

# Innovation Clusters

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## §1 Introduction

Entrepreneurship has become a popular career path in developed and developing countries, a phenomenon that has contributed to the intense interest in the subject shown by researchers and policymakers around the world.<sup>1</sup> In 2011, for example, the Global Entrepreneurship Monitor, a partnership between the London Business School and Babson College that administers a comprehensive research program to produce annual assessments of national levels of entrepreneurial activity, estimated that there were 388 million entrepreneurs distributed around the globe and engaging starting and running new businesses. Many commentators, beginning with Schumpeter, have argued that entrepreneurship is crucial for understanding economic development.<sup>2</sup> Acs and Virgill noted that “[t]he empirical evidence is . . . strong in support of a link between entrepreneurship and economic growth” and that [s]tudies have found that regional differences in economic growth are correlated to levels of entrepreneurship”.<sup>3</sup>

Shane et al. were particularly interested in improving the quality and conciseness of research on how human motivations influence entrepreneurship; however, they suggested a model that may well have broader application in the design of an analytical framework for studying the various factors that influence entrepreneurship.<sup>4</sup> Shane et al. believed that entrepreneurship was best viewed as a “process” that occurred over an extended period of time, rather than an isolated event or moment in time when a person decide whether he or she should become an “entrepreneur”. This process included a number of stages, including recognition of opportunities, development of ideas about how to pursue the opportunity by turning it into new products or services and, finally, execution of the activities required to harvest the desired profits from the opportunities. The execution phase involved array of tasks and activities such as evaluating the feasibility of the opportunity, product/service development, assembly of human and financial resources, organizational design and “market making” (i.e., identification and pursuit of customers).

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<sup>1</sup> Interestingly, studies of entrepreneurial behavior around the world have concluded that “entrepreneurs think alike, no matter what country they call home” (The Wall Street Journal, February 6, 1992, p A1. See also B. Berger, *The Culture of Entrepreneurship* (San Francisco: The Institute for Contemporary Studies, 1991).

<sup>2</sup> Z. Acs and L. Szerb, “The Global Entrepreneurship and Development Index (GEDI)” (Paper presented at Summer Conference 2010 on “Opening Up Innovation: Strategy, Organization and Technology”, Imperial College London Business School, June 2010). A review of the literature regarding the relationship of entrepreneurship to economic development appeared in Z. Acs and N. Virgill, “Entrepreneurship in developing countries”, *Foundations and Trends in Entrepreneurship*, 2009.

<sup>3</sup> Z. Acs and N. Virgill, “Entrepreneurship in Developing Countries”, *Jena Economic Research Papers*, No. 2009-023, March 2009, 26.

<sup>4</sup> S. Shane, E. Locke and C. Collins, “Entrepreneurial motivation”, *Human Resource Management Review*, 13 (2003), 257-279, 274-276.

In their model, the success or failure of the entire entrepreneurial process, and the decisions made along the way, are influenced by several important factors. The motivational traits of the prospective entrepreneur is one of them; however, in order to get a complete picture it is necessary to also take into account other factors that Shane et al. felt had been ignored by previous researchers such as cognitive factors, the nature of the opportunity and environmental conditions.<sup>5</sup>

## §2 Institutional environment and entrepreneurship

Several scholars have argued that the rate of new venture formation and growth is directly influenced by the institutional environment, both formal and informal, in which the venture is operating.<sup>6</sup> New ventures, being both new and small, must struggle to gain legitimacy and survive in their external environment and one way to do that is to conform to the norms and practices that have been prescribed and sanctioned by the institutional environment. In many ways, the institutional environment limits the range of strategic options that are available to new ventures in a society<sup>7</sup> and thus plays an important role in both the creation and destruction of entrepreneurial activities in that society.<sup>8</sup> It is, therefore, not surprising that one area of comparative research with respect to international entrepreneurship is comparing the institutional environment of different societies as to their favorability for entrepreneurship. The need for this type of research is particularly compelling for emerging economies as they struggle to identify and implement policies that can promote economic development including policies to encourage entrepreneurs to form new ventures that hopefully create new jobs and contribute to an increase in overall economic welfare.<sup>9</sup> In fact, several researchers have

<sup>5</sup> Id. at 258 (“In our arguments, we explicitly assume that all human action is the result of both motivational and cognitive factors, the latter including ability, intelligence and skills. We also assume that entrepreneurship is not solely the result of human action; external factors also play a role . . .”)

<sup>6</sup> R. Eunni, “Institutional Environments for Entrepreneurship in Emerging Economies: Brazil vs. Mexico”, *World Journal of Management*, 2(1) (March 2010), 1-18 (citing H. Hwang and W. Powell, “Institutions and Entrepreneurship” in Z. Acs and D. Audretsch (Eds.), *Handbook of entrepreneurship research*. (Norwell, MA: Kluwer, 2005), 179-210; D. Gnyawali and D. Fogel, “Environments for entrepreneurship development: Key dimensions and research implications”, *Entrepreneurship Theory and Practice*, 18(4) (1994), 43-62; and H. Aldrich, “Using an ecological perspective to study organizational founding rates”, *Entrepreneurship Theory and Practice*, 14(3) (1990), 7-24).

<sup>7</sup> D. Ahlstrom and G. Bruton, “An institutional perspective on the role of culture in shaping strategic actions by technology-focused entrepreneurial firms in China”, *Entrepreneurship Theory and Practice*, 26(4) (2002), 53-70; and W. Roy, *Socializing capital: The rise of the large industrial corporation in America* (Princeton, NJ: Princeton University Press, 1997).

<sup>8</sup> H. Aldrich and G. Wiedenmayer, “From traits to rates: An ecological perspective on organizational foundings” in J. Katz and A. and Brockhaus (Eds.), *Advances in Entrepreneurship, Firm Emergence, and Growth* (Greenwich, CT: JAI Press, 1993), 145-195.

<sup>9</sup> A. Wennekers and A. Thurik, “Linking entrepreneurship and economic growth”, *Small Business Economics*, 13(1) (1999), 27-55; and W. Baumol, *The Free Market Innovation Machine: Analyzing the Growth Miracle of Capitalism* (Princeton, NJ: Princeton University Press, 2002) (both observing that new venture creation leads to the creation of new jobs and economic welfare).

asserted that the rate and trajectory of entrepreneurial activities in emerging countries is significantly influenced by the institutional environment in those countries.<sup>10</sup>

While North defined the “institutional framework” of a society as “the fundamental political, social and legal ground rules, which establish the basis for production and distribution”<sup>11</sup>, Scott laid the foundation for meaningful comparison by suggesting that the formal and informal institutions that influence business can be categorized as follows: regulatory institutions, which include the formal system of laws and regulations which have been adopted and enforced in a given community, society or country; normative institutions, which include the commercial standards and conventions that have been established and recognized through professional and trade associations in a given community, society or country; and cognitive institutions, which encompass the culture-specific beliefs regarding socially appropriate behavior which are acquired by persons as they undergo the socialization process in the community, society or country.<sup>12</sup>

### §3 --Global Entrepreneurship Monitor

The Global Entrepreneurship Monitor (“GEM”) is a partnership between the London Business School and Babson College that administers a comprehensive research program to produce annual assessments of national levels of entrepreneurial activity. The project was first launched in 1999, when it covered just ten countries, and has since grown to cover as many as 85 countries in subsequent years and is recognized as the largest ongoing study of entrepreneurial dynamics in the world. The main objectives of the GEM program are measurement of differences in the level of entrepreneurial activity between countries, uncovering the factors that lead to appropriate levels of

<sup>10</sup> M. Peng and P. Heath, “The growth of the firm in planned economies in transformation: Institutions, organizations and strategic choice”, *Academy of Management Review*, 21 (1996), 492-528; D. Ahlstrom and G. Bruton, “An institutional perspective on the role of culture in shaping strategic actions by technology-focused entrepreneurial firms in China”, *Entrepreneurship Theory and Practice*, 26(4) (2002), 53-70; D. Smallbone and F. Welter, “The distinctiveness of entrepreneurship in transition economies”, *Small Business Economics*, 16 (2001), 249-262; and D. Smallbone and F. Welter, “Conceptualizing entrepreneurship in a transition context”, *International Journal of Entrepreneurship and Small Business*, 3(2) (2006), 190-206.

<sup>11</sup> D. North, *Institutions, institutional change, and economic performance* (New York: Norton, 1990). In a later work, North commented that institutions “form the incentive structure of a society, and the political and economic institutions, in consequence, are the underlying determinants of economic performance” and then defined institutions as “the humanly devised constraints that structure human interaction . . . [t]hey are made up of formal constraints (such as rules, laws, constitutions), informal constraints (such as norms of behavior, conventions, self-imposed codes of conduct), and their enforcement characteristics”. D. North, *Economic Performance through Time*, *American Economic Review*, 84(3) (1994), 359–68, 360.

<sup>12</sup> W. Scott, *Institutions and organizations* (Thousand Oaks, CA: Sage, 1995). Scott’s classification model has been adopted by a number of other researchers. See, e.g., D. Ahlstrom and G. Bruton, “An institutional perspective on the role of culture in shaping strategic actions by technology-focused entrepreneurial firms in China”, *Entrepreneurship Theory and Practice*, 26(4) (2002), 53-70; T. Kostova, “Country institutional profiles: Concept and measurement”, *Academy of Management Best Paper Proceedings*, 1997, 180-189; A. Parkhe, “Institutional environments, institutional change and international alliances”, *Journal of International Management*, 9 (2003), 305-316; and G. Bruton, V. Fried and S. Manigart, “Institutional influences on the worldwide expansion of venture capital”, *Entrepreneurship Theory and Practice*, 29 (2005), 737-760.

entrepreneurship and making suggestions for policies that may lead to enhancement of national levels of entrepreneurial activity. The GEM, like other models, has always been focused on exploration of the link between entrepreneurship and economic development and its original model attempted to integrate several variables thought necessary to enable business activity including entrepreneurial capacity, entrepreneurial opportunities and certain “entrepreneurial framework conditions” discussed in more detail below. Recently, the GEM model was revised to take into account that the contribution of entrepreneurs to an economy varies according to its phase of economic development, with those phases being defined in the manner suggested by Porter et al. and described elsewhere in this chapter, namely “factor-driven economies”, “efficiency-driven economies” and “innovation-driven economies”. A large amount of information regarding the work of the GEM researchers is available at its website and in addition to the annual global reports, such as the one for 2011 referred to herein, there are a number of country-specific “national reports” that provide international benchmarking, local context and recommendations for national entrepreneurship policies.

The GEM is based on a conceptual model of the institutional environment and its effect on entrepreneurship. The model recognizes the importance of the social, cultural and political context in which entrepreneurial activities occur and assumes that these contextual factors influence three sets of conditions: basic requirements, which include institutions, infrastructure, macroeconomic stability, health and primary education; “efficiency enhancers”, which include higher education, goods and labor market efficiency, financial market sophistication, technological readiness and market size; and the “entrepreneurial framework conditions” discussed below. Entrepreneurship itself is measured by looking at the entrepreneurship profile of prospective and actual entrepreneurs, including their attitudes, activities and aspirations; and at the entrepreneurship process itself. The GEM researchers acknowledge that entrepreneurship is a process that extends over multiple phases, thus allowing opportunities for assessing the state of entrepreneurship in a particular society at different phases.

The adult population surveys provide a means for measuring individual involvement in venture creation, identifying the motives of entrepreneurs, measuring the aspirations of entrepreneurs with respect to pursuing high growth and/or activities in foreign markets and understanding the societal climate for entrepreneurship. The “climate for entrepreneurship” includes not only the perceptions of prospective entrepreneurs regarding the availability of opportunities around them, their ability to start businesses and the value of doing so but also the availability of positive support from others regarding entrepreneurship as measured by “societal perceptions” of entrepreneurship and the willingness of vendors and investors to supply tangible and financial resources. The national expert surveys measure the following nine EFCs:

- Finance: The availability of financial resources—equity and debt—for small and medium enterprises (“SMEs”) (including grants and subsidies);
- Government policies: The extent to which taxes or regulations are either size-neutral or encourage SMEs;

- Government programs: The presence and quality of direct programs to assist new and growing firms at all levels of government (national, regional, municipal);
- Entrepreneurial education and training: The extent to which training in creating or managing SMEs is incorporated within the education and training system at all levels (primary, secondary and post-school);
- R&D transfer: The extent to which national research and development will lead to new commercial opportunities and is available to SMEs;
- Commercial and professional infrastructure: The presence of property rights and commercial, accounting, and other legal services and institutions that support or promote SMEs;
- Entry regulation: Contains two components including “Market Dynamics”, which is the level of change in markets from year to year, and “Market Openness”, which is the extent to which new firms are free to enter existing markets;
- Physical infrastructure and services: Ease of access to physical resources—communication, utilities, transportation, land or space—at a price that does not discriminate against SMEs; and
- Cultural and social norms: The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income.

#### §4 --Busenitz et al.’s “country institutional profiles”

As discussed above, Scott suggested that the formal and informal institutions that influence business could be placed into three categories—regulatory, normative and cognitive—and these categories served as the basis for the creation of a survey instrument by Busenitz et al. that has often been used as a means for measuring a country’s institutional profile.<sup>13</sup> The survey items for the various categories, sometimes referred to as “dimensions”, included the following:

- Regulatory: The level of government assistance and special support to individuals looking to start their own business; the degree to which the government sets aside contracts for new and small businesses; the level of government sponsorship of organizations that assist in the development of new businesses; and the degree to which the government assist entrepreneurs who have failed in earlier business to start new businesses.
- Cognitive: The knowledge and skills possess by people in the country pertaining to establishing and operating a new business as indicated by the degree to which individuals know how to legally protect a new business; the degree to which entrepreneurs know how to cope with high levels of risk and manage those risks; and the availability of information regarding markets for products and services to be offered by new businesses.

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<sup>13</sup> L. Busenitz, C. Gomez and J. Spencer, “Country institutional profiles: Unlocking entrepreneurial phenomena”, *Academy of Management Journal*, 43 (2000), 994-1003. For more on Scott’s classification model, see W. Scott, *Institutions and organizations* (Thousand Oaks, CA: Sage, 1995).

- Normative: The degree to which entrepreneurship is an admired career path within the society; the degree to which innovative and creative thinking is valued and viewed as a route to success within the society; and the degree to which entrepreneurs are admired in the society.<sup>14</sup>

## §5 --Kantis' entrepreneurial development system

Kantis suggested a model of an “entrepreneurial development system” created by adding in a combination of elements and factors that have an impact, both positive and negative, on the process and, ultimately, on the efficient development of entrepreneurs and entrepreneurial firms. Kantis grouped these factors into a short list of categories, which he introduced and described as follows<sup>15</sup>:

- *Social and economic conditions* reflect the profile of the households from which potential entrepreneurs emerge and take into factors such as the degree of social fragmentation, access to education, flow of information relevant to entrepreneurial activity, income levels and overall macroeconomic conditions such as the behavior of demand or the degree of economic stability;
- *Societal culture*, which is discussed extensively in this publication, influences the formation of the “entrepreneurial spirit” and cultural values impact important factors such as the social value ascribed to the entrepreneur and attitudes toward the risk of failure;
- *Productive structure and dynamism* refers to the sector and regional profile and the size of the existing enterprises and institutions and is considered important because it determines the type of work and professional experience, including opportunities for development of entrepreneurial skills and networks of relationships (see below), which individuals can obtain prior to becoming entrepreneurs;
- *Personal aspects*, which refers to socio-demographic profile of the entrepreneur—which are influenced by his or her family, educational and work environments—and his or her entrepreneurial skills (e.g., propensity to assume risk, tolerance for hard work, managerial capacities, and creativity);
- *Networks*, which include the assistance provided through his or her social networks (i.e., friends and family), institutional networks (i.e., business associations,

<sup>14</sup> It should be noted, however, that when discussing the normative dimension a comparison of the institutional environment for entrepreneurship in Mexico and Brazil, Eunni included the role of industry and trade associations, formalization of recordkeeping and accounting requirements, the sophistication of local banking and insurance industries, support for new business incubation and the availability of funding for the promotion of innovation. R. Eunni, “Institutional Environments for Entrepreneurship in Emerging Economies: Brazil vs. Mexico”, *World Journal of Management*, 2(1) (March 2010), 1-18.

<sup>15</sup> The summary description of each of the categories is based on H. Kantis, “A Systematic Approach to Enterprise Creation” in H. Kantis (Ed.), *Developing Entrepreneurship: Experience in Latin America and Worldwide* (Washington, DC: Inter-American Development Bank, 2005), 17-27, 20-22. Kantis deployed his model as a tool for cross-border comparison of entrepreneurial activities and policies. For further discussion, see “Factors Influencing Entrepreneurial Activities” in “Entrepreneurship: A Library of Resources for Sustainable Entrepreneurs” prepared and distributed by the Sustainable Entrepreneurship Project ([www.seproject.org](http://www.seproject.org)).

institutions of higher learning and/or development agencies) and commercial networks (i.e., suppliers and customers);

- *Factor markets*, which provide entrepreneurs with access to financial resources (e.g., bank loans, venture capital and/or government financing), skilled labor and professional services (accountants, consultants, etc.) and suppliers of inputs and equipment; and
- *Regulations and policies* that have an impact on enterprise creation, such as taxes, procedural requirements for formally establishing a new firm and initiatives and programs to develop entrepreneurship.

## §6 --Global Entrepreneurship and Development Index

Acs and Szerb believed that the GEM project and its focus on the business formation process in a large number of countries, while impressive and valuable, fell short due to its failure to incorporate the different impacts of new businesses and its ranking of countries based primarily on the number of new businesses without regard to their success from a financial perspective or in terms of job creation, improving the local knowledge base and increasing the level of development and innovation.<sup>16</sup> Specifically, they were critical of the tendency of empirical investigations of entrepreneurship to take “simple, one-dimensional approaches” even as modern research theories implicitly acknowledged that entrepreneurship required a multi-dimensional definition.<sup>17</sup> For example, they argued that indexes such as GEM’s TEA that are based solely or primarily on measures of “self-employment”, business ownership, new business creation or the percentage of the adult population willing to engage in “entrepreneurial” activity<sup>18</sup> neglected important differences in the “quality” of entrepreneurial activity (e.g., skills, innovation and high growth); differences in environmental factors; and the efficiency and level of the

<sup>16</sup> Z. Acs and L. Szerb, “The Global Entrepreneurship and Development Index (GEDI)” (Paper presented at Summer Conference 2010 on “Opening Up Innovation: Strategy, Organization and Technology”, Imperial College London Business School, June 2010).

<sup>17</sup> Id.

<sup>18</sup> With regard to self-employment, see Z. Acs, D. Audretsch and D. Evans, “Why does the self-employment rates across countries and over time?” (CERP Working Paper No. 871, Center for Economic Policy Research, 1994); D. Blanchflower, A. Oswald and A. Stutzer, “Latent entrepreneurship across nations”, *European Economic Review*, 45(4-6) (2001), 680-691; and I. Grilo and R. Thurik, “Determinants of Entrepreneurship in Europe and the US”, *Industrial and Corporate Change*, 17(6) (2008), 1113-1145. With regard to business ownership rate, see M. Carree, A. van Stel, R. Thurik and S. Wennekers, “Economic Development and Business Ownership: An Analysis Using Data of 23 OECD Countries in the Period 1976–1996”, *Small Business Economics*, 19(3) (2002), 271-290; and A. Cooper and W. Dunkelberg, “Entrepreneurship and Paths to Business Ownership”, *Strategic Management Journal*, 7(1) (1986), 53-68. With regard to new venture creation, see W. Gartner, “A Conceptual Framework for Describing the Phenomenon of New Venture Creation”, *The Academy of Management Review*, 10(4) (1985), 696-706; and P. Reynolds and D. Storey and P. Westhead, “Cross-national comparisons of the variation in new firm formation rates”, *Regional Studies*, 28(4) (1994), 443–456. For information on the TEA, see Z. Acs, P. Arenius, M. Hay and M. Minniti, *Global Entrepreneurship Monitor: 2004 Executive Report* (Babson Park, MA: Babson College and London: London Business School, 2005); and N. Bosma, K. Jones, E. Autio and J. Levie, *GEM executive report 2007* (Babson College, London Business School, and Global Entrepreneurship Research Consortium, 2008).

society's institutional setup (e.g., property rights, size and role of government and regulatory conditions to new venture formation).

In a report prepared for the US Small Business Administration Acs and Szerb explained that the GEDI captures the contextual features of entrepreneurship by focusing on three broad areas referenced in their definition of “entrepreneurship” referred to above: “The first is entrepreneurial attitudes, a society's basic attitudes toward entrepreneurship through education and social stability. The second area of focus is entrepreneurial activity, what individuals are actually doing to improve the quality of human resources and technological efficiency. The final area is entrepreneurial aspirations, how much of the entrepreneurial activity is being directed toward innovation, high-impact entrepreneurship, and globalization.”<sup>19</sup>

The GEDI created by Acs and Laszlo was a “super-index” based on societal scores on three sub-indexes measuring activity, aspiration and attitudes<sup>20</sup>:

- The entrepreneurial attitude sub-index, or “ATT”, focuses on identifying and measuring “entrepreneurial attitudes” associated with a society's entrepreneurship-related behavior. Among the areas of interest with respect to ATT are the potential for perceiving novel business opportunities, “fear of failure”, “startup skills” and personal networks. Acs and Laszlo believed that several institutional factors would influence ATT including the size of the market, education, business risk, Internet usage and culture.
- The entrepreneurial activity sub-index, or “ACT”, makes the GEDI distinguishable from other empirical measures of entrepreneurship through its focus on measuring “high growth potential start-up activity”. Among the factors taken into account are “opportunity start-up motives”, sophistication or intensity of technology involved, level of education and product/service uniqueness. Acs and Laszlo believed that the relevant institutional factors relating to ACT included ease of doing business (referred to as “business freedom”), the availability and absorption of the latest technology and the level of human development (i.e., education and training).
- The entrepreneurial aspiration sub-index, or “ASP”, relates to what Acs and Laszlo called “the distinctive, qualitative, strategy related nature of entrepreneurial activity” and incorporates “the efforts of the early-stage entrepreneur to introduce new products and services, develop new production processes, penetrate foreign markets,

<sup>19</sup> Z. Acs and L. Szerb, *Global Entrepreneurship and the United States* (Washington, DC: US Small Business Administration Office of Advocacy, September 2010) <http://www.sba.gov/content/global-entrepreneurship-and-united-states> [Accessed April 30, 2011]

<sup>20</sup> Z. Acs and L. Szerb, “The Global Entrepreneurship and Development Index (GEDI)” (Paper presented at Summer Conference 2010 on “Opening Up Innovation: Strategy, Organization and Technology”, Imperial College London Business School, June 2010). The article includes an extensive discussion of the methodology used in compiling and weighting the indexes and a description of the institutional variables used in the indexes.

substantially increase the number of firm employees, and finance the business with either formal or informal venture capital, or both”.<sup>21</sup>

Acs and Szerb concluded that public policy makers must take steps to strengthen institutions before a country’s entrepreneurial resources can be fully deployed.<sup>22</sup> Thus, for example, steps must be taken to increase “business freedom” by easing restrictions on the ability of entrepreneurs to start, operate and close a business and making governmental processes with respect to business approvals more efficient and transparent. In addition, the government must take appropriate action to improve the society’s human capital, through education and training to increase the capacity to absorb and apply new technologies, and reduce corruption and business risk by creating a legal framework that provides investors with a higher level of trust in entering into business transactions. Institutional building should also be targeted toward activities that have been identified as drivers of development such as technology-based ventures and enterprises that pursue distinctive business strategies and seek to become fully integrated into a global marketplace.

## §7 Innovation clusters

Many believe that the first serious reference to geographic concentrations of interconnected companies—“clusters”—appeared in the work of Cambridge economist Alfred Marshall, who described “industrial districts” that arose from an observed tendency of specialized companies to cluster together to form geographic concentrations of expertise and economic activity.<sup>23</sup> Marshall viewed these tendencies positively and, in fact, wrote in 1890 about how “...great are the advantages which people following the same skilled trade get from near neighboring to one another...”.<sup>24</sup> Other economists built on Marshall’s initial theory by suggesting and adding other “necessary elements” for the creation and maintenance of “innovation clusters” including the importance of a “self-interested economic agents”, or “entrepreneurs”, willing to take on and attempt to overcome the risks associated with unproven technologies to seek substantial profits. According to Schumpeter, these entrepreneurs drove the process of transferring and transforming emergent technologies into new products, services and product models and creating new methods for organizing economic activities to establish new industries and

<sup>21</sup> Z. Acs and E. Autio, “The Global Entrepreneurship and Development Index: A Brief Explanation”, [www.imperial.ac.uk/business-school](http://www.imperial.ac.uk/business-school) [Accessed April 30, 2011] One of the institutional variables used by Acs and Szerb was “business strategy” and referred to “the ability of companies to pursue distinctive strategies, which involves differentiated positioning and innovative means of production and service delivery”. See Z. Acs and L. Szerb, “The Global Entrepreneurship and Development Index (GEDI)” (Paper presented at Summer Conference 2010 on “Opening Up Innovation: Strategy, Organization and Technology”, Imperial College London Business School, June 2010).

<sup>22</sup> Id.

<sup>23</sup> L. Lazzeretti, S. Sedita and A. Caloffi, “Founders and Disseminators of Cluster Research”, *Journal of Economic Geography*, 14(1) (2014), 21.

<sup>24</sup> D. Dearlove, “The Cluster Effect: Can Europe Clone Silicon Valley?”, *Strategy+Business*, July 1, 2001 (citing A. Marshall, *Principles of Economics* (1890)).

markets.<sup>25</sup> Romer suggested that technological progress is driven by researchers searching for new ideas for innovations which can eventually provide them with monopoly profits.<sup>26</sup>

A century after Marshall's work Porter undertook an extension examination and analysis of business clusters and uncovered evidence of a strong positive relationship between the proximity of specialized companies and extraordinary competitive success.<sup>27</sup> Dearlove provided the following description of how Porter painted the boundaries of clusters: "Professor Porter suggests that clusters encompass an array of linked industries and other entities important to competition, including suppliers of specialized inputs and providers of specialized infrastructure. Clusters also extend downstream to channels and customers and laterally to manufacturers of complementary products, and to companies in industries with common skills, technologies, or inputs. Clusters often include governmental and other institutions, such as universities, standard-setting agencies, and think tanks, as well as providers of specialized training, education, information, research, and technical support."<sup>28</sup> Porter famously observed that the importance of clustering contrasts dramatically with the idea that the emerging global economy is breaking down barriers and making location less important as a condition for becoming a "global player" and referred to what he called the "paradox of location": "Paradoxically, the enduring competitive advantages in a global economy lie increasingly in local things—knowledge, relationships, and motivation that distant rivals cannot match."<sup>29</sup>

The following sections provide a selective, and far from complete, overview of some of the research and commentary on the necessary elements of an innovation cluster. Work in this area is important as it informs and drives the strategies that countries, regions and cities take in order to attract and retain growth-oriented entrepreneurs who can make significant contributions to the community through job creation and rising income levels for residents. The suggestions are varied; however, there seems to be general consensus about the importance of elements such as accessible domestic markets, including access to small and large companies and governments as customers; human capital, including managerial and technical talent and experience in launching and building knowledge-intensive firms; funding and finance; support systems, including mentors/advisors, professional services, incubators/accelerators and a network of entrepreneurial peers; regulatory framework and infrastructure; education and training; major universities as catalysts; and cultural support.<sup>30</sup>

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<sup>25</sup> For extensive discussion of Schumpeter's theories relating to "entrepreneurship", see J. Schumpeter, *Theory of Economic Development* (1949).

<sup>26</sup> See D. Romer, *Endogenous Growth*, in *Advanced Macroeconomics* (4<sup>th</sup> Ed.) (2011), 101.

<sup>27</sup> Porter explained his research and theories in a number of articles including M. Porter, "Clusters and the New Economics of Competition", *Harvard Business Review*, 76(6) (1998), 77; and M. Porter, "Location, Competition, and Economic Development: Local Clusters in a Global Economy", *Economic Development Quarterly*, 14(1) (2000), 16.

<sup>28</sup> D. Dearlove, "The Cluster Effect: Can Europe Clone Silicon Valley?", *Strategy+Business*, July 1, 2001.

<sup>29</sup> Id. (citing M. Porter, "Location, Competition, and Economic Development: Local Clusters in a Global Economy", *Economic Development Quarterly*, 14(1) (2000), 16).

<sup>30</sup> *Entrepreneurial Ecosystems around the Globe and Company Growth Dynamics: Report Summary for the Annual Meeting of the New Champions 2013* (World Economic Forum, September 2013).

On a practical level, innovation clusters should be able to provide entrepreneurs with the resources and tools they need to launch their emerging companies, including networks that can be used to tap into the human resources necessary to build a founding team and recruit knowledge workers who can create and develop new products and services; professional investors (e.g., venture capitalists) and/or corporate partners with the capital necessary to support the product development activities of the founders and the expansion of the company to the point required for effective promotion and distribution of the product or service; professional and business advisors, including attorneys, accountants, bankers, insurance brokers and consultants; regulatory framework that facilitates creation of business entities and establishment of governance systems and allows entrepreneurs to create and protect an intellectual property rights portfolio; and strategic partners that can collaborate with the new firm as suppliers, customers, manufacturers, distributors and research and development partners.<sup>31</sup>

### **§8 --Milken Institute’s elements for creation of “high-tech clusters”**

In 2000 The Milken Institute published the results of its study of the clustering phenomenon that included a list of eight key elements in the creation of high-tech clusters: the presence of cutting-edge research facilities and top educational institutions, which the Institute argued was probably the most important factor in the incubation of high-tech industries; a close network of research institutions, entrepreneurs, and risk-tolerant venture capitalists to facilitate rapid adoption of emerging technologies; a trained and educated work force; technology spillovers from nearby high-tech industries; the availability of venture capital; high quality of place, such as a pleasant climate, low crime rate, and good schools; a reasonable cost of living, especially affordable housing; and factors that favorably affect the cost of doing business, such as low land prices.<sup>32</sup>

### **§9 --“Golden Triangle”**

Pfeifer et al. argued that the level and intensity of innovation in a specific geographic area (i.e., an “innovation cluster”) was a function of the linkages among learning centers, the public sector, and the private sector on technology innovation, a so-called “Golden Triangle”.<sup>33</sup> They defined a “learning center” as including the local “academic or non-corporate institutions that conduct research and build knowledge assets and intellectual

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<sup>31</sup> For further discussion of the specific issues and challenges associated with launching an emerging company, as well as a description of the characteristics of such a firm, see the Part on “Launching a New Business” in “Entrepreneurship: A Library of Resources for Sustainable Entrepreneurs” prepared and distributed by the Sustainable Entrepreneurship Project ([www.seproject.org](http://www.seproject.org)).

<sup>32</sup> D. Dearlove, “The Cluster Effect: Can Europe Clone Silicon Valley?”, *Strategy+Business*, July 1, 2001 (citing The Milken Institute, *Blueprint for a High-Tech Cluster: The Case of the Microsystems Industry in the Southwest* (2000)).

<sup>33</sup> The discussion of the Golden Triangle model, including the list of the specific assessment tools, is adapted from A. Pfeifer, I. Alalawi, L. Heim, O. Pound, D. Pressman and S. Tsang, *The Golden Triangle: A Comparative Perspective—Silicon Fen (UK) and Campinas (Brazil)*. See also D. Whittaker (Ed.), *Comparative Entrepreneurship: The UK, Japan and the Shadow of Silicon Valley* (Oxford: Oxford University Press, 2009).

capital, and serve as a source of technology innovation” and noted that it was important to analyze not only the connections between learning centers and the public and private sectors but also the connections between different learning centers in the area. The “public sector” was defined as “the national, regional, or local policies, bodies and regulations that contribute to or constrain the development of technology innovation” and included the relevant organizations and institutions, national and local laws and regulations, fiscal policies, research and development funding, and infrastructure support. Finally, Pfeifer et al. defined the “private sector” as including the companies “that seek to apply research for commercial benefit”.

Pfeifer et al., who were particularly interested in understanding and comparing the innovation environments found in Silicon Fen in the United Kingdom and Campinas in Brazil, suggested the following list of assessment criteria that could be used to measure and test linkages between the three points of their Golden Triangle:

- Building of knowledge assets: Examination of the roles played by business, academic and the government communities in establishing and supporting the means to grow and retain knowledge capital and assets generated within the region.
- Accessibility of financial capital: Accessibility of financial capital within the vicinity (e.g., venture capital in the region, nearby financial services centers, government loans and grants, direct foreign investment).
- Intellectual property laws: The local laws and regulations relating to the protection of intellectual property, e.g. copyrights, patents and other restraints such as ownership of intellectual property between universities and the researchers.
- Mechanism for commercialization: The local channels for taking products or ideas to the markets and the support and mechanism in creating spin-off companies.
- Public policies on innovation: The national or regional policies on innovation, funding schemes, educational or human resources policies, government focus on regional innovation clusters.
- Fiscal environment and policies: The national and local taxation regulation on tax breaks for certain fostering innovations, investment incentives (e.g. credit/discount on land purchase, requirements for foreign investment, deposits within local areas for the first few years, likelihood of taxation policy to ensure regional efficient spending).
- Supporting infrastructure: Local information, communication, transport, housing infrastructure for supporting the local workforce in building knowledge capital.

## **§10 --Entrepreneurial ecosystems**

In recent years it has become increasingly popular to refer to innovation clusters as “entrepreneurial ecosystems”, a concept that Mason and Brown discussed in 2013 as part of the broader question of what types of policy initiatives should be taken to promote the creation and maturation of high growth firms (“HGFs”).<sup>34</sup> Mason and Brown cited the

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<sup>34</sup> C. Mason and R. Brown, “Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship” November 7, 2013, [International Workshop on Entrepreneurial Ecosystems and Growth Oriented](#)

works of several researchers that supported the premise that HGFs have a significant impact on economic development. For example, the OECD and Brown et al. have reported that HGFs drive productivity growth, create new employment, increase innovation and promote business internationalization<sup>35</sup>, and Henrekson and Johansson, after conducting a meta-analysis of prior empirical studies, concluded that “a few rapidly growing firms generate a disproportionately large share of all net new jobs compared with non-high growth firms. This is a clear-cut result... [T]his is particularly pronounced in recessions when Gazelles continue to grow”.<sup>36</sup> Others have suggested that HGFs have important spill-over effects that are beneficial to the growth of other firms in the same locality and industrial cluster.<sup>37</sup>

Mason and Brown noted that recognition of the disproportionate value of HGFs to economic development has led policymakers to consider adopting support programs for high growth entrepreneurship that are more “systems-based” and which rely mainly on “relational” forms of support including building connections and networks among entrepreneurs, prioritizing development of “blockbuster entrepreneurs” with significant economic potential and institutional alignment of priorities. A number of researchers have referred to the overall framework for providing this type of support as an “entrepreneurial ecosystem”<sup>38</sup>, which Mason and Brown defined, based on their own synthesis of definitions throughout the relevant literature, as: “a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organisations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g. the business birth rate, numbers of high growth firms, levels of ‘blockbuster entrepreneurship’, number of serial entrepreneurs, degree of sell-out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the

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Entrepreneurship Organized by OECD LEED Programme and Dutch Ministry of Economic Affairs Workshop; Background Paper (Final Version: January 2014).

<sup>35</sup> Organisation for Economic Co-operation and Development, *An international benchmarking analysis of public programmes for high-growth firms* (OECD LEED programme, Paris, 2013); and R. Brown, C. Mason and S. Mawson, *Increasing the Vital 6%: Designing Effective Public Policy to Support High Growth Firms* (National Endowment for Science Technology & Arts (NESTA), London, 2014).

<sup>36</sup> M. Henrekson and D. Johansson, “Gazelles as job creators: a survey and interpretation of the evidence”, *Small Business Economics*, 35 (2010), 227, 240.

<sup>37</sup> G. Mason, K. Bishop and C. Robinson *Business Growth and Innovation; The Wider Impact of Rapidly Growing Firms in UK City-Regions* (London: NESTA, 2009). [[http://www.niesr.ac.uk/pdf/190509\\_94959.pdf](http://www.niesr.ac.uk/pdf/190509_94959.pdf)]; J. Du, Y. Gong and Y. Temouri, *High Growth Firms and Productivity: Evidence from the UK* (London, NESTA, 2013). [[http://www.nesta.org.uk/publications/working\\_papers/assets/features/high\\_growth\\_firms\\_and\\_productivity](http://www.nesta.org.uk/publications/working_papers/assets/features/high_growth_firms_and_productivity)]; M. Feldman, J. Francis and J. Bercovitz, “Creating a Cluster While Building a Firm: Entrepreneurs and the Formation of Industrial Clusters”, *Regional Studies*, 39 (2005), 129-141; and R. Brown, “The determinants of high growth entrepreneurship in the Scottish food and drink cluster”, in G. Alsos, S. Carter, E. Ljunggren, & F. Welter (Eds.), *The handbook of research on entrepreneurship in agriculture and rural development* (Cheltenham: Edward Elgar, 2011).

<sup>38</sup> A. Zacharakis, D. Shepard and J. Coombs, “The development of venture-capital-backed internet companies: An ecosystem perspective”, *Journal of Business Venturing*, 18 (2003), 217; G. Napier and C. Hansen, *Ecosystems for Young Scaleable Firms* (FORA Group, 2011); and B. Feld, *Startup Communities: building an entrepreneurial ecosystem in your city* (Hoboken, NJ: Wiley, 2012).

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performance within the local entrepreneurial environment.”<sup>39</sup> While Mason and Brown added that entrepreneurial ecosystems were geographically bounded, they noted that cities did not have to be a particular size to qualify and pointed to Austin, Texas and Boulder, Colorado in the US and Cambridge in England as examples of smaller cities that had been successful at developing what they referred to as “thriving entrepreneurial ecosystems”. Mason and Brown also explained that a system could emerge around one industry or evolve and expand to cover several industries.<sup>40</sup>

For researchers like Isenberg, an entrepreneurial ecosystem is a “strategy for economic development” that depends on several key factors or domains: a conducive culture, enabling policies and leadership, availability of appropriate finance, quality human capital, venture friendly markets for products, and a range of institutional supports.<sup>41</sup> For their part, Mason and Brown argued that the distinguishing features of entrepreneurial ecosystems include “a core of large established businesses, including some that have been entrepreneur-led (entrepreneurial blockbusters); entrepreneurial recycling—whereby successful cashed out entrepreneurs reinvest their time, money and expertise in supporting new entrepreneurial activity; and an information-rich environment in which this information is both accessible and shared”.<sup>42</sup> Mason and Brown also believed that in order for entrepreneurial ecosystems to thrive there must be a group of “dealmakers” who are involved in a fiduciary capacity in several entrepreneurial ventures, ready availability of start-up and growth capital, and a supportive community of large firms, universities and service providers.<sup>43</sup>

As for the specific steps that should be taken to launch and stimulate entrepreneurial ecosystems, Mason and Brown argued that policymakers would need to focus on several dimensions including direct support of entrepreneurial actors through accelerators and incubators; development of entrepreneurial organizations and resource providers such as business angels, venture capital, banks, service providers, universities; creation of connectors within the ecosystem through public-private partnerships and alliances and peer-to-peer learning; and development and nurturing of an entrepreneurial environment or culture within the ecosystem through entrepreneurship education, role models, peer-to-peer networking and entrepreneurial recycling.<sup>44</sup> Mason and Brown noted while there

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<sup>39</sup> C. Mason and R. Brown, “Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship” November 7, 2013, International Workshop on Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship Organized by OECD LEED Programme and Dutch Ministry of Economic Affairs Workshop; Background Paper (Final Version: January 2014), 5.

<sup>40</sup> *Id.* at 5-6.

<sup>41</sup> D. Isenberg, *The entrepreneurship ecosystem strategy as a new paradigm for economy policy: principles for cultivating entrepreneurship* (Babson Park, MA: Babson Entrepreneurship Ecosystem Project, Babson College, 2011), 4.

<sup>42</sup> C. Mason and R. Brown, “Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship” November 7, 2013, International Workshop on Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship Organized by OECD LEED Programme and Dutch Ministry of Economic Affairs Workshop; Background Paper (Final Version: January 2014), 1.

<sup>43</sup> *Id.*

<sup>44</sup> C. Mason and R. Brown, “Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship” November 7, 2013, International Workshop on Entrepreneurial Ecosystems and Growth Oriented

was a role for governments to play in developing entrepreneurial ecosystems, they should limit their involvement to facilitation and leave the details to the private sector, experienced local entrepreneurs and/or leading local companies. Key to success would be the ability to create a local culture that was favorable to startup activity and which promoted and accepted entrepreneurial risk-taking. Experienced entrepreneurs could do their part by training, coaching and mentoring their prospective peers and local companies could contribute by allowing and encouraging spinoff of promising ideas into new firms. In many cases it will be necessary to provide training to both local entrepreneurs and investors on the financing process until such time as the ecosystem has a community of experienced angel and venture capital investors.

### Research on Entrepreneurial Ecosystems and Growth-Oriented Entrepreneurship

An extensive collection of materials relating to entrepreneurial ecosystems and growth-oriented entrepreneurship were developed and made available for distribution as part of a workshop on the topic organized by the OECD LEED Programme and the Netherlands' Ministry of Economic Affairs. The workshop covered three important topics. First, presenters looked into how entrepreneurial ecosystems could be defined, how they work, whether they have primarily a national or local dimension, and what their main drivers of success or failures are. The second topic focused on the actors needed for an entrepreneurial ecosystem to be growth-oriented. Prominent and important actors include not only investors, established firms, serial entrepreneurs, knowledge institutions and service providers, but also "connectors" or "dealmakers" that serve as the glue keeping the entrepreneurial ecosystem together (e.g., science parks, industry associations, entrepreneurs' clubs and entrepreneur mentors). The third topic was the role of policy for growth-oriented entrepreneurship and the specific measures that can and should be taken by national and local governments. Important links to papers and other presentations from the workshop, can be found here: <http://www.oecd.org/cfe/leed/entrepreneurialecosystemsandgrowth-orientedentrepreneurshipworkshop-netherlands.htm>

## §11 --Entrepreneurial ecosystems in Europe

While the area surrounding Cambridge University in the UK has long been considered to be among the world's innovation clusters, policymakers throughout Europe have long been concerned about development of entrepreneurial ecosystems to keep pace with rivals in the US and Asia. Dearlove pointed out that Europe does not lack large and important technology companies such as Nokia and Ericsson in Scandinavia; however, these companies have long histories and did not have their roots in technology clusters as their competitors in Silicon Valley and Route 128 near Boston did. In reality, the clusters that have developed around Europe, including those in the UK, have generally not been able to incubate larger companies and many of the European startups have eventually sold their technology off into the hands of American multinationals that have established subsidiaries in or near the European clusters.<sup>45</sup> In general, small technology companies established in Europe have been unable to bridge the gap between development and

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Entrepreneurship Organized by OECD LEED Programme and Dutch Ministry of Economic Affairs Workshop; Summary Report.

<sup>45</sup> D. Dearlove, "The Cluster Effect: Can Europe Clone Silicon Valley?", *Strategy+Business*, July 1, 2001.

commercialization and have often surrendered much of their intellectual property rights to US entrepreneurs with more experience in bringing products to market.

Writing in the early 2000s, Dearlove reported that European technology companies were beginning to adopt alternative business models based on a growing realization that steps needed to be taken to proactively transform the basic building blocks developed during scientific research into commercial products.<sup>46</sup> These alternative models included not only the traditional research activities, but also technology consulting, incubation activities, and licenses of intellectual property to startup companies accompanied by investments to assist those licenses with the hard work of commercialization. As time went by Europe began to develop a new set of recognized technology clusters including the areas around Munich and Stuttgart in Germany; Sophia Antipolis in Southern France; Kista in Stockholm; around Dublin in Ireland; around Oulu in Finland; and in the Etna Valley in Sicily.<sup>47</sup>

According to Choi, it is possible to identify and distinguish two different types of high-tech clusters in Europe.<sup>48</sup> The first, which is best illustrated by Cambridge's Silicon Fen, is the "naturally occurring" cluster that emerges and grows around research universities. The second requires active governmental intervention to launch and accelerate the growth of a cluster and the governmental toolkit typically includes public subsidies of technology companies and the infrastructure in which they are born and grow, creative tax incentives and adoption of laws and regulations intended to ease the business formation process and enhance the ability of entrepreneurs to appropriate the potential profits from their innovations. Sophia Antipolis, which is a large science park located on the French Riviera between Nice and Cannes, and Dublin are both examples of policy-led clusters.

While policy-led clusters have achieved some modest success, in general they have fallen well short of initial expectations. According to Dearlove, Cohan described the view of critics of this approach as follows: "The basic problem with the cluster concept for policy-makers is that it implicitly assumes that regional economic strength can be mandated by government."<sup>49</sup> Cohan went on to argue: "The reality is that regional economic powerhouses became strong because entrepreneurs and research universities spawned new companies. Supporting industries, such as venture capital, law, accounting, and IPO underwriting, emerged to meet the needs of the entrepreneurs. The role of government in these geographic regions was primarily to stay out of the way of the entrepreneurs and to provide some incentives in the form of lower capital gains taxes. In regions where governments try to mandate entrepreneurial behavior they fail."<sup>50</sup>

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<sup>46</sup> Id.

<sup>47</sup> Id.

<sup>48</sup> Id.

<sup>49</sup> Id. (citing P. Cohan, *Net Profit* (1999)).

<sup>50</sup> D. Dearlove, "The Cluster Effect: Can Europe Clone Silicon Valley?", *Strategy+Business*, July 1, 2001 (citing P. Cohan, *Net Profit* (1999)). Dearlove also cited a February 2001 report by the Department of Trade and Industry that identified 154 regional business clusters then operating in the UK and concluded, following extensive analysis, that new clusters cannot be kick-started by public policy initiatives. Porter also discussed the role of government in clustering extensively in M. Porter, "Location, Competition, and

## §12 Surveying and measuring entrepreneurship and innovation

Suggesting and measuring factors generally associated with innovative capacity has become a popular pastime in academia and business publications. The Global Entrepreneurship Monitor (“GEM”) mentioned above was one of the first, and highly ambitious, efforts in this area and has been followed by a wide range of rankings and analyses of entrepreneurship, innovation and competitiveness.

## §13 --Global Entrepreneurship Monitor

As mentioned above, GEM is a partnership between the London Business School and Babson College that administers a comprehensive research program to produce annual assessments of national levels of entrepreneurial activity. The project was first launched in 1999, when it covered just ten countries, and has since grown to cover as many as 85 countries in subsequent years and is recognized as the largest ongoing study of entrepreneurial dynamics in the world. The main objectives of the GEM program are measurement of differences in the level of entrepreneurial activity between countries, uncovering the factors that lead to appropriate levels of entrepreneurship and making suggestions for policies that may lead to enhancement of national levels of entrepreneurial activity.

The GEM researchers measure “total early-stage entrepreneurial activity”, or “TEA”, for each country by identifying and combining entrepreneurs who are either engaged in nascent activities or acting as new business owners. In addition to a TEA rate for each country, the GEM researchers also score and rank countries with respect to established business ownership rate, discontinuation of businesses, necessity-driven entrepreneurship as a percentage of TEA and improvement-driven opportunity entrepreneurship as a percentage of TEA. Countries are grouped by their phase of economic development so that comparisons can be made among comparable countries and researchers can also track how entrepreneurial activities change as countries develop economically and socially. As noted above, the GEM researchers borrowed from Porter by suggesting that countries go through three stages of economic development: a factor-driven stage; an efficiency-driven stage; and, finally, an innovation-driven stage.<sup>51</sup> Acs and Szerb have provided the following brief descriptions of each of these stages:<sup>52</sup>

- The factor-driven stage is marked by high rates of agricultural self-employment and countries in this stage generally compete based on low-cost efficiencies in the production of commodities or low value-added products. Countries in this stage do not create knowledge that can be used for innovation nor do they use knowledge to

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Economic Development: Local Clusters in a Global Economy”, *Economic Development Quarterly*, 14(1) (2000), 16.

<sup>51</sup> M. Porter, *Global Competitiveness Report* (Geneva: World Economic Forum, 2002).

<sup>52</sup> Z. Acs and L. Szerb, “The Global Entrepreneurship and Development Index (GEDI)” (Paper presented at Summer Conference 2010 on “Opening Up Innovation: Strategy, Organization and Technology”, Imperial College London Business School, June 2010).

engage in exporting activities. In the 2011 GEM survey, for example, seven of the 54 countries fell into the factor-driven stage including Guatemala (with the highest TEA among the group) and Pakistan (with the lowest TEA among the group).<sup>53</sup>

- The efficiency-driven stage requires that countries engage in efficient productive practices in large markets so that firms are able to achieve and exploit economies of scale. Industries in this stage are generally manufacturing-based and focused on the production and distribution of basic goods and services. Self-employment tends to decline during this stage and capital, labor and technology begin to emerge as the key drivers of productivity. In the 2011 GEM survey, for example, 24 of the 54 countries fell into the efficiency-driven stage including China, Chile and Peru with the highest TEA rates among the group and Hungary, Malaysia and Russia with the lowest TEA rates among the group.<sup>54</sup>
- In the innovation-driven stage, the key input is “knowledge” and decisions about embarking on new projects are based on primarily on expected net returns and the likelihood that economic activities can generate high value added products and services. In the 2011 GEM survey, for example, 23 of the 54 countries fell into the efficiency-driven stage including Australia and the US with the highest TEA rates among the group and Denmark, Japan and Slovenia with the lowest TEA rates among the group.<sup>55</sup>

As discussed below, as countries transition between stages of development there will be changes in their entrepreneurship profile. Even among comparable countries, countries at the same stage of economic development, the rate and profile of entrepreneurship may vary significantly due to environmental constraints that are specific to a given country. For example, a country may have a high rate of start-up activity but fail to maintain that rate at the established business phase due to societal factors that make it difficult for nascent entrepreneurs to maintain their momentum and get their businesses to the point where they are sustainable. In addition, the GEM researchers have often cautioned that higher TEAs do not necessarily imply better economic conditions. For example, certain nations with higher levels of TEA, such as the United Arab Emirates, Iceland and Greece, experienced severe economic distress in the early 2010s and some innovation-driven economies, such as Japan, have historically had low levels of TEA.

For 2011 survey results obtained from interviewing over 140,000 adults in 54 countries led the GEM researchers to make the following estimates<sup>56</sup>:

- 388 million entrepreneurs were actively engaged in starting and running new businesses;

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<sup>53</sup> D. Kelley, S. Singer and M. Herrington, *Global Entrepreneurship Monitor: 2011 Global Report* (Babson Park, MA: Global Entrepreneurship Research Association, 2012), 10.

<sup>54</sup> *Id.* at 10-11.

<sup>55</sup> *Id.* at 11.

<sup>56</sup> *Id.* at 4.

- There were 163 million women early-stage entrepreneurs; however, in most of the surveyed countries the entrepreneurship rates for women were significantly lower than for men;
- There were 165 million young early-stage entrepreneurs (i.e., between the ages of 18 and 35) and, in general, early-stage entrepreneurs tended to be young to mid-career (i.e., from ages 25 to 44) and entrepreneurs tended to be younger in the efficiency-driven economies;
- 141 million of the early-stage entrepreneurs expected to create at least five new jobs in the next five years;
- 65 million of the early-stage entrepreneurs expected to create 20 or more new jobs in the next five years;
- 69 million of the early-stage entrepreneurs offered innovative products and services that are new to customers and have few other competitors; and
- 18 million of the early-stage entrepreneurs sell at least 25% of their products and services internationally.

The results reported by the GEM researchers reflect some of the nuances in their assessment of entrepreneurial activity. In particular, the researchers who prepared the results of the 2011 GEM survey noted the interest in identifying the “profile of entrepreneurs”, rather than just the number of entrepreneurs, and that the report focused on three profile factors: inclusiveness, including the availability of entrepreneurial activities to women and people of various ages; industry, realizing that the skills and other attributes of entrepreneurs will differ from industry-to-industry; and, finally, impact, which looks at the role of innovation in an entrepreneurial endeavor and the aspirations of the entrepreneur with respect to internationalization and growth.<sup>57</sup>

The 2011 GEM survey also generated data that allowed the researchers to reach various conclusions regarding entrepreneurial activities in the 54 countries that were part of the survey. Highlights included the following<sup>58</sup>:

- With regard to potential entrepreneurship, countries included among the factor-driven economies displayed higher average perceptions about entrepreneurial activities in their area than countries falling into the other two development levels and also displayed higher perceived capabilities to start a business than countries classified as efficiency- or innovation-driven economies. The researchers explained that these differences could be attributed to individuals having different ideas about what kind of businesses to establish based on their level of development and noted that consumer-oriented businesses were the most popular in factor-driven economies while innovation-driven economies had a higher proportion of business services enterprises than countries in the other two development levels.
- Potential entrepreneurship varied significantly among countries in the same level of economic development. For example, the researchers pointed out that while Bangladesh, a factor-driven economy, scored highly on perceived opportunities the

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<sup>57</sup> Id. at 6, 15-21.

<sup>58</sup> Id at 7-18.

pool of entrepreneurs in that country was reduced by a high lack of confidence in ability to start a business and a high fear of failure. On the other hand, another factor-driven economy, Venezuela, displayed only an average level of perceived opportunities but had strong positive opinions regarding ability to start a business and a low fear of failure.

- A number of European countries who had been pummeled by adverse economic conditions at the time of the survey had relatively low perceptions of opportunities and low rates of opportunities and capabilities were also found in some of the innovation-driven Asian economies such as Japan, Korea and Singapore. The score from the respondents from the US with respect to perceived opportunities fell near the average of the innovation-driven economies; however, they were generally quite confident of their abilities to start a new business and had a relatively low fear of failure.
- The researchers asked respondents whether they felt that entrepreneurship was a “good career choice” and found that the percentage of respondents answering affirmatively declined as economic development improved. This finding was supported by the fact that perceptions about the status of entrepreneurs were higher in the factor-driven economies than in the other two development levels.
- Entrepreneurial intentions, as measured by the percentages of individuals who had not yet started a business but had expressed an intention to start a business within the next three years, were highest in factor-driven economies. Entrepreneurial intentions declined as the level of development increased. There was evidence that entrepreneurial intentions were influenced by the types of economic activities typically carried out in a country with countries that placed a high emphasis on extractive resources (i.e., Russia and the United Arab Emirates) having relatively low entrepreneurial intention rates.
- From 2010 to 2011 there was a significant increase in TEA rates in many economies across all development levels, an interesting trend given the turbulent economic conditions that countries all over the world were experiencing during that time.
- Consumer-oriented business (e.g., retail enterprises) tended to dominate entrepreneurial activities at the factor-driven and efficiency-driven stages; however, business services, which rely and compete on knowledge and technology, were the most prominent among entrepreneurs in the innovation-driven economies.<sup>59</sup>
- Among factor-driven economies necessity- and improvement-driven opportunism as a percentage of total TEA is roughly the same; however, as the level of development increased the necessity-driven opportunism became less important as a motivator to start a new business and improvement-driven opportunism became more important as a motivator.<sup>60</sup>

<sup>59</sup> Id. at 18. In addition to consumer-oriented businesses and business services, the GEM survey also tracked extractive and transforming activities.

<sup>60</sup> The GEM defined “necessity-driven” entrepreneurs as those persons who start new businesses because they have no other work options and need a source of income while improvement-driven entrepreneurs are defined as those persons interested in pursuing an opportunity and who do so in order to improve their incomes and/or independence in their work. Id. at 13. For further discussion of necessity-driven entrepreneurship and other methods for classifying “types of entrepreneurship”, see “Definitions and Types

- Comparing TEA rates to the rate of established business ownership, the GEM researchers found that TEA rates were highest in the factor-driven economies and decreased as the level of development increased and necessity-driven entrepreneurship declined. There were significantly more early-stage entrepreneurs than established business owners in the factor-driven economies; however, on average, by the time a country reached the innovation-driven stage it could be expected that the TEA rate would drop slightly become the level of established business ownership.
- Business discontinuance declined as the level of economic development increased, a finding attributed, at least in part, to the higher proportion of entrepreneurs at the earlier development phases and the higher levels of risk that those entrepreneurs must overcome. Business closings among factor- and efficiency-driven economies were often blamed on a lack of profitability and sources of financing while business discontinuances in the innovation-driven economies were more likely due to retirement, sale or the desire to pursue another opportunity.

The GEM researchers also focused on three other important measures of entrepreneurship: entrepreneurs' expectations regarding growth in terms of number of persons that will be employed in five years, the degree of "innovation" involved in the entrepreneur's product or service and "internationalization" (i.e., the extent to which entrepreneurs sell to customers in foreign countries).<sup>61</sup> Innovation was measured by looking at the extent to which an entrepreneur's product or service was new to some or all customers of the entrepreneur and whether there were few or no other businesses offering the same product or service. Measured in this way innovation is context-dependent and determined by the entrepreneur's main customer market. Accordingly a product or service offered for the first time in one country would be deemed innovative with respect to that country even if the product or service is commonly sold by number of competitors in other countries. Internationalization was measured by looking at what percentage of the entrepreneurs in a given country had at least 25% of their customers in foreign countries.

The survey results included growth expectations for the 54 countries at three levels: 0-4 employees in five years (low growth expectations), 5-19 employees in five years (medium growth expectations) and 20 or more employees in five years (high growth expectations). While factor-driven economies had more entrepreneurs, most of them were in the low growth category. On the other hand, innovation-drive economies had a lower percentage of entrepreneurs but those entrepreneurs were much more likely to have high growth expectations. As for innovativeness, it is not surprising that the researchers found that it increased along with the level of economic development. Finally, internationalization, like innovation, was lowest in the factor-driven economies but rose as economic development improved. Internationalization appeared to be influenced by

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of Entrepreneurship" in "Entrepreneurship: A Library of Resources for Sustainable Entrepreneurs" prepared and distributed by the Sustainable Entrepreneurship Project ([www.seproject.org](http://www.seproject.org)).

<sup>61</sup> D. Kelley, S. Singer and M. Herrington, *Global Entrepreneurship Monitor: 2011 Global Report* (Babson Park, MA: Global Entrepreneurship Research Association, 2012), 18-21.

factors other than just economic development such as the size of the population and land mass in the “home country” and the size and diversity of the local market.

The GEM researchers suggest that the nature of entrepreneurship and its contribution to the national economy changes as economies development and development should be accompanied by changes in emphasis of governmental policies. For example, since economic development in factor-driven economies is largely driven by the “basic requirements” in the GEM conceptual model of the relationship between the institutional context and entrepreneurship, emphasis during that phase should be placed on development of institutions, infrastructure, macroeconomic stability and health and primary education. Once an economy transitions into the efficiency-driven phase, government policies should be focused “efficiency enhancers” including the proper (i.e., “efficient”) functioning of goods and labor markets, development of higher education systems, enhancement of technological readiness and increasing the scope and sophistication of financial markets. While these initiatives may not have an immediate direct impact on entrepreneurship they will provide the foundation for attracting and enabling higher levels of entrepreneurship in the future. Finally, economies in, or about to enter, the innovation-driven phase requires governmental attention to each of the various EFCs mentioned above in order to create jobs and spur technical innovation.

The highest ratings for EFCs in the 2011 GEM survey came from the experts in the innovation-driven economies, which confirmed the assumption that the basic requirements and efficiency enhancers included the GEM theoretical model are more developed in those economies and thus it is appropriate to focus on the EFCs. Three of the EFCs were also considered to be quite important by experts from the factor-driven economies: post-school entrepreneurship education; internal market dynamics; and cultural and social norms for entrepreneurship. Significant differences between innovation-driven economies and factor-driven economies were found with respect to the following EFCs: government programs, physical infrastructure, R&D transfer, finance and national policy.<sup>62</sup>

## **§14 --Global Entrepreneurship and Development Index**

As mentioned above, Acs and Szerb believed that the GEM project and its focus on the business formation process in a large number countries, while impressive and valuable, fell short due to its failure to incorporate the different impacts of new businesses and its ranking of countries based primarily on the number of new businesses without regard to their success from a financial perspective or in terms of job creation, improving the local knowledge base and increasing the level of development and innovation.<sup>63</sup> Acs and Szerb, like others<sup>64</sup>, observed that an understanding of entrepreneurship requires going

<sup>62</sup> Id. at 22-23.

<sup>63</sup> Z. Acs and L. Szerb, “The Global Entrepreneurship and Development Index (GEDI)” (Paper presented at Summer Conference 2010 on “Opening Up Innovation: Strategy, Organization and Technology”, Imperial College London Business School, June 2010).

<sup>64</sup> See, e.g., L. Busenitz and J. Spencer, “Country Institutional Profiles: Unlocking Entrepreneurial phenomena”, *Academy of Management Journal*, 43(5) (2000), 994-1003.

beyond the traits and characteristics of the individual entrepreneur to also consider institutional variables and they noted that “[t]he dynamics of the [entrepreneurial] process can be vastly different depending on the institutional context and level of development within an economy”.<sup>65</sup> They explained that entrepreneurship occurs within an environment that is influenced by economic development and that development directly impacts and strengthens institutions that eventually affect characteristics that are considered to be vitally important to the phenomenon of entrepreneurship such as quality of governance, access to capital and other resources, the perceptions of entrepreneurs and incentive structures for prospective entrepreneurs. Researchers have found evidence that the strengthening of institutions causes more entrepreneurial activity to be shifted toward “productive entrepreneurship” which, in turn, strengthens economic development.<sup>66</sup> Entrepreneurial activity reaches its highest level of intensity as countries go through the innovation-driven stage and eventually levels off as institutions are fully developed and the country has achieved a high level of innovation.<sup>67</sup>

Acs and Szerb reported the rankings of the 71 countries in their survey and noted that their findings were significantly and highly correlated with other well-known measurement tools such as the Global Entrepreneurship Index, Index of Economic Freedom and Global Competitiveness Index. When reporting the rankings Acs and Szerb placed the countries into their appropriate stage of development using the aforementioned categories developed by Porter (i.e., factor-driven, efficiency-driven and innovation-driven).<sup>68</sup> Acs and Szerb pointed out the following notable findings from the 2010 rankings:

- Nordic and Anglo-Saxon countries in the innovation driven stage of development were in the front ranks. Denmark and Sweden led the GEDINDEX, Iceland and Norway joined them in the top ten and Finland was 13<sup>th</sup> overall. The US and Canada were third and fourth and Australia, Ireland and Switzerland also did well although they were weak in at least one of the sub-indexes.
- The most populous EU countries were in the middle part of the rankings, with the United Kingdom at 14<sup>th</sup>, Germany at 16<sup>th</sup>, France at 18<sup>th</sup>, Italy at 27<sup>th</sup> and Spain at 28<sup>th</sup>. Acs and Szerb suggested that there was a relationship between low levels of entrepreneurship in those countries and their relatively weak economic performance over the decade leading up to the rankings.
- The bottom of the rankings hosted a number of low GDP-level factor-driven countries such as Jamaica, Bosnia-Herzegovina, Venezuela, Brazil, Philippines, Iran, Bolivia, Ecuador and Uganda.

<sup>65</sup> Z. Acs and L. Szerb, “The Global Entrepreneurship and Development Index (GEDI)” (Paper presented at Summer Conference 2010 on “Opening Up Innovation: Strategy, Organization and Technology”, Imperial College London Business School, June 2010).

<sup>66</sup> D. Acemoglu and S. Johnson, “Unbundling institutions”, *Journal of Political Economy*, 113(5) (2005), 949-995.

<sup>67</sup> F. Fukuyama, “The End of History?”, *The National Interest*, 16 (1989), 3-18.

<sup>68</sup> Further discussion of the views of Acs and Szerb on the contributions of entrepreneurship to development and relative importance of institutional factors in promoting entrepreneurship at different stages of economic development is included elsewhere in this Part.

Entrepreneurial performance of the innovation driven countries was significantly different from the efficiency-driven countries, with the largest differences observed with respect to indicators of new products, “non-fear of failure”, internationalization and risk capital. Factor-driven and efficiency-driven countries were more similar regarding entrepreneurship indicators, but notable differences could be identified with respect to attitudinal indicators of “non-fear of failure” and “cultural support”.

Acs and Szerb also used “cluster analysis” to divide the surveyed countries into five country groups that possessed similar entrepreneurial features. The first group included most of the factor-driven economies in the survey with low scores on measures of international connections and development of human resources. A number of the efficiency-driven economies were in the next cluster and Acs and Szerb noted that these economies were involved in trying to increase entrepreneurship from what was currently a relatively low level of development. The remaining three clusters were home to most of the innovation-driven economies and broke down into innovation leaders, such as the US and the Scandinavian countries who topped the list for several reasons including the availability of formal and informal venture finance and excellence in technology application and adaptation; innovation followers that generally took a “follower” approach in identifying and pursuing innovation strategies first launched within the “leader” group; and innovation challengers who possessed some relative advantages that would allow them to compete with the leaders in certain instances. The most significant differences among the three “innovation” clusters could be found in the area of “entrepreneurial attitudes”, which included opportunity perception, startup skills, “non-fear of failure”, networking and cultural support.

In general, the innovation leaders were the same countries who led the GEDINDEX rankings; Latin American countries appeared in the factor-driven cluster; and most of the Eastern European and Balkan countries and five out of six of the African countries appeared in the efficiency transformers cluster. An interesting, although not totally surprising, finding was the tremendous diversity among the Asian countries with respect to entrepreneurship. Acs and Szerb observed that the poorer Asian countries fell into the resource- or factor-driven clusters while highly populated Asian countries such as China, India and Indonesia could be found in the efficiency-driven cluster. Among the richer Asian countries, Hong Kong was an innovation challenger and Japan, Korea and Singapore were innovation followers. None of the Asian countries appeared in the innovation leader cluster. Acs and Szerb concluded that the cluster analysis provided further confirmation of a strong and positive relationship between economic development and entrepreneurship.

In 2010 the five highest ranking countries on the entrepreneurial attitude sub-index, or “ATT”, were, in order, New Zealand, Australia, Canada, Sweden and Denmark. The US was 6<sup>th</sup>. The five lowest ranking countries were Guatemala, Indonesia, Russia, Syria and Uganda. The five highest ranking countries on the entrepreneurial activity sub-index, or “ACT”, were, in order, Denmark, Canada, Puerto Rico, Ireland and Norway. The US was 8<sup>th</sup>. The five lowest ranking countries were Bosnia and Herzegovina, Morocco, the

Philippines, Serbia and Uganda. The five highest ranking countries on the entrepreneurial aspiration sub-index, or “ASP”, were, in order, the US, Iceland, Singapore, Israel and Sweden. The five lowest ranking countries were Bolivia, Guatemala, Iran, Kazakhstan and the Philippines. Sub-index scores of a few of the other major global economic players were as follows: China—54<sup>th</sup> on ATT, 53<sup>rd</sup> on ACT, 26<sup>th</sup> on ASP and 40<sup>th</sup> overall on GEDI; Japan—47<sup>th</sup> on ATT, 23<sup>rd</sup> on ACT, 22<sup>nd</sup> on ASP and 29<sup>th</sup> overall on GEDI; and India—62<sup>nd</sup> on ATT, 51<sup>st</sup> on ACT, 40<sup>th</sup> on ASP and 53<sup>rd</sup> overall on GEDI. Not surprisingly, there were several instances of significant deviations, upward and downward, on one of the sub-indexes in relation to the other sub-indexes and overall GEDI. For example, Germany placed 7<sup>th</sup> on ASP but its ranking of 24<sup>th</sup> on ATT drove its overall GEDI placement down to 16<sup>th</sup>. Israel, not surprisingly, was 4<sup>th</sup> in ASP but its placement as 38<sup>th</sup> and 21<sup>st</sup> in ATT and ACT, respectively, led to an overall GEDI for this famously entrepreneurial society of 21<sup>st</sup>.

### §15 --Bloomberg Innovation Quotient

One of the most well-known efforts has been Bloomberg’s annual rankings of innovation among countries based on the compilation of a Global Innovation Index that featured a Bloomberg Innovation Quotient (“BIQ”) for each of the ranked countries that incorporated the seven factors which are described below, along with their relative weighting as a percentage<sup>69</sup>:

- “R&D Intensity” was measured by R&D as a percentage of GDP (20%)
- “Manufacturing Capability” was measured by looking at manufacturing valued-added as a percentage of GDP and products with high R&D intensity (aerospace, computers, pharmaceuticals, scientific instruments and electrical machinery) as a percentage of total manufactured exports (20%)
- “Productivity” was measured by looking at GDP per employed person (total annual hours worked) (10%)
- “High-tech Density” was measured by looking at the number of high-tech public companies (e.g., aerospace and defense, biotechnology, hardware, software, semiconductors, Internet software and services and renewable energy companies) as a percentage of all publicly listed companies (10%)
- “Tertiary Efficiency” was measured by looking at enrollment and graduation ratios in all subjects for post-secondary students; tertiary graduation ratio of students who majored in science, engineering, manufacturing and construction; and annual new graduates as a percentage of the total workforce (population aged 15-64) (10%)
- “Researcher Concentration” was measured by looking at R&D researchers per one million people (20%)
- “Patent Activity” was measured by looking at patents granted as a percentage of applications submitted and application granted worldwide; and resident filings per \$1 million of R&D spent (10%)

<sup>69</sup> Bloomberg Rankings: Global Innovation Index (as of April 20, 2012) (Sources included Bloomberg, World Bank, World Intellectual Property Organization, The Conference Board, OECD and UNESCO).

In general the data used was collected over a ten year period prior to compilation of the scores and rankings and countries had to be ranked for at least five of the ten years to qualify, which meant for example that the final universe for the 2012 rankings was limited to 81 countries or sovereign regions and that certain countries discussed in detail in this Survey, such as India and Vietnam, were not eligible for inclusion.

The following table summarizes the rankings of various countries as of 2012 with respect to their overall BIQ and each of the seven factors described above (factors rankings for countries outside of the first ten have been limited to factors as to which a country ranked particularly high or low in relation to the other countries):

COUNTRY	BIQ	R&D	MAN	PROD	TECH	TE	RC	PAT
Finland	1	3	10	15	7	2	1	21
Singapore	2	12	4	6	9	n/a	5	45
Korea	3	7	5	30	5	1	20	5
Japan	4	4	17	25	11	19	3	6
Sweden	5	2	20	14	2	11	4	18
Germany	6	9	12	16	3	50	15	12
US	7	6	39	3	1	25	6	13
Switzerland	8	5	15	20	14	28	12	31
France	9	11	57	8	8	9	17	14
Austria	10	13	18	9	13	39	18	23
Denmark	14						7	
UK	15			10		10		
Norway	21		62	2			8	
Russia	22		45	47		3		1
Israel	29	1	78		4			50
China	32		3	70		68		
S Africa	33			50				3
Mexico	46	53				61	50	64
Brazil	57							
Egypt	61							

The following table presents the countries with the highest scores on each of the factors included in the BIQ as of 2012:

	R&D Intensity	Manufacturing Capability	Productivity	Hi-Tech Density	Researcher Concentration	Tertiary Efficiency	Patent Activity
1	Israel	Thailand	Luxembourg	US	Finland	Korea	Russia
2	Sweden	Malaysia	Norway	Sweden	Iceland	Finland	Ukraine
3	Finland	China	US	Germany	Japan	Russia	South Africa
4	Japan	Singapore	Ireland	Israel	Sweden	Australia	Belarus
5	Switzerland	Korea	Belgium	Korea	Singapore	Ukraine	Korea
6	US	Philippines	Singapore	Netherlands	US	Ireland	Japan
7	Korea	Indonesia	Australia	Finland	Denmark	Belarus	Romania
8	Iceland	Hungary	France	France	Norway	New Zealand	Italy
9	Germany	Czech Rep	Austria	Singapore	Australia	France	Moldova

10	Denmark	Finland	UK	Hong Kong	Luxembourg	UK	Armenia
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One of the anticipated purposes of rankings such as those popularized by Bloomberg is that policymakers will use the information to prioritize steps that should be taken to improve the capacity for innovation in their countries and that changes should be expected as time goes by and countries implement their innovation strategies. In fact, Bloomberg's own rankings for 2014 reflected the following changes from 2012 in the rankings determined by the BIQ<sup>70</sup>:

COUNTRY	2012	2014
Finland	1	4
Singapore	2	8
Korea	3	1
Japan	4	2
Sweden	5	7
Germany	6	3
US	7	6
Switzerland	8	16
France	9	9
Austria	10	17
Denmark	14	11
UK	15	10
Norway	21	15
Russia	22	14
Israel	29	5
China	32	22
S Africa	33	49
Mexico	46	>50
Brazil	57	47
Egypt	61	>50

Care must be taken to not place too much emphasis on rankings and year-to-year movements. For example, although Switzerland's overall ranking declined from 2012 to 2014, it enjoyed substantial gains in "Manufacturing Capability", jumping from 15<sup>th</sup> in 2012 to 1<sup>st</sup> in 2014. Finland, Russia and Korea topped the 2014 factor rankings for "R&D Intensity", "Tertiary Efficiency" and "Patent Activity", respectively; however, Bloomberg pointed out that although Russia has traditionally been "well educated" in science, math and engineering, this has not necessarily turned the country into a global innovation powerhouse. Bloomberg also highlighted how countries such as Singapore and Korea had relied heavily on government-supported basic R&D to enhance their positions in the global innovation rankings.

## §16 --MIT Technology Review

In 2013 the MIT Technology Review defined "innovation clusters" as "places with dense webs of interconnected technology companies, customers and suppliers" and identified the five largest regional technology clusters as Silicon Valley, Boston, Israel, Bangalore

<sup>70</sup> Bloomberg Business Week, "What's in the Innovation Sandwich?", January 19-25, 2015.

and Beijing. The Review also noted the creation and development of Tech City in London, Saclay in Paris and Skolkovo Innovation City in Russia as interesting government-supported efforts to fuel innovations in those countries.

### **§17 --Venture Source**

Commentators often use venture capital activity as an indicator of a functioning entrepreneurial ecosystem. Data compiled by Dow Jones Venture Source in 2013 ranked the top venture capital funding “hotbeds” as follows (number in parentheses is amount of venture capital funding received by firms in country/region in 2012 express in billions of US dollars): San Francisco Bay Area, including Silicon Valley (11.2); New England, including Boston (3.6); Southern California (3.0); New York City Metro Area (2.4); UK (1.8); Beijing (1.5); Germany (1.0); Israel (1.0); France (0.9); Canada (0.8); Shanghai (0.6); Potomac Area, including Washington DC (0.6); Illinois (0.6), Bangalore (0.3); and Switzerland (0.3). It was notable that the top five hotbeds, the first four of which were in the US, brought in \$22 billion, representing 53% of the global total for that year.

### **§18 --Global Innovation and Competitiveness Indexes**

The top ten countries in The Global Innovation Index for 2012-2103 were as follows: Switzerland; Sweden; Singapore; Finland; United Kingdom; Netherlands; Denmark; Hong Kong; Ireland and the United States. This list overlapped substantially with the following ten leaders in the World Economic Forum’s Global Competitiveness Index for the same period: Switzerland, Finland, Sweden, Netherlands, Germany, United Kingdom, United States, Singapore, Hong Kong and Japan.

Innovation is also factored into other international comparisons. For example, in 2014 the top countries with respect to “innovation” in the World Economic Forum’s annual Global Competitiveness Index were, in order, Finland, Switzerland, Israel, Japan, US, Germany, Sweden, the Netherlands, Singapore and Taiwan.<sup>71</sup> In contrast to the quantitative factors relied on in the Bloomberg measures, WEF rankings are compiled based on qualitative assessments grounded in responses to questionnaire circulated to 15,000 executives worldwide that seek views on issues such as innovation and labor market efficiency, sophistication of business sector, collaboration between academic and business sectors, company spending on research and development, intellectual property protection, effectiveness and transparency of public institutions, governance, infrastructure, functionality of goods markets, developed financial markets and macroeconomic environment.<sup>72</sup>

### **§19 --World Startup Report**

*The Economist* published a Special Report on Tech Startups in January 2014 that covered a number of topics relevant to the development of productive entrepreneurial ecosystems

<sup>71</sup> Id.

<sup>72</sup> Detailed profiles of all 144 economies included in the Global Competitiveness Index are available at the World Economic Forum’s website.

around the world including new strategies for testing a new business concept and launching new ventures, venture capital, “accelerators”, business communities, founders and hardware startups. The Report included a summary of data compiled by researchers working on a World Startup Report on the number of Internet firms in various countries around the world, including the number of firms valued at over \$1 billion. The top ten countries on the list as of 2013, in order, included the following (number of firms valued at over \$1 billion appears in parentheses): United States (87); China (26); Japan (11); UK (10); Korea (7); Israel (6); Russia (5); Australia (5); Brazil (4); and India (4).<sup>73</sup>

## §20 --European investment hubs

A good of work has also been done on analyzing strengths and weaknesses of entrepreneurial ecosystems in various regions around the world. For example, the European Private Equity and Venture Capital Association published a report in 2013 on “The Case for Investing in European Venture Capital” that identified the following “Major European Investment Hubs”: Barcelona, Belgium, Berlin, Denmark, Eindhoven, Helsinki, Ireland, London, Paris, Rhein-Main-Neckar, Silicon Fen, Stockholm and Switzerland. According to the report, these cities, countries and regions were attracting talent through collaboration among local entrepreneurs, funders, universities and larger established technology companies.

## §21 --Global Cities Report

Another interesting lens for viewing innovation around the world has been provided by the A.T. Kearney Global Cities report, which was launched in 2008 and most recently updated in 2015.<sup>74</sup> The 2015 edition of Global Cities included two parts—The Global Cities Index (“GCI”) and the Global Cities Outlook (“GCO”). The GCI assessed “global engagement” for 125 cities around the world and relied on 26 metrics in five dimensions: business activity, human capital, information exchange, cultural experience and political engagement. The GCO, which appeared for the first time in 2015, evaluated the future potential of those same cities based on rates of change across four dimensions: personal well-being, economics, innovation and governance.

The announcement of Global Cities 2015 reflected an emphasis on the GCO—the top five cities on that measure were, in order, San Francisco, London, Boston, New York and Zurich—and highlighted the identification of 16 cities that were ranked in the top 25 of both the GCI and GCO, thus reflecting both strong current performance with respect to innovation and significant future potential. Members of this so-called “Global Elite” included New York, London, Los Angeles, Chicago, Toronto, San Francisco, Boston, Paris, Brussels, Berlin, Amsterdam, Tokyo, Singapore, Seoul, Sydney and Melbourne.

<sup>73</sup> Business communities: All together now, *The Economist* (January 18, 2014), A Cambrian Moment: Special Report on Tech Startups 11. World Startup Report rankings in 2014 indicated that 30 countries have at least one Internet company who value has at one time exceeded \$1 billion. Startup Nations, *The Economist* (July 12, 2014) 60.

<sup>74</sup> For more information on the Global Cities 2015, go to <https://www.atkearney.com/research-studies/global-cities-index>.

While most of the cities in the Global Elite were in developed countries, the A.T. Kearney consultants who authored the study noted that cities in China and India, especially Beijing, Ahmedabad and New Delhi, were well positioned for the future. Other cities in the developing world showing rapid improvements included Kolkata and Mumbai in India, Ho Chi Minh City in Vietnam, Buenos Aires in Argentina and Dubai. A commonly mentioned factor for advances among developing countries was improvements in human capital grounded in expansion of the number inhabitants with tertiary degrees and better scores of their universities.

## §22 --Index of the world's most dynamic cities

JLL, a professional services company that specializes in real estate and investment management and which changed its name from Jones Lang LaSalle in 2014, issues an annual City Momentum Index (“CMI”) which lists “the world’s most dynamic cities”.<sup>75</sup> JLL explained that the CMI tracks the speed of change of economic conditions and commercial real estate markets in 134 established and emerging business hubs around the world, identifying those cities that have the most dynamic attributes over the short and long term. The CMI is based on 42 measures of dynamism, which are grouped into three main sub-indices:

- Socio-economic momentum, which is based on changes in city GDP, population, air passengers, corporate headquarters and foreign direct investment
- Commercial real estate momentum, which is based on changes in absorption, construction, rents, investment volumes and real estate transparency covering the office, retail and hotel sectors
- High-value incubators, which measure the ability of the underlying attributes of a city to maintain momentum over the longer term in terms of education, innovation and environment (referred to by JLL as a city’s “future-proofing capacity”)

Cities that do well in the CMI are those that have the ability to embrace technological change, absorb rapid population growth and strengthen global connectivity. The top ten cities in the 2017 CMI, in order, were: Bangalore, Ho Chi Minh City, Silicon Valley, Shanghai, Hyderabad, London, Austin, Hanoi, Boston and Nairobi. High points of the survey results called out by JLL included the following:

- India’s Ascendancy: Not only was Bangalore ranked Number One, but six Indian cities were included in the CMI Global Top 30 (more than any other country and replacing China as the leader).
- The Ubiquity of Technology: Technology and innovation were the strengths of many of the top cities in the CMI, including several medium-sized cities in the US that made the CMI Global Top 30: Austin, Boston, Seattle, San Francisco and Raleigh-Durham.

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<sup>75</sup> The discussion in this section is adapted from JLL’s publication “What cities are changing fastest?: City Momentum Index 2017”, available for download at <http://www.jll.com/cities-research/City-Momentum>.

- **The Rise of Agile Emerging World Cities:** JLL called out several cities in the CMI Global Top 30 as examples of cities that have been successfully transitioning to higher-value activities: Shanghai, Shenzhen, Dubai, Bangalore and Hyderabad.
- **Asian Hotspots and Dynamic City Clusters:** Ho Chi Minh City and Hanoi, the two Vietnamese representatives in the top ten, were enjoying substantial interest from foreign investors, and clusters of dynamic cities were evolving in China (Shanghai, Hangzhou and Nanjing) as inter-regional connectivity in that country improved.
- **Future-Proofing of Northern European Cities:** While European cities were largely absent from the Global Top 30, several of them (e.g., Stockholm, Berlin, Munich and Amsterdam) demonstrated attributes to support longer-term momentum including specialized knowledge industries, strong educational institutions and supportive living conditions.
- **Challenges and Constraints:** Poor environmental scores dampened the overall performance of some of the CMI Global Top 30 cities (e.g., Delhi and Beijing) and San Francisco and Hong Kong were each challenged and constrained by affordability and space constraints.

### **§23 --Emerging markets**

As for emerging markets, private equity investors have been noticeably active in Brazil, China, India, Korea, Mexico, Russia, South Africa, Turkey and Vietnam, and researchers from the Wharton School reported an increasing interests in several other non-BRIC countries including Columbia, Chile and Peru in Latin America, Kenya and Nigeria in Africa, and Indonesia and Thailand in Asia.<sup>76</sup>

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<sup>76</sup> S. Sammut, Private Equity in Emerging Markets: Beyond the BRICs, Beacon: Wharton Entrepreneurship Blog (July 3, 2013).

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### About the Author

Dr. Alan S. Gutterman is the Founding Director of the Sustainable Entrepreneurship Project ([www.seproject.org](http://www.seproject.org)). In addition, Alan's prolific output of practical guidance and tools for legal and financial professionals, managers, entrepreneurs and investors has made him one of the best-selling individual authors in the global legal publishing marketplace. His cornerstone work, *Business Transactions Solution*, is an online-only product available and featured on Thomson Reuters' Westlaw, the world's largest legal content platform, which includes almost 200 book-length modules covering the entire lifecycle of a business. Alan has also authored or edited over 40 books on sustainable entrepreneurship, management, business law and transactions, international law business and technology management for a number of publishers including Thomson Reuters, Kluwer, Aspatore, Oxford, Quorum, ABA Press, Aspen, Sweet & Maxwell, Euromoney, CCH and BNA. Alan has over three decades of experience as a partner and senior counsel with internationally recognized law firms counseling small and large business enterprises in the areas of general corporate and securities matters, venture capital, mergers and acquisitions, international law and transactions, strategic business alliances, technology transfers and intellectual property, and has also held senior management positions with several technology-based businesses including service as the chief legal officer of a leading international distributor of IT products headquartered in Silicon Valley and as the chief operating officer of an emerging broadband media company. He has been an adjunct faculty member at several colleges and universities, including Boalt Hall, Golden Gate University, Hastings College of Law, Santa Clara University and the University of San Francisco, teaching classes on a diverse range of topics including corporate finance, venture capital, corporate law, Japanese business law and law and economic development. He received his A.B., M.B.A., and J.D. from the University of California at Berkeley, a D.B.A. from Golden Gate University, and a Ph. D. from the University of Cambridge. For more information about Alan, his publications or the Sustainable Entrepreneurship Project, please contact him directly at [alanguutterman@gmail.com](mailto:alanguutterman@gmail.com), and follow him on LinkedIn (<https://www.linkedin.com/in/alanguutterman/>).

### About the Project

The Sustainable Entrepreneurship Project ([www.seproject.org](http://www.seproject.org)) engages in and promotes research, education and training activities relating to entrepreneurial ventures launched with the aspiration to create sustainable enterprises that achieve significant growth in scale and value creation through the development of innovative products or services which form the basis for a successful international business. In furtherance of its mission the Project is involved in the preparation and distribution of Libraries of Resources for Sustainable Entrepreneurs covering Entrepreneurship, Leadership, Management, Organizational Design, Organizational Culture, Strategic Planning, Governance, Corporate Social Responsibility, Compliance and Risk Management, Finance, Human Resources, Product Development and Commercialization, Technology Management, Globalization, and Managing Growth and Change. Each of the Libraries include various Project publications such as handbooks, guides, briefings, articles, checklists, forms, forms, videos and audio works and other resources; management tools such as checklists and questionnaires, forms and training materials; books; chapters or articles in books; articles in journals, newspapers and magazines; theses and dissertations; papers; government and other public domain publications; online articles and databases; blogs; websites; and webinars and podcasts.

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