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Infrastructure for Entrepreneurship

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Summary and Keywords

Entrepreneurship is a critical driver of economic health, industrial rejuvenation, social change, and technological progress. In an attempt to determine how to best support such an important component of society, researchers and practitioners alike continue to ask why some countries, regions, and cities have more entrepreneurship than others. Unfortunately, the answer is not clear. This question is addressed by focusing on location-based support or infrastructure for entrepreneurship. A framework based on a social systems perspective guides this examination by concentrating on three main categories of infrastructure: resource endowments, institutional arrangements, and proprietary functions. Work from the knowledge-based perspective of entrepreneurship, systems of innovation, entrepreneurial ecosystems, and resource dependence literatures is integrated into this framework.

Keywords: entrepreneurship, infrastructure, new firms, nascent ventures, government

Introduction

Entrepreneurship changes the world. Over four million new companies are started each year around the globe that provide jobs, drive innovation and, in turn, create other firms.[1] At the industry level, new firms disrupt markets through the process of “creative destruction,” when existing firms are displaced and new industries emerge (Schumpeter, 1942). Entrepreneurial ventures also disrupt markets with new products, services, or even process innovations. In turn, governments benefit from the resulting tax revenue generated from product and service sales, corporate revenue, and job income, all of which support spending across the economy. Entrepreneurship is not only good for the economic bottom line, but also social change. Increasingly, entrepreneurs are tackling substantial social problems such as poverty, education, the environment and human

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rights. Thus, the success of nascent firms is important for economic health, innovation, and social wealth, all of which influence the competitiveness of countries, regions, and cities.

However, nascent firms struggle to survive since they are plagued with the “liability of newness,” which includes the difficulty of defining new roles, relationships, structure, and rewards or sanctions; the low degree of initiative and loyalty among workers; and the lack of loyalty among customers (Stinchcombe, 1965). These liabilities weaken a firm’s ability to obtain resources, gain legitimacy, and survive (Singh, Tucker, & House, 1986; Stinchcombe, 1965). Indeed, only half of the firms started five years ago are alive today (Small Business Administration, 2014).

Given the importance of entrepreneurship, the topic of support mechanisms or infrastructure for entrepreneurship is of great interest to public and private organizations alike. Many structures and mechanisms have been attempted across several levels of analysis including nations, regions, cities, and even universities. Policy and economic work has examined infrastructure as it is related to economic activity more broadly, with less focus on entrepreneurship. Management and strategy literature is increasingly looking at the influence of context on entrepreneurship (e.g., Audretsch, Heger, & Veith, 2015; Dean, Shook, & Payne, 2007; Woolley, 2014). However, the field remains fragmented. By bringing these literatures together, we can gain insight into one of the most important drivers of economic health.

This article analyzes the latest research on entrepreneurship and infrastructure, both in terms of support for the creation of new ventures and support for entrepreneurial success more broadly. Using a social systems perspective as a foundation, the article starts by describing the three main categories of infrastructure for entrepreneurship: resource endowments, institutional arrangements, and proprietary function support. Work from the knowledge-based perspective of entrepreneurship, entrepreneurial ecosystems, systems of innovation, and resource dependence literatures is integrated into this framework. The article then discusses unanswered questions that provide opportunities for future research that are important for both policy and theory.

Entrepreneurship and Infrastructure

Entrepreneurship is the seizure and enactment of “opportunities to bring into existence “future” goods and services” (Venkataraman, 1997, p. 120). Entrepreneurial activity is generally considered the creation and entry into new markets and includes the formation of new ventures, corporate venturing, and informal market participation (see Autio & Fu, 2015; Holmes et al., 2016). New organizations rely on external resources to overcome the liability of newness and survive their perilous first years (Stinchcombe, 1965). Infrastructure is made up of the physical, institutional, organizational structures that support economic activity, such as entrepreneurship. Thus, infrastructure for

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entrepreneurial activity exists outside the focal firm and supports the opportunity itself, people seizing and enacting an opportunity, the means to enact the opportunity, and a conducive environment. Some components of infrastructure, such as roads, energy, and health systems are necessary for most economic activity, while other components are particularly important for entrepreneurship (Venkataraman, 2004). This article focuses on infrastructure components beyond those basic requirements for economic activities that set a location apart from others in its ability to support entrepreneurship.

The social systems perspective argues that three functions of social systems provide infrastructure vital to industry emergence: technical instrumental functions, resource procurement functions, and institutional legitimation and governance (Van de Ven & Garud, 1989). This framework applied specifically to entrepreneurship can be reconceptualized and focused into the categories of infrastructure as the following: resource endowments, institutional arrangements, and proprietary function support (Van de Ven, 1993). Alternatively, Gnyawali and Fogel (1994) grouped the environmental conditions related to supporting entrepreneurship into five categories: government policies and procedures, socioeconomic conditions, entrepreneurial and business skills, financial support to businesses, and non-financial support to businesses. There is much overlap in these categorizations; however, Van de Ven's framework includes additional insight into knowledge recombination, opportunity creation, and recognition. Thus, this article uses Van de Ven's framework to organize work from the knowledge-based perspective of entrepreneurship, social systems perspective, entrepreneurial ecosystems, systems of innovation, and resource dependence literatures.

Resource Endowments

Organizational activities are predicated on the organization's ability to obtain resources from the environment in which it is embedded (Pfeffer & Salancik, 1974; Stinchcombe, 1965). Resource endowments are the "basic resources necessary to support proprietary instrumental activities" such as the creation and identification of opportunities (Van de Ven & Garud, 1989, p. 207). Knowledge, novel ideas and technology are the cornerstones of opportunities (Venkataraman, 2004). Thus, resource endowments particularly relevant to entrepreneurship include these: (1) basic scientific and technological knowledge, (2) a pool of competent labor, and (3) financing mechanisms (Van de Ven & Garud, 1989, p. 207). Basic scientific and technical knowledge provides the informational foundation that leads to opportunities and entrepreneurship (Agarwal, Audretsch, & Sarkar, 2007, 2010). The knowledge spillover perspective argues that locations with more knowledge have more entrepreneurial opportunities (Acs, Braunerhjelm, Audretsch, & Carlsson, 2009; Audretsch & Keilbach, 2007). Regions with more spillovers of knowledge, capital, and labor have been shown to foster the formation of new firms (Kirchhoff et al., 2007).

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Likewise, a training and available labor pool is necessary for entrepreneurial endeavors to develop.

Knowledge resource endowments are often linked to the R&D activities of universities and incumbent firms. These also provide the education and training to develop future employees. Likewise, universities and firms are two of the main sources of spin-off activity. However, governments are one of the largest financial supporters of knowledge development both in universities and nascent ventures. Each year, the U.S. government funds dozens of national R&D centers, systems analysis centers, and systems engineering centers (see Lerner, 1999). Together, universities, incumbent firm, and governments create the resource endowment component of entrepreneurial infrastructure.

University Resources for Basic Science and Technological Knowledge

Traditionally, universities are considered the one of the main sources of scientific and technical knowledge, while research and development in private firms is considered more applied than academic research. Resources at universities include training of scientists, students, laboratories, and internal structures dedicated to fostering the creation of cutting-edge technology and new knowledge. Entrepreneurship is fostered in such settings through the sharing of ideas, technologies, and opportunities. Thus, universities foster opportunity creation, recognition, and development. Universities also educate workers that help entrepreneurial ventures enact these opportunities. A competent labor pool is an essential resource for entrepreneurship since although knowledge provides a foundation, skilled workers develop that knowledge into commercial product and services (Penning, 1982; Van de Ven, 1993; Venkataraman, 2004). Programs to support the training and development of a skilled work force also support entrepreneurial ventures since new firms do not need to expend resources attracting and relocating such workers trained elsewhere (Pennings, 1982). Universities develop human capital that is essential for entrepreneurship (Qian, Acs, & Stough, 2013).

Private Support for Resource Endowments

Incumbent corporations are instrumental for advancing knowledge through internal R&D, developing the labor pool through training and on-the-job learning, and providing financing mechanisms. Firms also bring people together to share information and develop opportunities. For example, corporate spinoffs act as a mechanism where employees can develop ideas and transfer technology to a new firm to be explored outside of the confines of the existing organizational structure (Agarwal, Echambadi, Franco, & Sarkar, 2004).

Private market mechanisms such as angel investment and venture capital (VC) act as funding infrastructure. Angel investment is funding for a start-up firm in exchange for a share of equity ownership of the firm or convertible debt from single individuals or teams

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of individual investors with similar investment strategies who pool individual capital together. Angel investors can realize gains from the investment only when they are able to sell their share of the firm, such as when another company acquires the firm or the equity can be offered on a public stock exchange such as the New York Stock Exchange or NASDAQ after an initial public offering (IPO). Individual angel investors tend to contribute between $25,000 and $250,000 each either directly into a firm or to a team of similar angels. The average amount that a firm received from an angel investment deal was $342,000 in 2012 (Sohl, 2013). Angel investment varies greatly, but tends to total between $15 billion and $30 billion each year. In 2014, U.S. angel investment provided $24 billion in funding (Sohl, 2015). Importantly, angel investors tend to fund earlier-stage firms than venture capitalists (Elitzur & Gavious, 2003). While much attention has been given to the role of VC, it is clear that angel investment plays an important role in funding new ventures.

Venture capital or VC refers to funding that a company invests into a firm in exchange for partial equity ownership of the company. Similar to angel investment, VC is obtained from firms that pool resources of multiple investors. In contrast to angel investment, these investors can include individuals, firms, and large institutions such as pension funds. VC firms and investors also realize a return on investment when the ownership of the firm is sold such as in an acquisition or IPO. VC helps the formation and survival of new firms in several ways. First, although often not a formal program, venture capitalists not only provide funding for firm operations, growth, and R&D, but also often mentor the firm founders and executives through their own team of investors who have years of business knowledge and considerable social capital (Gerasymenko & Arthurs, 2014; MacMillan, Kulow, & Khoylian, 1989; Sapienza, 1992). Second, since venture capitalists carefully consider the firms in which they invest, VC funding provides a positive signal to external stakeholders such as potential employees, suppliers, and customers (Aldrich & Ruef, 2006; Davila, Foster, & Gupta, 2003), which is critical for nascent markets.

Venture capitalists focus on young firms with a high potential for growth in a relatively short time period, which often requires demonstrated technology and products. To balance the risk of the investment with the potential for growth, venture capitalists tend to fund firms that have a product or service that is commercially available. Early start-up firms that have a product in development but not yet commercialized are considered seed stage and are rarely funded with VC (Wright, Lockett, Clarysse, & Binks, 2006). Indeed, seed-stage firms tend to obtain less than 10% of all VC each year. Until the end of the millennium, the majority of VC investment went to expansion-stage firms. Since then, the proportion of VC to early-stage firms has grown. However, firms are more likely to obtain VC if they have a proof of concept and development; over 60% of annual VC goes to expansion and later development. The average size of VC funding deals in 2015 was $13 million (PricewaterhouseCoopers, 2016). The higher investment amount compels venture capitalists to be more involved in the development and operations of the company. It is common for VC investors to become active members of the board of directors and management to help contribute to the firm’s decision making. The amount of VC funding fluctuates greatly each year, with a similar pattern to angel investment. Before 2014, VC

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funding peaked at over $40 billion during the height of the Internet bubble in 2001, but dropped to $20 billion in 2003 and 2009, corresponding to the market crash and recession, respectively. However, in 2015, the U.S. VC market rebounded with venture capitalists investing in 4,380 deals totaling $58.8 billion, an increase of 20% over funding in 2014 (PricewaterhouseCoopers, 2016).

Government Support of Knowledge Creation and Diffusion

Science, technology, and innovation policy has long supported the development of knowledge in universities and entrepreneurial firms. These policies aim to strengthen both innovation and new entrepreneurial projects (Roig-Tierno, Alcazar, & Ribeiro-Navarrete, 2015). University and corporate research is in part shaped by the external funding sources such as government research funding (Etzkowitz, Webster, Gebhardt, Cantisano, & Branca, 2000). In addition to funding basic research, governments encourage universities to examine the economic potential of their intellectual property (Etzkowitz et al., 2000). As such, technology transfer offices are working with academic inventors to commercialize inventions (Friedman & Silberman, 2003). Government laboratories and research centers are also sources of scientific and technical knowledge, but have been largely neglected in the literature. The limited research that does exist shows that government labs and research centers generate technology and intellectual property (IP) that is used to establish new firms (Mowery & Ziedonis, 2001). In fact, Smith and Ho (2006) found more spinoffs from public labs than from universities in the Oxford area of the United Kingdom. Between 1997 and 2008, Los Alamos National Laboratory, a U.S. research center, created more than 50 spinoffs (Engardio, 2008).

Examples of government science, technology, and innovation funding programs for innovation exist throughout the world and include Innovate U.K. Smart Grants, Canada’s Mitacs-Accelerate, Australia’s Accelerating Commercialisation Grants, and Technopreneur Promotion Programme in India. Two of the largest programs created by the U.S. government to help nascent innovative ventures are the Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs. These programs provide financing that increases a firm’s ability to improve staff skills and conduct long-term research (Cooper, 2003). In addition to supporting R&D in small firms, these programs attempt to help firms cross the “valley of death” during which growth is stymied due to a lack of working capital. While both programs fund R&D, the SBIR program focuses on innovation in small businesses while the STTR program focuses on public/private collaborations, particularly between small businesses and nonprofit research institutions. Both programs are coordinated by the U.S. Small Business Administration. Through 2015, the SBIR and STTR programs have provided over $38 billion to small businesses (Small Business Administration, 2016).

Implemented in 1982 by the U.S. Small Business Innovation Development Act, the SBIR program seeks to promote high-technology innovation in small, often young businesses by funding R&D projects (Audretsch, Link, & Scott, 2002). Federal agencies in the U.S.

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government with a R&D budget of over $100 million must allocate 2.8% of their budget to SBIR grants. The 11 federal agencies then solicit R&D proposals related to the agencies' needs from small businesses. Through 2015, over 150,000 awards have been made totaling more than $35 billion (Small Business Administration, 2016). By providing funding for R&D activities that are often expensive, and at times beyond the means of small, nascent ventures (Bonvillian, 2011; Link & Scott, 2010), the SBIR program enables these firms to better compete with larger firms with more resources. In 1992, the Small Business Technology Transfer Act established the pilot STTR program to facilitate the transfer of intellectual property from research institutions to the market through commercialization with small firms. The STTR program focuses on supporting innovation collaborations between firms and public organizations such as universities and government labs. The resulting partnership must have at least 40% of the R&D conducted by the private firm and at least 30% by the public organization. Federal agencies with R&D budgets over $1 billion must allocate 0.3% to funding STTR grants, in addition to their SBIR program funding. Through 2015, the program has grown to provide over $3 billion through over 10,000 grants (Small Business Administration, 2016).

Despite the lengthy tenure of the SBIR and STTR programs, fairly limited work has sought to examine the influence of these programs on the nascent ventures (Wessner, 2008). While much attention has been paid to the influence of government support on firm creation, work has shown that these programs also influence the outcomes of participating ventures. For example, firms that obtain government funding are more likely to receive VC (Lerner, 1999) or funding from other sources (Feldman & Kelley, 2006). Government support programs are also tied to the increased commercialization of innovations (Audretsch et al., 2002), and the success of these innovations (Archibald & Finifter, 2003). Soderblom and colleagues (2015) found that firms supported by government funding had better long-term firm performance. Similarly, Autio and Rannikko (2015) found that high-growth entrepreneurship policy initiatives more than doubled the growth rate of participating firms; however, the mechanisms remain unclear.

Government Support of Entrepreneurship

Perhaps one of the most obvious set of institutional arrangements that support entrepreneurship is government initiatives, agencies, and laws. In addition to the science, technology, and innovation initiatives discussed earlier, government also offers economic initiatives that build infrastructure for entrepreneurship. Woolley and Rottner (2008) argue that economic initiatives provide financial resources, foster collaborations, encourage knowledge transfer through networking events, and advocate for relevant legislation. In fact, the authors found that states with both science and technology and economic initiatives related to a specific technology had six times more start-ups in the market (Woolley & Rottner, 2008).

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One way that governments can support entrepreneurial activity is by guaranteeing loans for small business and innovation. It seems that every country has their own small business guarantee program such as the United States.' Small Business Administration, Canada's Small Business Loans Act, France's SOFARIS, India's New Millennium Indian Technology Leadership Initiative, and the United Kingdom's DTI Loan Guarantee Scheme. Most research has examined the role of these loan programs on the performance of participating firms, but little work has address the efficacy of the programs on entrepreneurship (Riding, Madill, & Haines, 2007)

Specific to start-up activity, policies that ease the burden of starting a company reduce the barriers to entry for entrepreneurs and can encourage new venture creation (Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2002; Klapper, Laeven, & Rajan, 2006; Levie & Autio, 2011; Stenholm, Acs, & Wuebker, 2013). For example, reducing the time and administrative paperwork needed to start a business is tied to a country's start-up activity (Djankov et al., 2002). Countries with a high capital requirement for starting a business and more rigid labor market regulations experience lower rates of entrepreneurship (van Stel, Storey, & Thurik, 2007). Start-up incentive programs have been shown to increase entrepreneurship in Europe (Roman, Congregado, & Millán, 2013). Similarly, policies that reduce the tax burden for start-ups also encourage new venture creation and growth (Asoni & Tino, 2014; Djankov et al., 2010).

Other government laws and regulations have been designed to support entrepreneurship. Autio and Fu (2015) found that the quality of both governmental economic and political institutions influences entrepreneurship around the world. Laws protecting property rights, particularly intellectual property, encourage entrepreneurial endeavors (Arin, Huang, Minniti, Nandialath, & Reich, 2015; Autio & Acs, 2010; Estrin, Korosteleva, & Mickiewicz, 2013; LaPlume, Pathak, & Xavier-Oliveira, 2014; McMullen, Bagby, & Palich, 2008; Stenholm et al., 2013). Bankruptcy law that provide safety nets by protecting entrepreneurs reduce the downside risk of starting a new venture, thus encouraging start-up activity (e.g. Armour & Cumming, 2008; Lee, Yamakawa, Peng, & Barney, 2010; Peng, Lee, & Yamakawa, 2010; Seung-Hyun, Peng, & Barney, 2007; Stenholm et al., 2013; Venkataraman, 2004).

Institutional Arrangements

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Since entrepreneurship is local (Feldman & Francis, 2004), the institutional environment of an entrepreneur influences start-up activity (Baumol, 1990; Minniti, 2008; North, 1990). Organizations or structures that legitimate, regulate, and standardize a social system act as institutional arrangements that support and guide entrepreneurial activities (Scott, 2013; Van de Ven & Garud, 1989, p. 209). In addition to establishing governance structures and procedures for a market, institutional arrangements also legitimizing activity in relation to other industrial, social, and political systems (Van de Ven & Garud, 1989). As such, institutional arrangements act to establish and codify norms and values related to new ventures, which help reduce uncertainty for entrepreneurs and their stakeholders such as funders, suppliers, and customers. New ventures also benefit from the increased level of resources, decreased uncertainty, and the establishment of market norms. Institutional arrangements are particularly important for emerging domains of activity that lack structure to support new ventures, industries, and economies (North, 1990).

Several actors in many areas help establish institutional arrangements. For example, creators of resource endowments discussed earlier also contribute to the creation of institutional arrangements. For example, when a university creates a program dedicated to a nascent field of study, it not only creates knowledge resource endowments, but also it signals legitimacy for the discipline and entrepreneurship seeking to develop that discipline into commercial products and services. Similarly, government initiatives supporting an emerging domain build legitimacy in the eyes of nascent entrepreneurs, thereby spurring new venture formation in that domain of activity. Other examples of institutional arrangements include government initiatives and agencies, regulations, professional and industrial associations, standardization boards, and interest groups. Together, these seemingly disparate actors form a normative and regulatory foundation for entrepreneurship.

Private Institutional Arrangements

Industrial, scientific, professional, and trade associations play multiple roles such as acting as a knowledge hub, facilitating information sharing, and legitimating nascent markets or technologies (Aldrich & Ruef, 2006; Greenwood, Suddaby, & Hinings, 2002; Sine, Haveman, & Tolbert, 2005). Such associations often bring together dissimilar actors to meet and exchange information (Garud, 2008). These groups also provide access to supply chains that help nascent firms overcome the liability of newness. Similarly, interest groups and standardization boards can build legitimacy, act as resource hubs, and enable opportunities for entrepreneurs (Gnyawali & Fogel, 1994).

Proprietary Function Support

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In addition to resource endowments to facilitate opportunity creation and discovery and institutional arrangements to legitimate, regulate, and standardize commercial domains, entrepreneurship needs structures to support the venture's enactment of an opportunity. Proprietary function support structures enable a firm to change knowledge and public resources into products and services for commercialization. Proprietary functions include applied R&D, commercialization, manufacturing, marketing, innovation network/resource channel activities, and access to markets (Van de Ven & Garud, 1989; Venkataraman, 2004). Together, these functions can develop products and, with adequate revenue, a viable firm (Mezias & Kuperman, 2000; Van de Ven, 1993). Proprietary functions create a flow of resources that enable additional firm activities, product production, and market growth. Thus, proprietary functions are the foundation for entrepreneurial (individual or corporate) activity and firm development that can lead to industry creation. Thus, infrastructure is necessary to support the internal development of and external procurement of these functions. Both new ventures and incumbent firms can be involved in these activities.

Given the difficulty of starting and building new firms, both public and private organizations have created venture development programs that provide support to nascent firms to improve their likelihood of success (Amezcua, Grimes, Bradley, & Wiklund, 2013). These programs often provide technical and managerial assistance and training that entrepreneurs may have difficulty acquiring elsewhere (Soloman, Bryant, May, & Perry, 2013). Venture development programs extend enormous levels of resources through capital, mentoring, and education to entrepreneurs. Billions of dollars are spent each year on and by venture development programs in the United States, yet few studies have looked at the long-term outcomes of these programs or the relative performance of the participating firms.

Work based on the public sponsorship perspective has mainly focused on how the programs increase the creation of new firms by lowering barriers to entry and reducing the hazard of exit (Schwartz, 2009). These sponsorship programs both "buffer" the firm from environmental threats and "bridge" with external relations to build legitimacy and resources (Amezcua et al., 2013). Work looking at these programs individually has largely found that venture development programs indeed increase a firm's access to much needed resources and promote survival. However, few studies have looked at the long-term outcomes of these program or their relative performance. Work on business incubators, private accelerator and university incubator programs also focus on the performance of program participants with a few studies comparing these to non-participants.

Private Business Incubators

Business incubators provide fledgling companies with office space and basic business services including shared administrative support (Bollingtoft & Ulhio, 2005; Bruneel, Ratinho, Clarysse, & Groen, 2012; Grimaldi & Grandi, 2005). Business incubators are

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attractive since they reduce the initial operating costs; however, participants do not follow a planned training program and are not mentored. Of particular help to high-technology firms is the access to lab space that some business incubators provide (Feldman & Francis, 2004). These programs tend to be unstructured, with few admission requirements. The National Business Incubation Association estimates about 800 independent business incubators existed in the United States in 2012. Amezcua and colleagues (2013) found that over half of the participants in business incubators were in the service industry followed by finance, insurance, and real estate. Colombo and Delmastro (2002) found that participants in private Italian incubator programs had higher growth, technology adoption, alliances, and public funding than other firms.

Private Accelerators

Private accelerators, or independent private incubators (Grimaldi & Grandi, 2005), are for-profit firms that provide services and resources to help nascent ventures including shared offices, business assistance, access to capital, and business networks (Mian, 1996). Private accelerators “make seed-stage investments in promising companies in exchange for equity as part of a fixed-term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo day” (Dempwolf, Auer, & D’Ippolito, 2014). Private accelerators differ from general business incubators in their highly competitive selection process and structured outline for participation and graduation. Private accelerators often provide connections to mentors in the industry or niche of the participating venture. Seed-db.com (2015) lists over 200 private accelerator programs around the world with over half of those in the United States. The over 4,000 firms accelerated through these programs have obtained over $7 billion in funding. No analysis has been conducted on the composition of accelerator portfolios.

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University Technology Transfer and Incubators

The “triple helix” perspective posits that in addition to education and research, universities take on industrial roles such as supporting the commercialization of university-generated intellectual property (Cosh & Hughes, 2010; Etzkowitz et al., 2000). For example, universities are using a variety of technology transfer mechanisms to benefit from internally generated IP (Friedman & Silberman, 2003). Academic spinoffs have been a key element in such university efforts. Additionally, universities are increasingly supporting nascent ventures through their own incubators. University incubators are similar to private accelerators, but are sponsored by a college or university (Grimaldi & Grandi, 2005; Mian, 1996). Participation in university incubators is competitive and unlike general business incubators, often have a structured program. Depending on the program, participation can be limited to firms with a university affiliation. In addition to the resources and services that private accelerators offer, university incubators also provide access to faculty advisors, student employees, libraries, technology transfer services, and R&D labs (Colombo & Delmastro, 2002; Quintas, Wield, & Massey, 1992). Participating firms also benefit by gaining legitimacy through their affiliation with a university (Mian, 1996; Rothaermel & Thursby, 2005B). The National Business Incubation Association estimates about 400 university incubators existed in the United States in 2012. University Business Incubator Index found over 800 university incubator programs throughout the world in 2014. Currently, there are no analyses of the types of firms that join university incubators. Rothaermel and Thursby (2005B) found that participants in Georgia Tech’s incubator with ties to a sponsoring university were less likely to either fail or graduate the incubator program. And while Schwartz (2009) found that survivability of firms after graduating from an incubators went down, Amezcua and colleagues (2013) found that the influence of a university incubators on firm survival depended on the number of nearby firms.

Other Support for Proprietary Functions

Support services are often taken for granted, but set apart some regions as more friendly to entrepreneurship. For example, firms supplying legal services are crucial to start-ups that often lack resources for internal legal counsel (Venkataraman, 2004). Similarly, communications technology companies offering robust broadband access directly influence start-up activity since they provides access to markets, supply chains, and firms providing other support services (Audretsch, Heger, & Veith, 2015). Intangible components of infrastructure are difficult to quantify, but are just as important to entrepreneurship as tangible components. Venkataraman (2004) identified other intangible infrastructure necessary for entrepreneurship such as informal forums, role models, and mentoring organizations. Saxenian (1994) emphasized that informal structures enabled workers in Silicon Valley to interact and share knowledge, which helped support the emergence of the semiconductor industry.

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Discussion and Opportunities for Future Research

Thus far, this article has looked at components of infrastructure that are related to how many firms are started in a location. Although this work uses several perspectives, it relies on two basic assumptions: (1) that entrepreneurship is a local phenomenon (Feldman & Francis, 2004), and that (2) the existence of a certain bundles of location-specific resources is necessary for firms to be created (Specht, 1993). We can question both of these assumptions to move into the next generation of research questions important to this field. For example, the boundaries of entrepreneurial activities may be becoming less important. Firms are able to obtain resources from distant sources easier than ever before. Angels and venture capitalists cross national boundaries to invest in start-ups. Online courses are available from top universities. Entrepreneurs obtain education, training, and coaching from mentors around the world. The changes in technology and society give rise to our fundamental conceptions of location-based resource munificence.

Maintaining that entrepreneurship is a local, or at least location-related activity, research has shown that a location with an abundance of resources in a location may not support entrepreneurship if there are few ways by which a firm can access those resources (Woolley & Rottner, 2008). The creation of new ventures is shaped not only by the level of resources, but also by competition and structures or mechanisms that impede or facilitate access to resources (Begley, Tan, & Schoch, 2005; Saxenian, 1994). Perception of the access to resources is perhaps more important since it influences the physical movement or relocation of entrepreneurs to different regions. Begley and colleagues (2005) showed that the perception of resources in the environment influenced entrepreneurship.

Culture is one of the most important and yet poorly understood influences to entrepreneurship. Much of the work on culture and entrepreneurship has studied national level constructs. For example, Busenitz and colleagues (2000) found that cultural norms and attitudes were tied to the level of entrepreneurship in a country. Stephan and Uhlaner (2010) specifically found that nations with socially supportive cultures had more entrepreneurship. Indeed, individual traits and perceptions that lead to entrepreneurship are contingent on macro-level institutions (Autio, Pathak, & Wennberg, 2013; Wennberg, Pathak, & Autio, 2013). However, work has yet to identify the infrastructure mechanisms that lead to such an entrepreneur supportive culture. To say that entrepreneurship thrives in a setting that is culturally supportive of entrepreneurs creates a useless circular logic. There is a theoretical and practical opportunity for future research to look at how the social psychology of a location influences the start-up behavior. Furthermore, we must look beyond national boundaries to identify culture that exists in other settings such as regions, cities, and organizations. Regional clusters (Saxenian, 1994) and systems of innovation (Etzkowitz & Leydesdorff, 2000; Feldman & Francis, 2004) are arguably

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more useful contexts to study in our quest to understand how to support entrepreneurship than nations.

Much of the literature on infrastructure for entrepreneurship has focused on contextual factors that support the *creation* of firms. Recently, scholars and policy makers are questioning this focus. As mentioned, half of the firms started today will be closed in five years. Given the vast amounts of resources spent to support new venture creation, some are wondering if just getting ventures started is the right goal. Likewise, a considerable body of work has looked at how to support firm survival. Little work has attended to the question of how infrastructure can support the founding of the *right types* of firms and other entrepreneurial activity (Holtz-Eakin, 2000). And while infrastructure for entrepreneurship is considered beneficial for a location, it is not clear what the right level of infrastructure is or when resources should be allocated toward other needs.

Lastly, one of the most difficult questions to answer is identifying the influences of time and change on a system. Infrastructure and entrepreneurship do not exist in a vacuum and just as firms must adapt to changing markets, locations must adapt in response to changes in the political, social, and economic landscape for start-ups. Feldman and Francis (2004, p. 134) succinctly noted that, “targeted programs seem to be preferred by politicians because they clearly delineate goals, but they may be limited in success because industries are fluid.” Policies, initiatives and programs that are created using existing market information may miss the needs of the future firms. Furthermore, these programs do not act alone, but we know little about how the additionality and interdependencies influence the efficacy of a policy mix in an entrepreneurial ecosystem (Autio, Kenney, Mustar, Siegel, & Wright, 2014).

Places, be it nations, regions, cities, or organizations, are alive. To improve our understanding of infrastructure for entrepreneurship, we must examine the history of a location, its identity, and how these influence the people who live and immigrate there. Only then will we understand why a location attracts people with the entrepreneurial mindset that make opportunities happen and who support the next generation of new ventures.

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Notes:

(1.) Data compiled from World Bank, U.S. Census, StartUp Britain, and OECD.

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