilitate wider economic development in relation to a number of core strands, including community development. There is, however, little underlying policy research that seeks to integrate these strands to provide a cohesive framework for understanding how the social condition of particular regions and their communities impinges on economic development trajectories and vice versa.

This suggests the requirement for a fundamental rethinking of the organization and governance of regional policymaking. As new concepts and measures of this social condition emerge, they will offer a significant opportunity to understand better not only the well-being of places but also the social welfare aspects of policy intervention. In future, these aspects must play a stronger role in policymaking at the regional level.

Conclusion

This paper has sought to frame both theoretically and empirically the underlying tenets of regional competitiveness. It has shown how regional competitiveness is both allied to, and an extension of, regional growth theories, with a key factor in achieving such growth likely to be the possession of a critical stock of firms that are able to generate knowledge, entrepreneurs, and innovations in developing sectors and markets, and ultimately new jobs. Regional competitiveness, therefore, is predicated on the presence of conditions that enable firms to compete in their chosen markets, and on the value these firms generate being captured by the respective region. This view is consistent with endogenous approaches to regional development focused on factors such as human capital, education, and innovation systems, with regional competitiveness occurring only when sustainable growth is achieved at labor (wage) rates that enhance overall standards of living. Although some commentators have criticized the regional competitiveness discourse because of the connotations of head-to-head winner-takes-all battles, the concept is far more related to a notion of regions comparing and contrasting themselves as a means of improving.

Research on regional competitiveness benchmarking and measurement has recognized that performance must be evaluated via a balanced picture of the available statistical information analyzed within a robust framework. Within this framework, consideration has to be given towards the overall value of indicators and their relative effectiveness as a performance measure. The inspiration underlying these independent exercises has often stemmed from previously established exercises benchmarking the competitiveness or innovation capabilities of nations.

Critics suggest that regional competitiveness benchmarking is a flawed technique because it does not allow regions to see themselves in a manner that is meaningful or constructive to policy formulation. Such criticism fails to take account of the variety and rapid development of regional benchmarking systems. Instead, it largely draws on well-worn arguments regarding problems in transferring policy from one context and environment to another. Knowing and measuring how other regions are doing, as Malecki (2007) argued, "seems to be a prerequisite for membership among competitively advantaged regions" (p. 645). However, a recurring

paradox of regional benchmarking exercises is that although it is often paramount to understand activities and practices related to intangibles and institutional infrastructure, such as the networks, knowledge-transfer mechanisms, and social capital underlying new models of innovation, there are few methodologies available to enable their benchmarking.

The growing theoretical support for the concept of localized competition lends considerable weight to the use and importance of competitiveness theory and measurement at the regional, rather than the national, level. This is not to dismiss the fact that in some circumstances, a *region* remains a somewhat arbitrary level of analysis. Given, however, that we can possibly never define, let alone find data for, identically integrated economic areas, then clearly as a geographic unit of analysis, the use of subnational units (*regions*) will bring us much closer in line with the nature of competition and the appropriate role of government in economic development activity. Policymakers are increasingly seeking to improve the economic performance of the regions for which they have responsibility, and the competitiveness discourse, and the theoretical and empirical basis upon which it is constructed, offers a route for policy makers to understand further the most viable options for removing economic unevenness.

Further work, however, is required, particularly in terms of integrating the role of institutions and institutional enablers into regional competitiveness. This suggests that alongside the competitiveness performance measures outlined in this paper, there is a need to examine in more depth the processes that allow regional economic systems to function effectively, as well as the policies than can support this functioning. In this regard, there is scope to further develop techniques related to process benchmarking, based on a comparison of the structures and systems constituting the practices and functioning of regions, as well as policy benchmarking, based on a comparison of the types of public policy considered to influence the nature of these practices and, subsequently, the characteristics of regions.

References

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. In P. Aghion & S. Durlauf (Eds.), *Handbook of economic growth*: *Vol. 1A* (pp. 385-472). Amsterdam, The Netherlands: North-Holland.

Acemoglu, D., & Robinson, J. A. (2012). *Why nations fail*: *The origins of power, prosperity, and poverty*. New York, NY: Crown Publishers.

Aghion, P., & Howitt, P. (1997). *Endogenous growth theory*. Cambridge, MA: MIT Press.

Aiginger, K. (2006). Competitiveness: From a dangerous obsession to a welfare creating ability with positive externalities. *Journal of Industry, Competition and Trade*, *6*(2), 161-177. dx.doi.org/10.1007/s10842-006-9475-6

Amin, A. (1999). An institutionalist perspective on regional economic development. *International Journal of Urban and Regional Research*, *23*(2), 365-378. dx.doi.org/10.1111/1468-2427.00201

Andersson, D. E. (2005). The spatial nature of entrepreneurship. *The Quarterly Journal of Austrian Economics*, *8*(2), 21-34. dx.doi.org/10.1007/s12113-005-1020-7

Andersson, M., & Karlsson, C. (2007). Knowledge in regional economic growth – The role of knowledge accessibility. *Industry and Innovation*, *14*(2), 129-149. dx.doi.org/10.1080/13662710701252450

Antonelli, C., Patrucco, P., & Quatraro, F. (2011). Productivity growth and pecuniary knowledge externalities: An empirical analysis of agglomeration economies in European regions. *Economic Geography*, *87*(1), 23-50. dx.doi.org/10.1111/j.1944-8287.2010.01104.x

Aoyama, Y. (2009). Entrepreneurship and regional culture: The case of Hamamatsu and Kyoto, Japan. *Regional Studies*, *43*(3), 495-512. dx.doi.org/10.1080/00343400902777042

Asheim, B. (1996). Industrial districts as 'learning regions': A condition for prosperity. *European Planning Studies*, *4*(4), 379-400. dx.doi.org/10.1080/09654319608720354

Atkinson, R. D., & Correa, D. K. (2007). *The 2007 state new economy index*: *Benchmarking economic transformation in the states*. Kansas City, MO: Ewing Marion Kauffman Foundation.

Atkinson, R. D., & Gottlieb, P. D. (2001). *The metropolitan new economy index*: *Benchmarking economic transformation in the nation's metropolitan areas*. Washington, DC: Progressive Policy Institute.

Audretsch, D. B., & Keilbach, M. (2004). Entrepreneurship and regional growth: An evolutionary interpretation. *Journal of Evolutionary Economics*, *14*(5), 605-616. dx.doi.org/10.1007/s00191-004-0228-6

Audretsch, D. B., & Thurik, A. R. (2001). What's new about the new economy? Sources of growth in the managed and entrepreneurial economies. *Industrial and Corporate Change*, *10*(1), 267-315. dx.doi.org/10.1093/icc/10.1.267

Begg, I. (1999). Cities and competitiveness. *Urban Studies*, *36*(5-6), 795-809. dx.doi.org/10.1080/0042098993222

Begley, T. M., & Tan, W-L. (2001). The socio-cultural environment for entrepreneurship: A comparison between East Asian and Anglo-Saxon countries. *Journal of International Business Studies*, *32*, 537-553. dx.doi.org/10.1057/palgrave.jibs.8490983

Benneworth, P. (2004). In what sense 'regional development'?: Entrepreneurship, underdevelopment and strong tradition in the periphery. *Entrepreneurship & Regional Development*: *An International Journal*, *16*(6), 439-458. dx.doi.org/10.1080/0898562042000249786

Benneworth, P., & Charles, D. (2005). University spin-off policies and economic development in less successful regions: Learning from two decades of policy practice. *European Planning Studies*, *13*(4), 537-557. dx.doi.org/10.1080/09654310500107175

Beugelsdijk, S., & Maseland, R. (2011). *Culture in economics*: *History, methodological reflections, and contemporary applications*. New York, NY: Cambridge University Press.

Boschma, R. A. (2004). Competitiveness of regions from an evolutionary perspective. *Regional Studies*, *38*(9), 1001-1014. dx.doi.org/10.1080/0034340042000292601

Boschma, R. A., & Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. *Journal of Economic Geography*, *6*(3), 273-302. dx.doi.org/10.1093/jeg/lbi022

Bristow, G. (2005). Everyone's a 'winner': Problematising the discourse of regional competitiveness. *Journal of Economic Geography*, *5*(3), 285-304. dx.doi.org/10.1093/jeg/lbh063

Bristow, G. (2010). Resilient regions: Re-'place'ing regional competitiveness. *Cambridge Journal of Regions, Economy and Society*, *3*(1), 153-167. dx.doi.org/10.1093/cjres/rsp030

Camagni, R. (2002). On the concept of territorial competitiveness: Sound or misleading? *Urban Studies*, *39*(13), 2395-2411. dx.doi.org/10.1080/0042098022000027022

Camagni, R., & Capello, R. (2010). Macroeconomic and territorial policies for regional competitiveness: An EU perspective. *Regional Science Policy & Practice*, *2*(1), 1-19. dx.doi.org/10.1111/j.1757-7802.2010.01016.x

Camagni, R., & Capello, R. (2012). Regional competitiveness and territorial capital: A conceptual approach and empirical evidence from the European Union. *Regional Studies*. dx.doi.org/10.1080/00343404.2012.681640

Cantner, U., Conti, E., & Meder, A. (2009). *Networks and innovation*: *The role of social assets in explaining firms' innovative capacity* (Jena Economic Research Papers 2009-040). Jena, Germany: Friedrich Schiller University.

Capello, R., Caragliu, A., & Nijkamp, P. (2011). Territorial capital and regional growth: Increasing returns in knowledge use. *Tijdschrift voor Economische en Sociale Geografie*, *102*(4), 385-405. dx.doi.org/10.1111/j.1467-9663.2010.00613.x

Capello, R., & Nijkamp, P. (2009). *Handbook of regional growth and development theories*. Cheltenham, UK: Edward Elgar Publishing.

Castellacci, F., & Archibugi, D. (2008). The technology clubs: The distribution of knowledge across nations. *Research Policy*, *37*(10), 1659-1673. dx.doi.org/10.1016/j.respol.2008.08.006

Chaston, I. (2009). Entrepreneurs, intuition, and small-business performance. *Journal of CENTRUM Cathedra*, *2*(1), 37-45. dx.doi.org/10.7835/jcc-berj-2009-0021

Chesbrough, H. (2003). *Open innovation*: *The new imperative for creating and profiting from technology*. Boston, MA: Harvard Business School Press.

Christopherson, S., Michie, J., & Tyler, P. (2010). Regional resilience: Theoretical and empirical perspectives. *Cambridge Journal of Regions, Economy and Society*, *3*(1), 3-10. dx.doi.org/10.1093/cjres/rsq004

Cooke, P. (1997). Regions in a global market: The experiences of Wales and Baden-Wurttemberg. *Review of International Political Economy*, *4*(2), 349-381. dx.doi.org/10.1080/096922997347814

Cooke, P. (2004). Introduction: Regional innovation systems – an evolutionary approach. In P. Cooke, M. Heidenreich, & H-J. Braczyk (Eds.), *Regional innovation systems*: *The role of governance in a globalized world* (2nd ed., pp. 1-18). London, UK: Routledge.

Cooke, P., Asheim, B., Boschma, R., Martin, R., Schwartz, D., & Tödtling, F. (2011). *Handbook of regional innovation and growth*. Cheltenham, UK: Edward Elgar Publishing.

Courlet, C., & Soulage, B. (1995). Industrial dynamics and territorial space. *Entrepreneurship & Regional Development*: *An International Journal*, *7*(4), 285-307. dx.doi.org/10.1080/08985629500000019

DeVol, R. C. (1999). *America's high-tech economy*: *Growth, development, and risks for metropolitan areas*. Santa Monica, CA: Milken Institute.

DeVol, R. C., Bedroussian, A., & Kim, S. (2007). *Best performing cities 2007*: *Where America's jobs are created and sustained*. Santa Monica, CA: Milken Institute**.**

DeVol, R. C., Koepp, R., & Ki, J. (2004). *State technology and science index*: *Enduring lessons for the intangible economy*. Santa Monica, CA: Milken Institute.

Dijkstra, L., Annoni, P., & Kozovska, K. (2011). *A new regional competitiveness index*: *Theory, methods and findings* (European Union Regional Policy Working Paper No. 02/2011). Brussels, Belgium: European Commission.

Easterlin, R. A. (1974). Does economic growth improve the human lot? In P. A. David & M. W. Reder (Eds.), *Nations and households in economic growth*: *Essays in honor of Moses Abramovitz* (pp. 89-125). New York, NY: Academic Press.

Farole, T., Rodríguez-Pose, A., & Storper, M. (2011). Human geography and the institutions that underlie economic growth. *Progress in Human Geography*, *35*(1), 58-80. dx.doi.org/10.1177/0309132510372005

Florida, R. (2002). The economic geography of talent. *Annals of the Association of American Geographers*, *92*(4), 743-755. dx.doi.org/10.1111/1467-8306.00314

Florida, R., Mellander, C., & Stolarick, K. (2011). Beautiful places: The role of perceived aesthetic beauty in community satisfaction. *Regional Studies*, *45*(1), 33-48. dx.doi.org/10.1080/00343404.2010.486784

Foss, N., & Nielsen, B. B. (2012). Researching multilevel phenomena: The case of collaborative advantage in strategic management. *Journal of CENTRUM Cathedra*, *5*(1), 11-23. dx.doi.org/10.7835/jcc-berj-2012-0064

Fox, R. K., & Treuhaft, S. (2006). *Shared prosperity, stronger regions*: *An agenda for rebuilding America's older core cities* (2nd ed.). Oakland, CA: PolicyLink.

Freeman, C. (1987). *Technology, policy, and economic performance*: *Lessons from Japan.* London, UK: Pinter.

Freeman, C. (1994). The economics of technical change. *Cambridge Journal of Economics*, *18*(5), 463-514.

Furman, J. L., Porter, M. E., & Stern, S. (2002). The determinants of national innovative capacity. *Research Policy*, *31*(6), 899-933. dx.doi.org/10.1016/S0048-7333(01)00152-4

Garofoli, G. (2002). Local development in Europe: Theoretical models and international comparisons. *European Urban and Regional Studies*, *9*(3), 225-239. dx.doi.org/10.1177/096977640200900303

Grossman, G. M., & Helpman, E. (1994). Endogenous innovation in the theory of growth. *Journal of Economic Perspectives*, *8*(1), 23-44. dx.doi.org/10.1257/jep.8.1.23

Ha, J., & Howitt, P. (2007). Accounting for trends in productivity and R&D: A Schumpeterian critique of semi-endogenous growth theory. *Journal of Money, Credit and Banking*, *39*(4), 733-774. dx.doi.org/10.1111/j.1538-4616.2007.00045.x

Harris, R. G. (2001). The knowledge-based economy: Intellectual origins and new economic perspectives. *International Journal of Management Reviews*, *3*(1), 21-40. dx.doi.org/10.1111/1468-2370.00052

Harris, R. G. (2011). Models of regional growth: Past, present and future. *Journal of Economic Surveys*, *25*(5), 913-951. dx.doi.org/10.1111/j.1467-6419.2010.00630.x

Hauser, C., Tappeiner, G., & Walde, J. (2007). The learning region: The impact of social capital and weak ties on innovation. *Regional Studies*, *41*(1), 75-88. dx.doi.org/10.1080/00343400600928368

Hollanders, H. (2007). *2006 European regional innovation scoreboard*. Brussels, Belgium: European Commission.

Hudson, R. (2010). Resilient regions in an uncertain world: Wishful thinking or a practical reality? *Cambridge Journal of Regions, Economy and Society*, *3*(1), 11-25. dx.doi.org/10.1093/cjres/rsp026

Huggins, R. (1997). Regional competitive specialization. Development agency sector initiatives in Wales. *Area*, *29*(3), 241-252. dx.doi.org/10.1111/j.1475-4762.1997.tb00026.x

Huggins, R. (2003). Creating a UK competitiveness index: Regional and local benchmarking. *Regional Studies*, *37*(1), 89-96. dx.doi.org/10.1080/0034340022000033420

Huggins, R. (2010a). Regional competitive intelligence: Benchmarking and policy-making. *Regional Studies*, *44*(5), 639-658. dx.doi.org/10.1080/00343400802331312

Huggins, R. (2010b). Forms of network resource: Knowledge access and the role of inter-firm networks. *International Journal of Management Reviews*, *12*(3), 335-352. dx.doi.org/10.1111/j.1468-2370.2009.00266.x

Huggins, R., Bussell, S., Liu, J., Sootarsing, K., Day, J., Izushi, H., & Jones, M. (2004). *World knowledge competitiveness index 2004*: *Benchmarking the globe's leading knowledge economy regions.* Pontypridd, UK: Robert Huggins Associates.

Huggins, R., Day, J., Emlyn-Jones, N., Liu, J., & Sootarsing, K. (2003). *World knowledge competitiveness index 2003-2004*: *Benchmarking the globe's leading knowledge economy regions*. Cardiff, UK: Robert Huggins Associates.

Huggins, R., & Izushi, H. (2002). *World knowledge competitiveness index 2002*: *Benchmarking the globe's high-performing regions.* Pontypridd, UK: Robert Huggins Associates.

Huggins, R., & Izushi, H. (2007). *Competing for knowledge*: *Creating, connecting and growing*. London, UK: Routledge.

Huggins, R., & Izushi, H. (2009). Regional benchmarking in a global context: Knowledge, competitiveness, and economic development. *Economic Development Quarterly*, *23*(4), 275-293. dx.doi.org/10.1177/0891242409347896

Huggins, R., & Izushi, H. (2011). *Competition, competitive advantage, and clusters*: *The ideas of Michael Porter*. Oxford, UK: Oxford University Press.

Huggins, R., & Izushi, H. (2013). Knowledge-based development in leading regions across the globe: An exploratory analysis of the co-evolution of resources, capabilities and outputs. *Urban Studies*, *50*(5), 1030-1048. dx.doi.org/10.1177/0042098012458002

Huggins, R., Izushi, H., & Davies, W. (2005). *World knowledge competitiveness index 2005.* Pontypridd, UK: Robert Huggins Associates.

Huggins, R., Izushi, H., Davies, W., & Shougui, L. (2008). *World knowledge competitiveness index 2008*. Cardiff, UK: Centre for International Competitiveness.

Huggins, R., & Johnston, A. (2009). Knowledge networks in an uncompetitive region: SME innovation and growth. *Growth and Change*, *40*(2), 227-259. dx.doi.org/10.1111/j.1468-2257.2009.00474.x

Huggins, R., & Johnston, A. (2010). Knowledge flow and inter-firm networks: The influence of network resources, spatial proximity and firm size. *Entrepreneurship & Regional Development*: *An International Journal*, *22*(5), 457-484. dx.doi.org/10.1080/08985620903171350

Huggins, R., Johnston, A., & Thompson, P. (2012). Network capital, social capital and knowledge flow: How the nature of inter-organizational networks impacts on innovation. *Industry and Innovation*, *19*(3), 203-232. dx.doi.org/10.1080/13662716.2012.669615

Huggins, R., & Thompson, P. (2010). *UK competitiveness index 2010*. Cardiff, UK: Centre for International Competitiveness.

Huggins, R., & Thompson, P. (2012). Well-being and competitiveness: Are the two linked at a place-based level? *Cambridge Journal of Regions, Economy and Society*, *5*(1), 45-60. dx.doi.org/10.1093/cjres/rsr017

Huggins, R., & Williams, N. (2009). Enterprise and public policy: A review of labour government intervention in the United Kingdom. *Environment and Planning C*: *Government and Policy*, *27*(1), 19-41.dx.doi.org/10.1068/c0762b

Huggins, R., & Williams, N. (2011). Entrepreneurship and regional competitiveness: The role and progression of policy. *Entrepreneurship & Regional Development*: *An International Journal*, *23*(9-10), 907-932. dx.doi.org/10.1080/08985626.2011.577818

Ibert, O. (2007). Towards a geography of knowledge creation: The ambivalences between 'knowledge as an object' and 'knowing in practice.' *Regional Studies*, *41*(1), 103-114. dx.doi.org/10.1080/00343400601120346

Institute for Management Development. (2012). *World competitiveness yearbook 2012*. Lausanne, Switzerland: Institute for Management Development.

Kitson, M., Martin, R., & Tyler, P. (2004). Regional competitiveness: An elusive yet key concept? *Regional Studies*, *38*(9), 991-999. dx.doi.org/10.1080/0034340042000320816

Kline, S. J., & Rosenberg, N. (1986). An overview of innovation. In R. Landau & N. Rosenberg (Eds.), *The positive sum strategy*: *Harnessing technology for economic growth* (pp. 275-305). Washington, DC: National Academy Press.

Krugman, P. (1994). Competitiveness: A dangerous obsession. *Foreign Affairs*, *73*(2), 28-44. dx.doi.org/10.2307/20045917

Krugman, P. (2003). *Growth on the periphery*: *Second wind for industrial regions? The Allander series.* Glasgow, UK: Fraser Allander Institute.

Lagendijk, A., & Lorentzen, A. (2007). Proximity, knowledge and innovation in peripheral regions. On the intersection between geographical and organizational proximity. *European Planning Studies*, *15*(4), 457-466. dx.doi.org/10.1080/09654310601133260

Lall, S. (2001). Competitiveness indices and developing countries: An economic evaluation of the Global competitiveness report. *World Development*, *29*(9), 1501-1525. dx.doi.org/10.1016/S0305-750X(01)00051-1

Lawson, C., & Lorenz, E. (1999). Collective learning, tacit knowledge and regional innovative capacity. *Regional Studies*, *33*(4), 305-317. dx.doi.org/10.1080/713693555

Leborgne, D., & Lipietz, A. (1988). New technologies, new modes of regulation: Some spatial implications. *Environment and Planning D*: *Society and Space*, *6*(3), 263-280. dx.doi.org/10.1068/d060263

Lee, S. Y., Florida, R., & Acs, Z. (2004). Creativity and entrepreneurship: A regional analysis of new firm formation. *Regional Studies*, *38*(8), 879-891. dx.doi.org/10.1080/0034340042000280910

Lorenzen, M. (2007). Social capital and localised learning: Proximity and place in technological and institutional dynamics. *Urban Studies*, *44*(4), 799-817. dx.doi.org/10.1080/00420980601184752

Lucas, R. E. Jr. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, *22*(1), 3-42. dx.doi.org/10.1016/0304-3932(88)90168-7

Lundvall, B-Å. (2010). *National systems of innovation*: *Toward a theory of innovation and interactive learning*. London, UK: Anthem Press.

Maillat, D. (1998). Innovative milieux and new generations of regional policies. *Entrepreneurship & Regional Development*: *An International Journal*, *10*(1), 1-16. dx.doi.org/10.1080/08985629800000001

Malecki, E. J. (2004). Jockeying for position: What it means and why it matters to regional development policy when places compete. *Regional Studies*, *38*(9), 1101-1120. dx.doi.org/10.1080/0034340042000292665

Malecki, E. J. (2007). Cities and regions competing in the global economy: Knowledge and local development policies. *Environment and Planning C*: *Government and policy*, *25*(5), 638-654. dx.doi.org/10.1068/c0645

Martin, R. (2005). *Thinking about regional competitiveness*: *Critical issues.* Nottingham, UK: East Midlands Development Agency.

Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of Economic Geography*, *6*(4), 395-437. dx.doi.org/10.1093/jeg/lbl012

Martin, R., & Sunley, P. (2011). Conceptualizing cluster evolution: Beyond the life cycle model? *Regional Studies*, *45*(10), 1299-1318. dx.doi.org/10.1080/00343404.2011.622263

Mellander, C., Florida, R., & Stolarick, K. (2011). Here to stay – the effects of community satisfaction on the decision to stay. *Spatial Economic Analysis*, *6*(1), 5-24. dx.doi.org/10.1080/17421772.2010.540031

Morgan, K. (1997). The learning region: Institutions, innovation and regional renewal. *Regional Studies*, *31*(5), 491-503. dx.doi.org/10.1080/00343409750132289

North, D. (1990). *Institutions, institutional change and economic performance*. Cambridge, UK: Cambridge University Press.

North, D. (2005). *Understanding the process of economic change.* Princeton, NJ: Princeton University Press.

North, D., & Smallbone, D. (2000). Innovative activity in SMEs and rural economic development: Some evidence from England. *European Planning Studies*, *8*(1), 87-106. dx.doi.org/10.1080/096543100110947

Organisation for Economic Co-operation and Development. (1999). *OECD Science, technology and industry score-board 1999*: *Benchmarking knowledge-based economies*. Paris, France: Organisation for Economic Co-operation and Development.

Parkinson, M., Hutchins, M., Simmie, J., Clark, G., & Verdonk, H. (2004). *Competitive European cities*: *Where do the core cities stand?* London, UK: Office of the Deputy Prime Minister.

Peterson, G. (2000). Political ecology and ecological resilience: An integration of human and ecological dynamics. *Ecological Economics*, *35*(3), 323-336. dx.doi.org/10.1016/S0921-8009(00)00217-2

Porter, M. E. (1980). *Competitive strategy*: *Techniques for analyzing industries and competitors*. New York, NY: Free Press.

Porter, M. E. (1990). *The competitive advantage of nations*. New York, NY: Free Press.

Porter, M. E. (1998). *On competition.* Boston, MA: Harvard Business School Publishing.

Porter, M. E. (2000). Locations, clusters, and company strategy. In G. L. Clark, M. P. Feldman, & M. S. Gertler (Eds.), *The Oxford handbook of economic geography* (pp. 253-274). New York, NY: Oxford University Press.

Porter, M. E., & Stern, S. (1999). *The new challenge to America's prosperity*: *Findings from the Innovation Index*. Washington, DC: Council on Competitiveness.

Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, *68*(3), 79-91.

Rodríguez-Pose, A. (2013). Do institutions matter for regional development? *Regional Studies*, *47*(7), 1034-1047. dx.doi.org/10.1080/00343404.2012.748978

Rodríguez-Pose, A., & Storper, M. (2006). Better rules or stronger communities? On the social foundations of institutional change and its economic effects. *Economic Geography*, *82*(1), 1-25. dx.doi.org/10.1111/j.1944-8287.2006.tb00286.x

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, *94*(5), 1002-1037. dx.doi.org/10.1086/261420

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, *98*(5), S71-S102. dx.doi.org/10.1086/261725

Romer, P. M. (2007). Economic growth. In D. Henderson (Ed.), *The concise encyclopedia of economics* (pp. 128-131). Indianapolis, IN: Liberty Fund.

Rose, R. (1993). *Lesson-drawing in public policy*. Chatham, NJ: Chatham House Publishers.

Rothwell, R. (1994). Towards the fifth-generation innovation process. *International Marketing Review*, *11*(1), 7-31. dx.doi.org/10.1108/02651339410057491

Rutten, R., & Boekema, F. (2007). *The learning region*: *Foundations, state of the art, future.* Cheltenham, UK: Edward Elgar.

Sabel, C. (1996). Learning-by-monitoring: The dilemmas of regional economic policy in Europe. In Organisation for Economic Co-operation and Development (Ed.), *Networks of enterprises and local development*: *Competing and co-operating in local productive systems* (pp. 23-51). Paris, France: Organisation for Economic Co-operation and Development.

Schumpeter, J. A. (1934). *The theory of economic development*. Cambridge, MA: Harvard University Press.

Scott, A. (1995). The geographic foundations of industrial performance. *Mathematical Social Sciences*, *30*(3), 319-320.

Simmie, J., & Martin, R. (2010). The economic resilience of regions: Towards an evolutionary approach. *Cambridge Journal of Regions, Economy and Society*, *3*(1), 27-43. dx.doi.org/10.1093/cjres/rsp029

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, *70*(1), 65-94. dx.doi.org/10.2307/1884513

Solow, R. M. (1957). Technical change and the aggregate production function. *The Review of Economics and Statistics*, *39*(3), 312-320. dx.doi.org/10.2307/1926047

Stimson, R., Stough, R. R., & Nijkamp, P. (2011). *Endogenous regional development*: *Perspectives, measurement and empirical investigation*. Cheltenham, UK: Edward Elgar.

Storper, M. (1997). *The regional world*: *Territorial development in a global economy.* New York, NY: The Guilford Press.

Storper, M. (2005). Society, community, and economic development. *Studies in Comparative International Development*, *39*(4), 30-57. dx.doi.org/10.1007/BF02686164

Storper, M. (2008). Community and economics. In A. Amin & J. Roberts (Eds.), *Community, economic creativity, and organization* (pp. 37-68). New York, NY: Oxford University Press.

Storper, M., Lavinas, L., & Mercado-Célis, A. (2007). Society, community, and development: A tale of two regions. In K. Polenske (Ed.), *The economic geography of innovation* (pp. 310-339). Cambridge, UK: Cambridge University Press.

Storper, M., & Scott, A. J. (2009). Rethinking human capital, creativity and urban growth. *Journal of Economic Geography*, *9*(2), 147-167. dx.doi.org/10.1093/jeg/lbn052

Swan, T. W. (1956). Economic growth and capital accumulation. *Economic Record*, *32*(2), 334-361. dx.doi.org/ 10.1111/j.1475-4932.1956.tb00434.x

Tappeiner, G., Hauser, C., & Walde, J. (2008). Regional knowledge spillovers: Fact or artifact? *Research Policy*, *37*(5), 861-874. dx.doi.org/10.1016/j.respol.2007.07.013

Ter Wal, A. L. J., & Boschma, R. (2011). Co-evolution of firms, industries and networks in space. *Regional Studies*, *45*(7), 919-933. dx.doi.org/10.1080/00343400802662658

Thornton, P. H. (1999). The sociology of entrepreneurship. *Annual Review of Sociology*, *25*, 19-46. dx.doi.org/10.1146/annurev.soc.25.1.19

Thornton, P. H., Ribeiro-Soriano, D., & Urbano, D. (2011). Socio-cultural factors and entrepreneurial activity: An overview. *International Small Business Journal*, *29*(2), 105-118. dx.doi.org/10.1177/0266242610391930

Tura, T., & Harmaakorpi, V. (2005). Social capital in building regional innovative capability. *Regional Studies*, *39*(8), 1111-1125. dx.doi.org/10.1080/00343400500328255

Vaz, T. N., & Nijkamp, P. (2009). Knowledge and innovation: The strings between global and local dimensions of sustainable growth. *Entrepreneurship & Regional Development – an international Journal*, *21*(4), 441-455. dx.doi.org/10.1080/08985620903020094

Veenhoven, R. (2009). Well-being in nations and well-being of nations. *Social Indicators Research*, *91*(1), 5-21. dx.doi.org/10.1007/s11205-008-9323-7

Virkkala, S. (2007). Innovation and networking in peripheral areas – a case study of emergence and change in rural manufacturing. *European Planning Studies*, *15*(4), 511-529. dx.doi.org/10.1080/09654310601133948

Walter, J., Lechner, C., & Kellermanns, F. W. (2007). Knowledge transfer between and within alliance partners: Private versus collective benefits of social capital. *Journal of Business Research*, *60*(7), 698-710. dx.doi.org/10.1016/j.jbusres.2007.01.026

Wennekers, S., & Thurik, R. (1999). Linking entrepreneurship and economic growth. *Small Business Economics*, *13*(1), 27-56. dx.doi.org/ 10.1023/A:1008063200484

Werker, C., & Athreye, S. (2004). Marshall's disciples: Knowledge and innovation driving regional economic development and growth. *Journal of Evolutionary Economics*, *14*(5), 505-523. dx.doi.org/10.1007/s00191-004-0237-5

Wong, C. (2002). Developing indicators to inform local economic development in England. *Urban Studies*, *39*(10), 1833-1863. dx.doi.org/10.1080/0042098022000002984

World Economic Forum. (2012). *The Global Competitiveness Report 2012-2013*. Geneva, Switzerland: World Economic Forum.

Zucker, L. G., Darby, M. R., Furner, J., Liu, R. C., & Ma, H. (2007). Minerva unbound: Knowledge stocks, knowledge flows and new knowledge production. *Research Policy*, *36*(6), 850-863. dx.doi.org/10.1016/j.respol.2007.02.007

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