ECOSYSTEMS OF OPEN INNOVATION

Their applicability to the growth and the development of economies within small countries and regions

Bill O’Gorman and Willie Donnelly

Introduction

In essence this chapter addresses what Oughton, Landabaso and Morgan (2002) call the ‘regional innovation paradox’. The innovation paradox refers to the concept whereby it is clear that certain regions and small countries need to invest heavily in R&D, innovation and the commercialisation of research if they are to close the income and wealth creation gaps compared to ‘wealthier’, ‘more sustainable’ regions and countries; however, these regions and countries do not have the capacity nor capability to effectively manage such investments. This may be due to a lack of experience and/or being at a stage of development whereby neither the region’s or small country’s enterprise and innovation policies nor infrastructures are conducive to effectively utilise investments geared for R&D, innovation and the commercialisation of research. Specifically, from a regional perspective the innovation paradox often exists as the result of centralised government and policies and/or a country’s economy being dominated by an advanced and well performing capital city, large urban area(s), or region(s) that overshadow(s) weaker and underperforming regions (O’Gorman 2005).

Most developing economies transition from a policy of protectionism through to a focus on foreign direct investment (FDI) (O’Gorman and Cooney 2007). Indeed many such developing economies find it difficult to transition beyond the focus on FDI to the detriment of indigenous enterprise and innovation (O’Heam 1998; O’Sullivan 2000). However, in a globalised economy, where the boundaries between regions and economies are blurring, in order to remain competitive and to sustain their economies regions and small countries need to realise that the capability and capacity to innovate and commercialise research is essential.¹

National and regional boundaries often generate restrictions to commerce, trade, innovation, technology development and the commercialisation of research. But in the current information
age of cloud computing, and the relative ease of brain circulation (physical and electronic) across boundaries how do we define ‘region’? What is a region? Is a region an area or territory constrained by geography such as rivers, mountains and seas, or is it merely a mental picture used to classify the real world? Or is a region a ‘space’ bounded by economics, social constructs and culture? There are many definitions and interpretations of what a ‘region’ is.

For the purposes of this chapter the authors have chosen the Organisation for Economic Co-operation and Development (OECD 2011) concept of region as being based on economic linkages that may not match political borders but can span regional or even national boundaries.

However, the definitions, while once adequate, are now questionable in an era marked by phenomena such as globalization, unbundling of production cycles and processes, open innovation systems, brain circulation, factors triggering and feeding innovation and regional development are increasingly found ‘elsewhere’ rather than within the internal network of relations that have traditionally been the main focus of regional development (Bellini and Hilpert 2013). Bellini and Hilpert suggest that in order for a region (or small country) to create, maintain, increase or reshape its ‘relational assets’ such aspirations must be added to a region’s (small country’s) objectives of their modern regional economic policy. They continue that regional development should be defined in terms of space: economic space, innovation space, political space, and culture and identity space.

The focus of this chapter is primarily on innovation space and thus the determination of an ecosystem of open innovation for regions and small countries. The main argument throughout this chapter is that, for small countries and regions, it is often more difficult to build the required capacity to innovate. These limited innovation capacities and capabilities have a significant impact on a region’s (country’s) development and competitiveness with regional performance being hampered as a result. Driven by the increased intensity of international competition in a globalising economy, the shortcomings of traditional regional development models, and the emergence of successful clusters of firms and industries in many regions around the world (Enright 1994), considerable attention is now being paid to the concept of regional innovation systems (RIS) and specifically, as discussed in this chapter, ecosystems of open innovation as a conducive method of building the required capacity and capability to innovate and commercialise research.

It is the contention of the authors of this chapter that developing and implementing an ecosystem of open innovation that is conducive to business growth and regional economic and social development, will assist small countries and regions to overcome the regional innovation paradox. However, ‘such processes [will] demand highly innovative labour, collaboration and an exchange of ideas and competencies, which refer to a particular region’s profile in scientific research and technology and a particular stock of innovative knowledge’ (Hilpert 2013: 3). Equally those tasked with the role of enhancing a region’s economy and sustainability need to enmesh all relevant stakeholders to embrace and develop an environment whereby the region’s boundaries of porous and permeable capacities and capabilities can absorb and disseminate innovative labour, knowledge and technology.

Strong regions contribute to national development. In particular regions that are open and prepared to engage and collaborate with ‘outside’ leading institutions can attract expertise and specialisms into their respective regions thus enhancing economic development, growth and sustainability for their region and their country. Therefore whereas most previous research and literature pertaining to this subject area has focused on large successful regions, this chapter focuses on how small countries and regions can enhance their competitiveness and sustainability through the development and implementation of an ecosystem of open innovation in their respective domains.
Innovation, policies and the development of small countries and regions

Innovation can be defined in many ways; however, we contend that it is not the innovation itself that is key but rather the process and location of innovation and the commercialisation and internationalisation of research outputs. The locus and catalyst of innovation systems and the commercialisation of research is in fact within the region, as opposed to solely at a national or supranational level. Therefore supranational, national, regional and local innovation policies need to be aligned (Sternberg 2009). In 2011, the OECD stated that policy makers at all levels need to support both innovation and regional development at the same time to ensure that regions can become functional agents of change, keeping pace with global markets and trends.

Doloreux and Parto (2005) posit that much of our understanding of regions as a locus of innovation comes from research into innovation milieu, learning regions, clusters, industrial districts and regional innovation systems. However, such studies are by no means conclusive and are largely based on metropolitan areas or exemplary regions such as Silicon Valley, Emilia-Romagna and Baden-Württemberg, to mention but a few (Cooke and Morgan 1998) that are conducive to the development of innovation systems. On the other hand, small countries and/or peripheral regions are considered to be inferior and lack the dynamics, actors and infrastructure to avail of inward investment to create and develop effective regional innovation systems. Such regions (and small countries) consist mainly of traditional industries with low levels of innovation and R&D capacity, are often over-reliant on FDI (where innovation and R&D are jealously guarded by those in the home nation’s HQ) and are therefore considered to be less developed in terms of possessing the resources, supports, networks, education infrastructure, or knowledge support systems to develop a cohesive, interactive triple helix of regional (or national) actors to internationalise and commercialise technology and knowledge transfer. Even though these peripheral regions and small countries are operating in open economic systems they are still mostly ‘inward looking’ and find it difficult to break out of the ‘innovation paradox’ cycle.

Regional innovation systems that are successful make extensive use of endogenously generated as well as exogenously available knowledge to strengthen their competencies and to remain competitive in a global economic environment (Doloreux and Parto 2005). Whereas, not so long ago, the demarcation between endogenously and exogenously generated influencers on the development of regions and countries was clearly evident, in the current high-tech, information age the endogenous–exogenous boundaries are blurring. This is especially so when one considers the possibility and actuality of R&D, innovation, and new product development commercialisation in multi(national) site locations. The world wide web (www), cloud computing and other technology and communication advances have enabled this multi(national) site feature of product development and commercialisation to become a reality, to the extent that the definition of ‘region’ becomes even more confusing and complex. Indeed the role of local, regional and national politics and its influence over delineating and implementing innovation policies, taking local, regional and national nuances into consideration, becomes even more questionable. Thus there is the absolute need for the relevant triple helix of stakeholders of peripheral regions and small countries to generate RTD and innovation policies of cooperation and collaboration to create an environment whereby ecosystems of open innovation can thrive.

Evolution from innovation milieu to ecosystems of open innovation

The evolution to what we today call ecosystems of open innovation has taken many guises over the last several decades. The first incarnation is what was referred to as innovation milieu. This
Ecosystems of open innovation

is a concept developed in the late 1980s and early 1990s by a group of economists known as GERMI. The innovation milieu is the socio-economic environment of a region produced by the interactions of firms, institutions and labour. It is the relationships and interactions between these entities that creates the innovative capacity of the milieu. However, to date, it is still not clear how an innovation milieu comes into being, whether through luck or historical accident. It is also not clear whether they represent a general model of regional development or a specialised model suited to unique circumstances (Bergman 1991).

Next came the concept of the industrial district – a term used to describe a location where workers of heavy industry lived and worked, e.g. Northern England, Northern Italy. It is a geographically localised productive system, based on a strong local division of work between small firms specialising in different aspects of the production and distribution cycle of an industrial sector. However, in more recent times the term was used to imply the ways in which economic specialisation arises through clustering in a particular industry-zoned area/region. But the key aspects to innovation in the district lies with the SMEs themselves and relationships, trust and reciprocity between the SMEs. The concept of industrial districts stresses that a region’s economic development is dependent on the trust and opportunism between SMEs, the role of culture as a vehicle for change, and the way in which agents (firms) who behave inappropriately are penalised for their actions.

The concept of local production systems assumes that for its creation a region (locality or district) already has production factors and resources, technology capability, leading firms, a dynamism of local demand and appropriate institutional actions (and interactions). Leading firms are a critical factor in this concept as it is supposed that these are the catalysts for the development of human capital, the creating and development of the supply infrastructure and the generation of spin-offs. However, it appears that within this concept, it is the leading firms solely that are the drivers of economic growth in isolation from other institutions within the local system. On the other hand, in the 1990s, the concept of new industrial spaces (also referred to as the theory of new economic geography) was based on the social division of labour, the proliferation of small to medium sized industries and the re-agglomeration of production and services industries, in particular high-technology industries that made use of information technology, employed large numbers of highly skilled and educated staff and actively engaged in inter-firm networks. The use of technology by highly skilled and educated staff was core to the development of business and social networks across regional and international boundaries. As a result, in the late 1990s and early 2000s, the movement of people and especially the sharing and use of technology and knowledge across firm, regional and national boundaries became even more prolific leading to globalised industrialisation, innovation and commercialisation of research as we know it today.

Clusters of innovation, learning regions and regional innovation systems are concepts that are often used interchangeably and confused. Based on Porter’s work on clusters of innovation in the early 1990s governments in general and organisations such as the OECD and EU in particular have embraced the notion that clusters of innovation are key to the economic development of regions. Clusters of innovation are geographic concentrations of firms, suppliers, service providers and supporting institutions involved in the same or similar industry sectors (Porter 1998). However, the mere existence of these entities in a single geographic area alone, while supporting a region’s economic development, does not guarantee a region’s longevity nor its sustainability. Rather, it is the learning region, i.e. the interaction between these entities, the formal and informal networking between their employees, and particularly the transfer of technology and knowledge between the entities, and the two-way sharing of knowledge supported by learning and dissemination institutions such as universities and research centres that fuels the economic development and growth of regions. An essential ingredient to this regional development, growth
and long term sustainability is finance and the access to finance. Creating the financial infrastructure whereby firms, and supporting institutions have the capacity and capability to gain access to and use necessary venturing capital to generate endogenous innovation is what constitutes a regional innovation system (Andersson and Karlsson 2004).11

This brings us back to the question of the ‘regional innovation paradox’ and how peripheral regions and small countries can innovate and compete successfully in an open globalised economy against regional innovation systems such as Silicon Valley, Route 128, Emilia-Romagna and Baden-Wurttemberg, which have the venturing capital, human capital, technology and infrastructures to create an environment to generate endogenous innovation within their regions.

Equally, where a regional innovation system expands its own boundaries through a process of economic integration, globalisation, and attraction and dissemination of innovative labour and technologies, and ‘brain exchange’ in a sharing, collaborative and complementary process with other regional innovation systems, reinforces its innovation capacity and capability. The process becomes a spiral of ever increasing creation, innovation and commercialisation.

However, as stated earlier, peripheral regions and small countries, because of their governance (which is usually centralised), the small size of their markets, their reliance on FDI and exports, and their lack of access to adequate venture capital, find it difficult to nurture an environment that leads them to being a competitive, effective regional innovation system.

Current research and dialogue about regional innovation systems suggests that, in an environment of international markets and multi-(international)-site production, delivery and innovation systems where knowledge flows freely and boundaries (at firm and regional levels) are blurred, ecosystems of open innovation are the new way forward if regions are to compete successfully and assure their sustainability.

**Ecosystems and innovation ecosystems**

Preparing the way for ecosystems of open innovation is the concept of ‘Islands of Innovation’. Islands of Innovation are regions where the most advanced industries and R&D facilities are located, where there are attractions to maintain and/or draw in scientists and high-skilled and innovative labour, and effective government policies support innovation policies (Hilpert 2003) and where brain exchange and brain circulation exist. However, since the mid 1990s economists, researchers and policy makers have attempted to use the notion of ecosystems to define a new and emerging generation of innovation systems. Many have intimated that any capitalist economy can be viewed as a living ecosystem consisting of competition, specialisation, cooperation, exploitation, learning and growth as being central to economic life. They suggest that the basic mechanisms of economic change are similar to those found in nature with the main difference being speed and that economic development, and the resulting social change, are not shaped by society’s genes, rather by the accumulation of technical knowledge.12

A key feature of any ecosystem is its ability to adapt to change, be it caused exogenously or endogenously and a variety of distinct species must exist to ensure that at least part of the population can cope with any new environmental change (Peltoniemi and Vuori 2004). The ‘variety of distinct species’ consists of firms (from a variety of industry sectors and not just a single cluster), consumers, suppliers, R&D centres and supporting economic, cultural, educational and legal institutions. The nutrients required to develop, regulate and balance the equilibrium of innovation ecosystems are: entrepreneurial capacity, business acumen, risk capital, R&D enterprises, technology commercialisation, human capital, physical infrastructure, an industrial base, global linkages, networking opportunities, a culture that fosters innovation and a
community mindset, networking, capital, knowledge and technology transfer processes, professional services, support infrastructures, supportive government policies and a balanced quality of life (Jackson 2011; TECNA 2011). Another key aspect to the development and maintenance of innovation ecosystems is the development of trust, cooperation, collaboration and co-evolution of the species and organisms constituting the ecosystem and the management of the complex relationships arising from these interactions.

By the same token there is a need for decentralised decision making and self-organisation within the ecosystem. But, just as in the biological ecosystem, innovation ecosystems are characterised by the large number of interconnected participants who depend on each other for their mutual survival. If the ecosystem is healthy and functioning well individual species (organisations) prosper. On the other hand if the ecosystem is unhealthy this will result in fragmentation, a reduction in interconnectedness, reduced cooperation and increased competition (Iansiti and Levien 2004). However, some innovation ecosystems are often built around one single organisation that is highly connected (Power and Jerjian 2001) and seen to be the engine at the heart of the whole (eco) system (Gossain and Kandiah 1998).

Jackson (2011) suggests that innovation ecosystems comprise two distinct economies (i) the research economy and (ii) the commercial economy (see Figure 18.1). The research economy is driven by fundamental research, whereas the commercial economy is driven by the needs of the marketplace. However, the innovation ecosystem will be thriving and healthy when the resources invested in the research economy (either from private, government or direct business funds) are subsequently replenished by innovation induced profit increases in the commercial economy. Such practices allow for the discovery of innovations to be capitalised upon and commercially introduced to the marketplace.

An essential ingredient to create the ‘innovation ecosystem spectrum’ is appropriate active government enterprise policy and government infrastructures to support R&D, innovation, commercialisation, internationalisation, the nurturing of innovative labour, and industry. An equally important ingredient for the sustainability of an ‘innovation ecosystem spectrum’ is to create an environment and culture of ‘free movement’ of scientific and innovative labour across boundaries. This will be discussed in more detail later in the chapter under the heading a blueprint for ecosystems of open innovation.

Whereas it is very important to note that successful, thriving innovation ecosystems are based on decentralised decision making and self-regulation, it is the constantly evolving relationships between a wide range of innovation partners (local, regional, national and international) that affect knowledge creation, the rate of knowledge diffusion, and knowledge transformation into innovation and commercialisation. It is also important to note that it is essential that regional innovation ecosystems must leverage off local, regional, national and international infrastructures to fuel the regional innovation process through the collaboration of multiple partners including research parks, universities, large research-driven firms, start-ups, investors and other professionals (Wolfe 2009).

However, much of what is expressed above is based on highly urbanised metropolitan regions where well established institutional organisations and knowledge-intensive firms known for their creativity, share information and knowledge, resulting in high levels of success and economic prosperity (Doloreux and Dionne 2008). Much of the research on innovation ecosystems, presented to date, does not take into account the unique features of small countries, sub-regions nor peripheral regions. Neither does the research explain how innovation ecosystems might emerge in such locations, which very often lack the basic requirements conducive to the fostering of an innovation culture, what Oughton et al. (2002) referred to as the ‘regional innovation paradox’. For example, small countries, sub or lagging regions, and peripheral regions often do
not have the dynamics, actors or support organisations conducive to developing an innovation system. Such regions are less developed in terms of innovation, lacking the resources and supports required, for example networks, technology transfer supports, and knowledge support systems. Frequently, such regions lack specialised services and have poor technology transfer links between the public and private sectors. Less developed regions and countries often have a larger portion of SMEs in traditional industries with little R&D and low absorptive capacity, with levels of innovation frequently lower in comparison to urbanised regions (Tödtling and Tripl 2005). Innovation in lagging regions tends to be small scale, incremental and normally takes place through the application of existing knowledge (Asheim and Coenen 2005). Therefore, it can be difficult to attract high-skilled jobs to such regions resulting in reduced productivity.

**Figure 18.1** Innovation ecosystem spectrum.

Ecosystems of open innovation

(Doloreux and Dionne 2008), with the possibilities of entrepreneurial growth often limited due to the lack of local competition in product markets, the limited scale and scope of local market opportunities, combined with lengthy distances to larger markets (North and Smallbone 2000). A major challenge therefore for governments of small and/or developing countries and regions is how to increase that country’s or region’s attractiveness to draw in scientists, innovative labour, technologies and know-how. A key question for such governments is what is the catalyst to start the ‘brain circulation’ process.

Ecosystems of open innovation – comparing regions and countries

Based on the above analysis we believe the five essential ingredients to develop an ecosystem of open innovation are: connectedness between individuals, organisations and support institutions, infrastructure provided at a local and regional levels, an environment conducive to business, economic and regional development and growth, a culture that supports innovation and knowledge exchange, and governance that offers the mechanisms for regional economic and social development in a sustained and supported manner. To test this theory we selected sixteen regions/countries selected from the Regional Innovation Scoreboard (RIS 2012) based on their classification as either innovation leaders, innovation followers, moderate innovators or modest innovators. Innovation leaders tend to be located in the most well developed and economically prosperous countries, whereas modest innovators tend to be located in poorer, less developed countries and/or in peripheral regions. Table 18.1 shows the comparison between the sixteen regions/countries based on the five factors we identified as being critical to creating and developing an ecosystem of open innovation.

Connectedness

The presence of a high level of cluster development, where organisations and key stakeholders collaborate and cooperate, share information and have common goals and objectives is essential for a region to remain competitive and be at the forefront of technological change. Regions that have demonstrated the benefits of cluster development include Silicon Valley and Route 128 in the US. Both regions have well established clusters of businesses and key support organisations that work in tandem, aiding regional growth and development in a sustained manner. The presence of key indigenous industries contributes enormously to a region’s growth and development, in-flux of venture capital, attraction of public and private sector investments, attraction of skilled human capital, and the region’s governance; for example Apple, Microsoft and HP in Silicon Valley; General Electric in Boston on Route 128; Nokia in Finland; and Bosch, Damlher and SAP in Baden-Wurtemberg.

Infrastructure

The presence of pro-business institutions that actively encourage the set-up and support of new firms is crucial to regional development, especially in regions seeking to transition and develop their innovation capacity. Silicon Valley grew as a direct result of a pro-business environment (Herbig and Golden 1993) that fostered a collective, team-driven approach to doing business. Inter-regional linkages and cooperative employer–employee relationships, supported by consensus in politics and business also facilitated growth and development in Baden-Wurtemberg, Germany (Krauss and Wolf 2002). Additionally, the presence of tertiary education and research organisation is important to a region’s development of its innovation capacity and
### Table 18.1  Ecosystem of open innovation – five-factor analysis of countries and regions

<table>
<thead>
<tr>
<th>RIS 2012 Classification</th>
<th>Silicon Valley, California</th>
<th>Route 128 Boston</th>
<th>Eastern Region, United Kingdom</th>
<th>Switzerland</th>
<th>Hordaland, Norway</th>
<th>Southern Region, Sweden</th>
<th>Singapore</th>
<th>Norway</th>
<th>Israel</th>
<th>Baden-Wurttemberg, Germany</th>
<th>Tampere, Finland</th>
<th>Sophia Antipolis, France</th>
<th>Northern Ireland</th>
<th>Bucuresti-Iflor, Romania</th>
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<td>Innovation Leader</td>
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<td>High level of cluster development</td>
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<td>Presence of major indigenous organisation</td>
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<td>Presence of university/higher education institution</td>
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<td>High level of university/HEI – industry research collaboration</td>
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<td>High level of FDI and technology transfer</td>
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<td>High level of population with tertiary education</td>
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### INNOVATION CULTURE

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<td>High propensity for supporting innovation</td>
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<td>High capacity for innovation</td>
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<td>Regional attractiveness</td>
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<tr>
<td>Critical mass of industry</td>
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<tr>
<td>High level of SMEs innovating in-house</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>High level of innovative SMEs collaborating with others</td>
<td>X</td>
<td>X</td>
<td>X</td>
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### GOVERNANCE

<table>
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<td>Low level of government regulation</td>
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<td>X</td>
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<tr>
<td>Decentralisation of economic policy making</td>
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Source: authors.
capability. Examples include Stanford University near Silicon Valley and Massachusetts Institute of Technology (MIT) near the Route 128 region in Boston. Although it is clear that all regions examined benefited from the presence of a university/HEI, those regions characterised as innovation leaders or followers reported higher levels of university/HEI – industry research collaboration. Collaborative research relationships between such institutions and the business community is of significant importance to the development of regional innovation systems. A similar argument is presented in terms of FDI and technology transfer. Those same regions (innovation leaders and followers) that benefit from greater levels of research collaboration reported higher levels of FDI and technology transfer.

**Environment**

Exemplar regions known for their innovation, technology and knowledge transfer tend to report higher levels of their population having tertiary education that are skilled and capable to engage in the workforce (Bramwell et al. 2012). Having a well educated and skilled workforce that can develop and disseminate new knowledge is critical to the development of a culture of innovation, conducive to business growth and regional economic and social development. Additionally, the investment in R&D from both the public and private sectors is equally important to ensure regional development and growth. Regions that reported higher levels of R&D expenditure in the public and private sectors (as per cent of GDP) are more likely to be regions and countries characterised as innovation leaders.

**Innovation culture and regional attractiveness**

In this instance culture refers to an embedded spirit of entrepreneurship and the supports to foster a collaborative approach to the creation and development of innovation processes and systems. Fostering a regional culture of innovation, where knowledge is generated, diffused and exploited will assist business growth and therefore benefit the region’s economy (Zhang 2012). This in turn positively impacts the attractiveness of a region and enables synergies to develop with other stakeholders both within and external to the region, thus leading to greater levels of inward, institutional and government investment in the region. Table 18.1 shows that regions and countries classified as innovation leaders, and to a lesser extent innovation followers, report a high propensity for supporting innovation and therefore have a high capacity for innovation.

Studies of regional attractiveness are often based on socio-economic, social life and living standard indices. Good public services, a low crime rate, a clean environment and low levels of unemployment are all contributing factors to a region’s attractiveness. Equally, individuals, businesses and investors are often attracted to regions with a strong social and cultural identity. For instance, the sun and sea climate was identified as a significant factor in attracting industry to Silicon Valley and Sophia-Antipolis (Longhi 1999). For example, highly skilled graduates from Taiwan, Japan, Korea and Vietnam located in Silicon Valley in search of better living standards, whereas Boston was noted as offering a pleasant living environment for migrants (Herbig and Golden 1993).

However, regional attractiveness is not all about sunshine and pleasant living environments, it is also about jobs – the availability of good paying, good quality jobs and interesting jobs. The attractiveness of a region is also about its capability to offer innovative labour the opportunity for career, experience and qualification advancement. In a study performed by Bernard, Patockova and Kostelecky (2013) about what motivates Czech researchers and scientists...
to migrate abroad to innovation regions they found ‘professional development and qualifications’ to be the most significant and dominant factor (148).

**Governance**

The quality of regional governance makes a significant difference to the success of regional innovation systems. The primary concern should be to establish the best governance that offers the mechanisms for regional economic and social development in a sustained and supported manner. Government regulations can advance or hinder regional development and growth intentions. Some regions favour a centralised approach (e.g. UK, France, Ireland) viewing regional government as yet another layer of bureaucracy that often results in a slowdown of decision making and policy implementation. Such regions favour an approach that consolidates municipalities and regions to form larger entities in anticipation of benefits of scale. On the other hand, some countries (e.g. Sweden, Denmark, USA) favour a more regional/localised approach to governance.

However, the effects of the style of governance are inconclusive (see Table 18.1). For example, some successful regional innovation systems report low levels of government regulation with a high degree of decentralised economic policy making i.e. Silicon Valley, USA; Southern Sweden; Baden-Württemberg, Germany. Other successful regional innovation systems report the opposite, having a system of high government regulation with a low regional level of economic policy making, i.e. Eastern UK; Switzerland; Singapore.

It must be noted and understood that the role government adopts and the tone, content and implementation of its enterprise, research and innovation policies has a huge impact on economic regional performance and, as a result, the performance on the country’s economy. In particular, policy makers need to be aware of the knock-on effect on restrictive policies. To ameliorate the effect of such policies and practices government leaders and policy makers need to become more integrated with industry and in particular international business good practices and processes.

A blueprint for ecosystems of open innovation for small countries and regions

According to Hilpert (2013), Islands of Innovation are centres of competence and locations where knowledge is applied and new knowledge is generated. They are also centres that attract innovation labour. But ecosystems of open innovation need to be more than this, they need to have porous and permeable boundaries that can, at the same time, absorb new knowledge and expertise while equally disseminating knowledge about their own specialisms to international centres of research and trade. No small or developing region or country has the capacity or capability to efficiently develop the five-factors of ecosystems of open innovation outlined above. To be successful these regions and small countries need to rely on international support.

Therefore, in our opinion, for regions and small countries to become ecosystems of open innovation they need to embed themselves in a process of international mobility of innovative labour. There are probably three parallel processes that must be adopted to achieve this, (i) build a wealth of sought after knowledge of regional specialisms and nuances, (ii) increase the attractiveness of the region (or small country) by creating and continuously developing leading edge research centres, improving the quality of tertiary education beyond international standard levels, and providing high-value and interesting jobs, and (iii) entering an arrangement with international partners whereby there is an equitable process of brain exchange.
However, the question is how can a lagging region or small country achieve such specialisms and open innovation systems? Such ecosystems of open innovation take time to develop. Figure 18.2, depicts the upward positive spiral effect of the necessary interaction between government policy and funding, research, industry investment and education needed to develop an ecosystem of open innovation. The dotted boundary suggests the need for porosity and permeability to facilitate the inward and outward flow of innovative staff. This flow of innovative staff consists of (i) brain drain where well educated scientists, researchers, engineers and other professionals leave the region/country. This activity is prevalent in countries and regions of low economic status, lagging regions, peripheral regions and emerging economies; (ii) brain gain where ‘outsider’ scientists, researchers, engineers and other professionals are attracted into the region/country. For example Singapore has built its economy on a strategy of a combination of foreign direct development (FDI) and attracting foreign talents into the city state; (iii) brain exchange whereby there are collaborative agreements for the mutual exchange of scientists, researchers, engineers and other professionals between the region/country and relevant international partners; and (iv) ‘free’ brain circulation within, out of, and into the region/country. All of this leads to knowledge spillover, job mobility and wealth creation.

Coupled to this is the need to create a supportive, collaborative balance between the research economy and commercial economy. These are complementary, not mutually exclusive, economies. Finally, immersing the regional/national community into an evolving entrepreneurial culture is essential, particularly policy makers, entrepreneurs, business owners, employers and

![Figure 18.2](Image)

*Figure 18.2* Ecosystem of open innovation for small countries and regions.

*Source:* authors.
citizens have got to embrace the concept of job mobility, brain circulation and labour/skill circulation. Instead of putting barriers in place to hinder mobility and free flow of personnel, stakeholders should encourage it knowing that the circulation of knowledge, skill and labour is what is required to build regional wealth and sustainability – it is the ecosystem of open innovation.

A central entity in making this happen is the catalyst (see Figure 18.2) that is needed to create and implement the policies to nurture the environment and provide the nutrients to develop the ecosystem of open innovation. The catalytic agent could be an institution, a group of institutions, an industry, or a group of industries or government. In the opinion of the authors of this chapter, it is best if government are the catalytic agent, but government must create, develop and implement an all inclusive process of engagement of all regional stakeholders, supported by appropriate enterprise, research and innovation policies that encourage growth rather than hindering it.

In summary

Policy makers, policy implementers and academics should expand their horizons beyond the limiting view that the outputs from innovation and regional innovation systems (RIS) are new forms of technology, technology processes, improved manufacturing processes and delivery systems. They should equally explore innovation in low-tech industries, public sector organizations, service industries and the delivery of services to consumers at large. There is also the need to embrace the broader aspects of social innovation (SI) and in particular to use imaginative thinking, creativity and innovation in the reshaping of social interactions.16

In order to nurture a sustainable ecosystem of open innovation there is also the need for ‘brain circulation’ and that, not alone should the consumer/citizen be embraced as a key element of the innovation process, but also that the innovation process must be multidisciplinary, multi-organisational, multi-sectoral, and multi-institutional.17 However, to realise this potential the region’s/small country’s institutions need to be adaptable and responsive to international networks of collaboration. Governments (local, regional and national) need to play an important role as a catalyst of different potentials and activities to induce innovation and the development of new technologies and new applications of these technologies.

Notes

1 See Montana et al. (2001).
2 For further discussion on the determination of ‘region’ see for example Maskell (1998); Wolfe and Gertler (1998); Latouche (1998); Cooke and Schienstock (2000); Niosi (2000); Cooke (2001); Simmie (2001); Asheim and Isaksen (2002); Doloreux and Parto (2005a, b); Paasi (2009).
3 A few such examples are: Cooke, Uranga and Etxebarria (1997) classified region as ‘a territory less than its sovereign state, possessing distinctive supralocal administrative, cultural, political, or economic power and cohesiveness, differentiating it from its state and other regions’. Johansson (1992, 1998) writes about a region having a high intensity of economic interaction and connectivity of nodes via economic networks and networks of infrastructure. According to Andersson and Karlsson (2004), region is a territory in which the interaction between the actors and the flow of goods and services, create a regional economic system whose borders are determined by the point at which the magnitude of such interactions and flows change from one direction to another.
4 For example some say it is the introduction of new products and services in the market (Bannock 1992), or the implementation of change in practice (Suranyi-Unger 1982), or thinking outside the box through creativity and design (OECD 2011).
5 For further reading on this concept see for example Landabaso and Reid (1999); Cooke, Boekholt and Tödtling (2000); Etzkowitz and Leydesdorff (2000); Isaksen (2001); Doloreux (2003); Asheim and Coenen (2005); Tödtling and Trippl (2005); Doloreux and Dionne (2008).

6 GERMI = Groupement Européen des Milieux Innovateurs.

7 For further reading about the innovation milieu see for example Camagni (1995); Maillat (1998); Crevoisier (2001); Moulart and Sekia (2003); Konstadakopulous (2004).

8 For further reading about local production systems see for example Bouchara (1987); Porter (1998); Courlet (2000); Viesti (2000); Lombardi (2003).

9 For further reading about new industrial spaces (and the theory of new economic geography) see for example Storper and Scott (1988); Batheit and Hecht (1990); Krugman (1991); Moulart and Scott (1997); Kaufman and Karson (2000); Gatefield and Yang (2006).

10 For further reading about clusters of innovation see for example Porter (1990, 1998); Enright (1994); Saxenian (1994); Karlsson and Karlsson (2004); for learning regions see for example Storper (1995); Sternberg (1996, 2009); Morgan (1997); Florida (1995); Cooke (1998); Konstadakopulous (2004); and for regional innovation systems see for example Meeus, Oerlemans and van Dijk (1999); Edquist (1997); Ladendijk (1998); Doloreux and Parto (2005); Doloreux and Dionne (2008).

11 See for example Rothschild (1990); Peltoniemi and Vuori (2004).

12 For further reading about ecosystems see for example Rothschild (1990); Moore (1996, 1998); Gossain and Kandah (1998); DeLong (2000); North and Smallbone (2000); Power and Jerjjan (2001); Miletton-Kelly (2003); Ianisti and Levien (2004); Peltoniemi and Vuori (2004); Asheim and Coenen (2005); Tödtling and Trippl (2005); Doloreux and Dionne (2008); Wolfe (2009); Jackson (2011); Mercan and Goktas (2011); TECNA (2011); Bramwell, Hepburn and Wolfe (2012).

13 It is extremely important that these knowledge and technology transfer processes facilitate all four of the following scenarios (i) firm – firm, (ii) institution – firm, (iii) firm – institution, and (iv) institution – institution.

14 For further reading about new industrial spaces (and the theory of new economic geography) see for example Storper and Scott (1988); Batheit and Hecht (1990); Krugman (1991); Moulart and Scott (1997); Kaufman and Karson (2000); Gatefield and Yang (2006).

15 For further reading about networks see for example Portor (1990, 1998); Enright (1994); Saxenian (1994); Karlsson and Karlsson (2004); for learning regions see for example Storper (1995); Sternberg (1996, 2009); Morgan (1997); Florida (1995); Cooke (1998); Konstadakopulous (2004); and for regional innovation systems see for example Meeus, Oerlemans and van Dijk (1999); Edquist (1997); Ladendijk (1998); Doloreux and Parto (2005); Doloreux and Dionne (2008).


17 Ibid.

References


Ecosystems of open innovation


