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WEAK TIES AND GLOBAL REACH: NETWORK THEORY AND THE ATLANTIC ENTREPRENEURIAL ECOSYSTEM

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Weak Ties and Global Reach:

Network Theory and the Atlantic Entrepreneurial Ecosystem

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ABSTRACT

Interest in entrepreneurial ecosystems has intensified with the acceleration of the importance of entrepreneurship to the creation of successful economies. The discussion has principally focussed on historical and ethnographic accounts of the interactions of personalities, events, actions of various companies, the recycling of talent, and the composition of a variety of different types of actors and groups in the ecosystem. The research outlined here responds to the need to study the complex dynamics of differing ecosystems, their context, and institutional characteristics (Audio, Kenney et al., 2014). Here, the knowledge-seeking behaviours of ecosystem participants are measured and mapped using network theory. The knowledge-seeking actions are the unit of measurement. The work also draws on the sociological literature of 'weak ties' and clusters of innovation. The results demonstrate a highly quantitative method of charting the dynamics of an entrepreneurial ecosystem, yet so visually arresting as to appeal to the most cynical policy maker.

Keywords: Innovation; entrepreneurial ecosystem; cluster; network theory; entrepreneur

INTRODUCTION

Entrepreneurship is the conduit to success attributed to specific locations such as Israel, Silicon Valley, and Route 128 as examples (Saxenian 1994). More recently, entrepreneurship is recognized as accelerant for the specific strategies adopted for the strategic management of locales, regions and places (Audretsch 2015). Underlying this success is the curiosity of individuals, their desire to expand their knowledge to increase their propensity to innovate and enterprise, combined with numerous other tangible and intangible supports. Concentrated systems of entrepreneurial innovation in specific regions has spawned the terminology of entrepreneurial ecosystems (Bahrami and Evans 1995) and clusters of innovation (Bresnahan, Gambardella et al. 2001). The term entrepreneurial ecosystem goes back beyond 1995 where the most famous entrepreneurial ecosystem in the world, Silicon Valley, was characterized by "fleeting opportunities, shifting customer preferences, cascades of technological innovations, brutally short product life cycles, and furious global competition" (Bahrami and Evans 1995, p 62).
The purpose of this study is to investigate the relationships amongst the various groups of actors within an entrepreneurial ecosystem. It does so using network theory as its method of analysis and knowledge-seeking activities as the unit of analysis. This work considers a geographically located entrepreneurial ecosystem as its starting point. It seeks to understand the innovation-seeking reach of the ecosystem, its major constituents, and to observe and measure the connectivity and its density within and beyond its geographic borders.

The study responds to the call to study the dynamics of differing entrepreneurial ecosystems and their context (Autio, Kenney et al. 2014) and to use more quantitative approaches (Engel 2015; Overholm 2015). It also sets the stage for measurements of connectivity, density and diversity in a more structured manner (Stangler and Bell-Masterson 2015). This study uses the type, frequency, and importance of knowledge-seeking behaviours as the measure of innovation-seeking activity (Alvarez and Barney 2007). The data is analysed using network theory to map the knowledge-seeking behaviours amongst the constituents of the ecosystem. Network theory demonstrates the distribution of information-seeking activities in a visual and quantitative manner. We conduct this study using an entrepreneurial ecosystem located on the east coast of Canada where the foci are a number of small provinces that are sparsely populated and avoid focus on the firm or the entrepreneur.

Key constituents in the ecosystem are obvious by their rankings. Investigating the types of information sought highlights the curiosity for business versus technical information. Moreover, stripping away various elements of the ecosystem shows the relative importance of various actors. The methodology is a powerful policy tool at a municipal, provincial and federal level as its visual, and highly specific presentation, is informative for key decision makers.

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The paper proceeds as follows. It begins with a short description of the entrepreneurial ecosystem under investigation which outlines the AEE's geographic, political and economic context. The methodology for studying the ecosystem follows including the nature of the analysis, the sampling methodology, the survey protocol and descriptives of the respondents. The next section contains the results, including network charts and tables of measures. The paper concludes with a discussion of the implications, limitations and opportunities for further research.

ENTREPRENEURIAL ECOSYSTEMS

Current interest in entrepreneurial ecosystems has a tendency to place successful ecosystems within their current day context, yet most successful ecosystems have roots well back into the 1940's and 50's and beyond. The most successful of some of these regionally-based entrepreneurial undertakings have caused them to be the focus of considerable attention such as Silicon Valley, Route 128 in Massachusetts, Start-up Nation Israel, Silicon Glen in Scotland and Sophia-Antipolis in France to name a few. Some attention has been paid on less-than-successful locales (Honig and Black 2007) as well.

The study of entrepreneurial ecosystems has taken many forms in the extant literature. Ethnographic or historical accounts identify numerous variables associated with cultivating regional advantage such as a combination of community, success, concentrations of university talent, pools of venture capital, and adept abilities to adopt new paradigms (Saxenian 1994) and refer to "visits, interviews and other materials" (Bresnahan, Gambardella et al. 2001, p 825) in their data collection. Constituents contributing to the ecosystem are used to build models illustrating the flow of activities amongst the groups (i.e. Bahrami and Evans 1995; Ferrary and Granovetter 2009). Models of economic entrepreneurial ecosystems have been constructed using expenditure and investment data (i.e. McCann 1997). Autio, Kenney et al. (2014) constructed a framework for investigating entrepreneurial ecosystems within the context of the industry, technology, social policy and organizational context, and related policy concerns, but also considered the temporal and global, national and regional innovation systems. Survey data of location decision measurements such as location decisions (Galbraith, Rodriguez et al. 2008) complements interpretive analysis resulting in theoretically constructed propositions (Honig and Black 2007). A longitudinal analysis of the inventor networks highlighted the emergence of clusters and networks in specific industrial classifications (Ter Wal 2013).

Entrepreneurial ecosystems represent "networks of actors contributing to joint value creation" that had "undertaken some degree of co-innovation or adaptation" (Overholm 2015, p 19). Simultaneously, the evolution of entrepreneurial ecosystems has been buttressed by the emergence and growth of clusters of innovation (Bresnahan, Gambardella et al. 2001). A cluster of innovation is an "environment that favors the creation and development of high potential entrepreneurial ventures, and is characterized by heightened mobility of resources, including people, capital and information" (Engel and del-Palacio 2009). Clusters of innovation have been characterized as local networks strengthened by the prevalence of weak ties which are essential to innovation activities and networks

(Granovetter 2005), but that achieve greater success by extending their reach globally (Engel and del-Palacio 2009). With effort, teasing out the distinction between the two terms is possible; both have elements of co-location and clustering, but are also characterized by far-reaching networks and innovation-search activities. From a generalist's perspective, it appears that the large and successful entrepreneurial ecosystems described in the 90's now seem to be referred to as clusters of innovation.

Role of Knowledge-Seeking in an Ecosystem

In entrepreneurial ecosystems or clusters of innovation, networks of actors cooperate to encourage the entrepreneurial activity in a region. One activity that spurs innovation is the search for information from persons who are casual acquaintances (referred to as weak ties) because new information from casual acquaintances is more likely to be novel and unique than the information derived from close friends and family (Granovetter 1973). In particular, information that crosses boundaries of knowledge, referred to as structural holes can be excellent sources of new innovations (Burt 2004).

Weak ties, necessary for broad information gathering, arise from person-to-person networking, personal inquiries, casual acquaintances, open innovation requests, and other means of person-to-person interactions. Weak ties are an essential element in the clusters of innovation framework and the subsequent acceleration of entrepreneurship as ecosystem participants seek information from specialized support groups, trade fairs, conventions, professional gatherings, universities, governments, and industrial collaborations. Ecosystem participants use the information gathered to enhance the mobility of people, talent, know-how, capital and other tangible and intangible assets. Knowledge-seeking efforts open the founder to complementary competencies and resources to gain access to new knowledge and people. Knowledge-seeking by networking is an active way to create entrepreneurial opportunities for high-tech innovation, and high-tech founders exploit existing opportunities and deploy their networks to form new contacts and relationships that form new opportunities (Moensted 2010).

Multiple and/or increasingly strong connections made between members over the duration of a year simulates the durable bonds defined by Engel and del-Palacio (2009). The increasing strength of weak ties (durable bonds) is represented by ecosystem participants building more reliance upon one another which is suggested if ties are more numerous or more important to the seeker.

Breadth of Knowledge-Seeking

The successful ecosystems and clusters are distinctive in their geographic reach. Whatever their origins, they end up greatly networked; they do not operate as isolated islands. The most successful clusters of innovation are highly connected on a global level and they utilize their durable bond relationships with other clusters to enhance their resources, leverage information, access markets and accelerate innovation. Even the most famous Silicon Valley was described as having run out of room geographically, by being situated in a valley enclosed on both sides, eventually turned to other regions of the world to expand their network (Bresnahan, Gambardella et al. 2001). "These linkages, and the networks they construct, allow participants to reap benefits beyond those derived from proximity

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groupings and achieve efficiencies and innovation on a global scale" (Engel and del-Palacio 2011, p 27).

Global connections serve to span boundaries, bridge structural holes, and connect networks. Global connections encourage the mobility of people in and out of businesses and regions, promote the transfer of high technology know-how, encourage the development of born-global firms, increase the participation of specialized support groups to cross pollinate activities and resources, stimulate the movement of people between industry and academia, and foster deep expertise for specific support mechanisms.

METHODOLOGY

Studying entrepreneurial ecosystems with more quantitative approaches have been encouraged in order to contribute a different lens (Engel 2015; Overholm 2015) to the highly insightful and subtle qualitative observations made by significant scholars in the area. The measure analysed was knowledge-seeking behaviours. A survey of the knowledge-seeking behaviours of constituents of an entrepreneurial ecosystem used a convenience sample of start-ups in the region and continued with a snowball sampling method of firms mentioned in the survey results. To effectively analyse the ecosystem's knowledge-seeking behaviours quantitatively, network theory was employed which permits viewing connectivity, density and diversity of the network. Information about the knowledge-seeking activities included the importance and frequency of the ecosystem's participants' activities. A more detailed description follows with sub sections on the measures, sampling, data collection and descriptives.

Measures

Alavrez and Barnery (2007, p 19) noted that the central measure used in the opportunity literature were "actions that entrepreneurs take to form and exploit opportunities." Measuring of an "action" that is to acquire information is congruent with the notion of weak ties as described by Granovetter (1973), and later by Engel and del-Palacio's (2009) durable bonds. So where performance is driven by entrepreneurial innovation which is a function of entrepreneurial behaviour (Autio, Kenney et al. 2014), the curiosity underlying an search for information, is known here as knowledge-seeking behaviours.

In this study, knowledge-seeking behaviours were defined as actions taken by phone, in person, or by email/text where a constituent of the ecosystem reached out to another individual in an effort to find information to make a decision related to an entrepreneurial firm. Three dimensions were investigated regarding each knowledge-seeking activity: importance, frequency and type of information sought. The number of times an ecosystem member reached out was measured indicating weak and developing bonds, and the importance of the information to the seeker was measured with a seven-point Likert scale. The information sought was also assessed as either business/market/ financial information (business processes and management), or product/scientific/ technical information (product development).

Sample Selection

There is no list *per se* of all entrepreneurs or entrepreneurial firms; the research sample was drawn from a list of start-ups within the past 10 years drawn from media sources within the entrepreneurial community of Atlantic Canada. The Atlantic Entrepreneurial Ecosystem (AEE) is situated on the east coast of Canada with four principle hubs (Halifax, Saint John, Fredericton and St. John's) spanning four provinces: Nova Scotia, New Brunswick, Newfoundland and Labrador, and Prince Edward Island. The four provinces compose what is referred to as Atlantic Canada. With approximately three percent of the nation's population, the region suffers difficulties. With a combined population of less than 2 million persons, the Region suffers from a declining birth rate as well as declining population.

Using respondent-driven sampling, respondents indicated persons from whom they sought advice, information, or knowledge about entrepreneurial decisions and innovation. The individuals noted by each respondent become the source for enlarging the sample and developing new potential respondents. The technique of using respondent-driven sampling is appropriate for network analysis (Biernacki, 1981) particularly where the intention is to see how broad the reach of the constituents starting at a prescribed geographic region. Using this method, it was possible to access hidden agents participating in the Entrepreneurial Ecosystem, but not physically located there.

The targeted sample for the AEE began with a base list of 148 qualified potential respondents generated by carefully evaluating personal contacts of the lead researcher, Entrevestor.com (an entrepreneurial news service), AllNovaScotia.com (a business news service), and the online networking site, LinkedIn.ca. As the surveys were returned, which implicated other people and companies as part of their search for information, surveys were sent to those whose emails could be accessed by the researchers.

Data Collection

The survey protocol was executed by means of a "fillable form" survey which was emailed to the sample. Returned surveys with digital data were directly loaded into a database. This type of survey distribution was adopted to avoid services such as Survey Monkey to ensure that the process of exporting data from the surveys occurred on servers owned, and operated, by the University, as opposed to an independent third parties where the information may pass through the United States and therefore subject to possible inspection (2015) .

Data from returned surveys, via .pdf fillable forms, was exported to a .csv file and populated the database automatically. Staff manually cleaned and coded the data to avoid duplicate nodes that had misspellings or varying acronyms, and to categorize various differing types of agents (i.e. venture capitalists, entrepreneurs, universities, professionals, government, universities, and corporations). The data were analysed using network theory and the open source software, Gephi (Cherven 2013).

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Survey Descriptives

The survey instrument was responded to by 95 individuals (some of whom declined to participate for specific reasons). The survey was completed by 79 respondents. The total number of different individuals noted in the ecosystem was 1268 which related to 781 organizations. A total number of 1474 knowledge-seeking transactions were engaged in by this model of the ecosystem.

The nature of the respondents' capacities within the ecosystem is outlined in Table 1. Most of the respondents were entrepreneurs (46.8%) followed by a class of individuals who reported themselves as consultants (36.7%). As a collection, the next largest group were the venture capitalists (15.2%), and professors from local universities and colleges represented 12.7 percent of the respondents' professions. the private individual investors (10.1%) and a member of an angel network (1.3%). Respondents were permitted to self-identify into more than one category.

Table 1 - Self Identification of Profession

Self Identified as	Percent (%)
Entrepreneur	46.8
Consultant	36.7
Venture capitalist	15.2
Professor	12.7
Private Individual Investor	10.1
Government Representative	3.8
Mentor	3.8
Employee at a large firm	1.3
Bank Representative	1.3
Member of Angel Network	1.3
Lawyer	1.3

Professors aside, the level of education amongst the ecosystem is very high. Respondents were highly educated with all but two having had some form of post- secondary education. Combined, more than half of the respondents had a masters' level or a doctorate and 27.1 percent of the group had a bachelors' degree. Fourteen percent of the respondents had a professional designation. *Table 2 - Level of Education* outlines the educational profiles of the respondents involved.

Table 2 - Level of Education (Excepting Professors)

Level of Education	Percent (%)
High School/Equivalent	2.9
Vocational/Technical School	2.9
Professional Designation	14.3
Bachelor Degree	27.1
Master Degree	42.9
Doctoral Degree	10.0

RESULTS

The image of the entire knowledge-seeking activities for the AEE is displayed in Figure 1. The legend for color-coding the various types of constituents is in the lower left corner. In this chart, the size of the node (circles with institutional names noted) represents the number and importance of the knowledge-seeking behaviours which others sought of the named node. The centrality of a node is an indication of its interconnectedness amongst many different information seekers. The arcs (lines between nodes) indicated the type of information sought and the value of the information to the seeker. Close examination of the arcs indicates the direction of the knowledge-seeking role by the pointy end on one end of the arc.

AEE Constituent Groups

The knowledge-seeking activities of the AEE are very complex. There are 781 different organizations represented in the reported AEE and 1474 separate knowledge-seeking relationships defined. Fifty-seven percent (57%) of all of the nodes in the AEE represent firms, both entrepreneurial and corporate. The next largest group of constituent organizations in the ecosystem are supportive-type organizations at 14 percent. Financial organizations representing VCs, business angels, and banks are 11 percent of the ecosystems constituents. Universities represented 4 percent of the nodes indicating a total of approximately 31 universities, colleges and technical universities noted in the ecosystem. The University of Ethiopia is one of them. Various types of Federal and Provincial governments, and professional firms represent the bulk of the remaining named organizations that were named in the AEE.

The centrality of a node indicates its interconnectedness to the rest of the ecosystem. Centrality can occur because of much inbound connectivity – other organizations seeking information from that node. Alternatively centrality can occur from much outbound connectivity – where an organizations has many instances of seeking knowledge from others. For example, an entrepreneurial firm like NewPace is very central because they reached out for information from dozens of different organizations. Their node is rather small, however, because NewPace was not a source of information from a large number of other firms.

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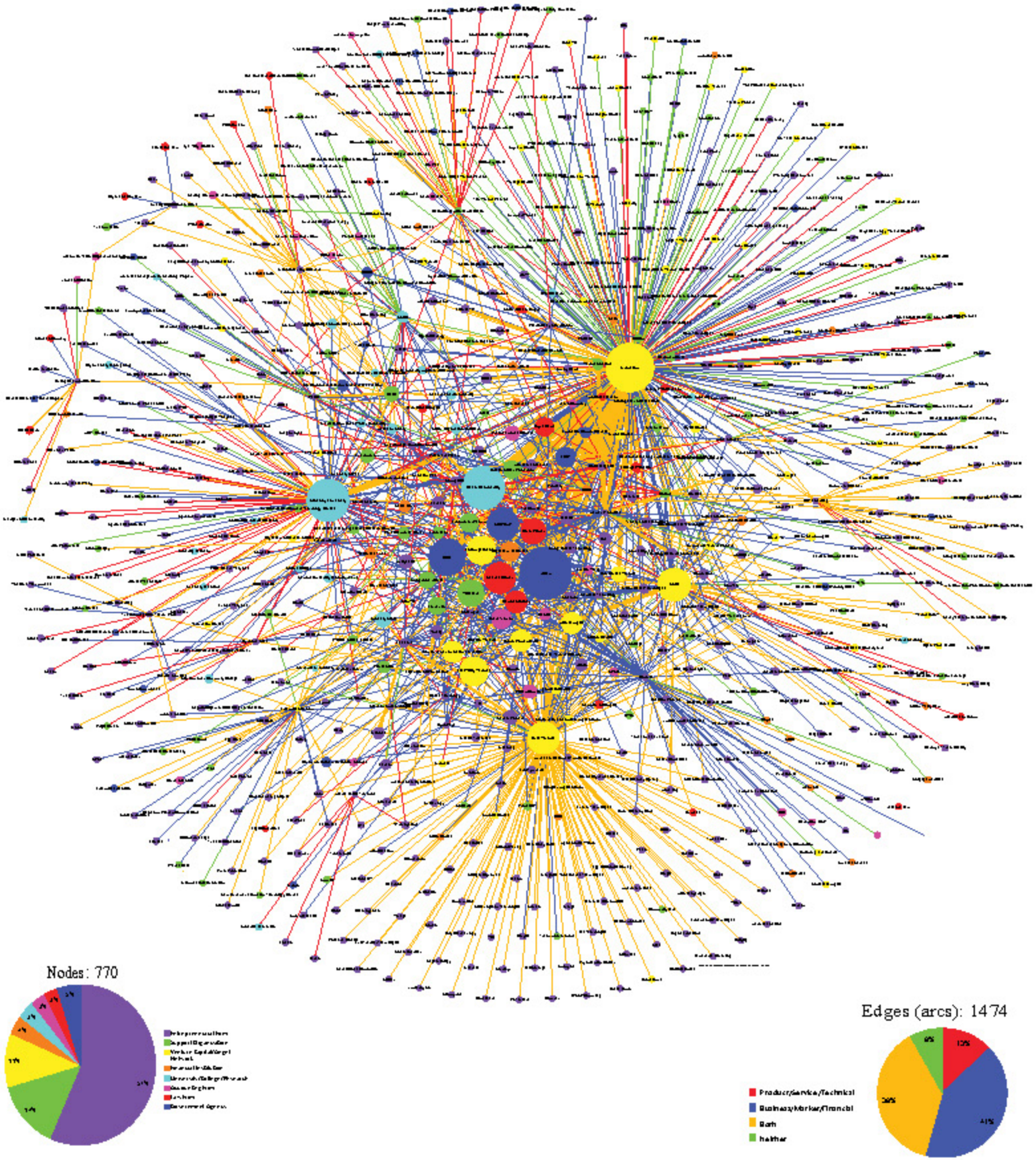
Figure 1: Entire Ecosystem



The size of an organization's node reflects the amount of information that was *sought of* that organization, not information that their employees might have sought from others. Hence, the size of an organization's node is not influenced by their own out-bound information-seeking activity, but rather by the amount of information-seeking activity that was sought from them. A large node like Saint Mary's University is central because it is connected to many other organizations, but also has a large node, because many organizations sought information from individuals inside that organization.

The principal constituent groups are homogeneous amongst themselves and heterogeneous between one another. Despite their heterogeneity, however, their work shares a similar mandate which is to nurture venture firms, as well as to accelerate mobility of resources (talent, people capital, and know-how), innovation, and entrepreneurship amongst the venture firms. To this end, the various types of constituents are complementary to accomplishing the mandate; the ecosystem needs them to act together. Their complementarity to ensuring the mandate's success thereby necessitates their interdependency; they must work together. In a successful ecosystem, a lack of interdependency and interaction amongst the constituents could weaken their ability to achieve hastening ecosystems' successes.

Knowledge –Seeking Requests and Weak Ties

The act of reaching out for information from persons other than close friends and family is essential to innovation and are referred to as weak ties by Granovetter (1973). In Figure 1, careful examination of the arcs (the lines connecting nodes) reveals the direction of the information-seeking activity. The small pointed end, terminating on the periphery of a node means the information was sought *from* that organization. Avive Naturals, for example, has many arcs emanating from their node; they sought information from Perennia, NSBI, Canada Business Reference Library, Halifax Port Authority, NRC-IRAP, Export Canada and the Port of Mexico to name just a few. Avive Natural's node, on the other hand, is very small because no one had requested advice from Avive.

Many of the firms on the periphery of the chart are those from which information was sought. Not having returned a survey, we have no other known knowledge-seeking associations with any other company in the AEE.

Two key types of information were suggested as the basis for respondents' information-search: 13 percent of information-requests were *Product/Service/Technical* in nature suggesting physical, product development, programming, manufacturing, service, equipment, or technical information; and 41 percent of the information-requests were for *Business/Market/ Financial* information relating to markets, business or administration, funds or finance-seeking, business operations or management information. The balance of the types of knowledge-seeking were those seeking both kinds of information (38 percent) and those looking for information other than these two key categories (eight percent).

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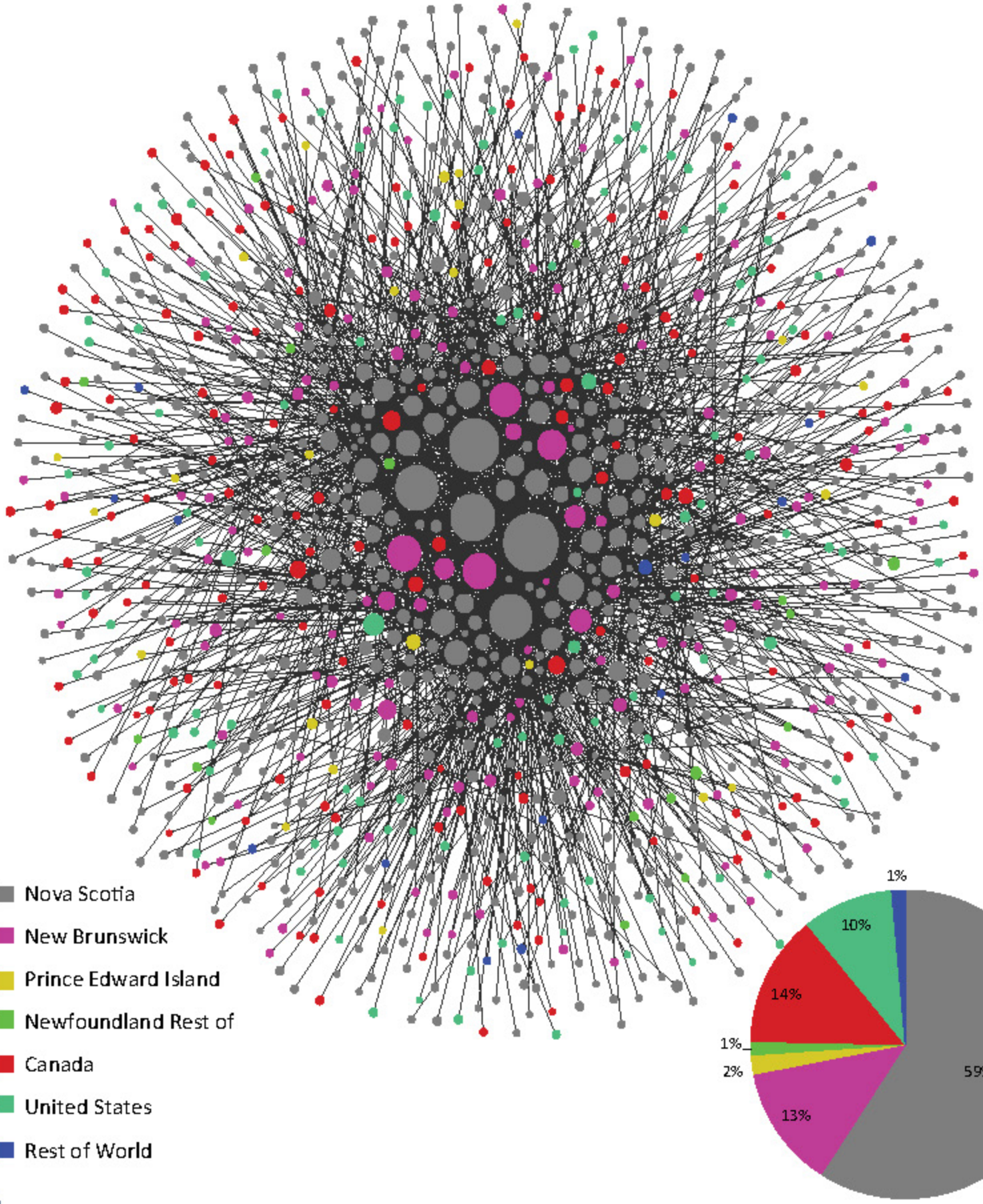
Durable bonds were described as Figure 1 displays the importance of the information exchange by the width of the arc as well. Therefore, the importance of the product/service/technical information or the importance of the business/market/financial information is displayed by the width of the lines. Increasing the size of a .pdf version of Figure 1 highlights the different widths of the arcs. For example, GrowthWorks Atlantic places more value on the information sought from the Canadian Venture Capital Association than does NSBI because the width of the arc is wider. (This may be difficult to view on the .pdfs attached.)

Breadth and Reach of AEE

The geographic location of each individual person who was part of the weak ties request for information is charted in Figure 2. In this chart, the colours indicate the location of the person sought of for information. Most of the knowledge-seeking behaviours of the AEE are immediately proximal to the Atlantic Canadian location. Approximately 75 percent of the sources of information sought by respondents are situated in the Atlantic Region. Encouragingly, 15 percent of the nodes are from the rest of Canada, nine percent are from the U.S., leaving a remaining only one percent of ties sought from abroad. This suggests a group making good use of its reach amongst the rest of Canada and even the U.S., but little outreach to the rest of the world.

Figure 2: Geographic location of ecosystem



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IMPLICATIONS & FUTURE RESEARCH

This work is novel in that it is a practical application of frameworks developed around clusters of innovation; the construct measured is more elemental and related to innovation than economic transactions alone; the entrepreneurial firms and large companies are included in the analysis compared to some studies; and the full value of network theory is deployed because of the large number of nodes represented in the research.

Firstly, this work extends the current body of knowledge by investigating the AEE as a practical application of an innovative cluster and entrepreneurial ecosystem and then applies the clusters of innovation frameworks in order to identify commonalities amongst the world's great (and not-so-great) ecosystems and clusters of innovation (Engel and del-Palacio 2009). The study quantifies the ties of the AEE's knowledge-search as a practical application of weak ties and measures entrepreneurial actions and practices that are the essence of curiosity, attempting to map the weak ties that enhance the likelihood of creating meaningful collaborations, innovation-centred relationships, or ultimate partnerships (durable bonds).

The value of the knowledge-seeking measure was further enhanced by investigating the source of the information sought. Entrepreneurs' overwhelming search for business, market and financial information rather than technical/scientific/product information is a surprising finding. A number of reasons may explain it. If entrepreneurs are competent in their design, science and production of their products, their needs may be largely related to the development of markets, delivery of product, sales techniques and methods of building a firm. That would be reassuring. In an area of challenged resources and financial capabilities, the search for business acumen and finance may be expected. However, if the entrepreneurs are spending most of their time on business-building activities with little or no product innovations or design improvements, difficulties related to immature innovations may prevail.

Second, this work represents the search for information sought by members of an ecosystem in an effort to make decisions about entrepreneurial ventures. In the Ferrary and Granovetter (2009) study, the links between organizations represented economic and financial ties whereas this study goes to a more fundamental element of knowledge-seeking or knowledge acquisition, simulating weak ties. The arcs in this work represent people-to-people requests for information thereby driving at the source of innovation, curiosity. These links may later become economic relationships, but those are outcomes that result from the cultivation of weak ties. Other research highlight the economic relationships between companies as captured in news reports (i.e. CB Insights), or whom-is-linked-to-whom in social media (such as LinkedIn) though there may never be any direct interaction amongst the two, or in observation- only searches (i.e. following Twitter accounts).

The interconnectedness of the constituents in the AEE is amply highlighted in the charts. It is recognized that governments cannot establish, or mandate, an entrepreneurial ecosystem (Soto-Rodríguez 2014); only the value creation contributions of many actors working in concert through their interconnectedness (Cohen 2006) results in a functioning

and sustainable ecosystem. However, the global imperative is clear in the cluster of innovation research. Given the AEE's proximity to Europe, Scandinavia, Africa and the Middle East the level of outreach seems North-American centric. Given that successful ecosystems have demonstrated a considerable global outreach, the AEE's efforts to bond with other global clusters needs more effort. Such engagements cannot be mandated by governments Outward-facing nodes inoculate against dis-entrepreneurship which occurs when the community adopts an inward-facing orientation rather than an outward orientation in a globalizing world "Entrepreneurs finding themselves in communities characterized by strong client-patron relations would do well by appealing to broader regional institutions the frequently trump local oligopolies" (Honig and Black 2007, p. 286).

Third, by including entrepreneurial ventures and large companies, the breadth of the ecosystem is modelled, and the relationships between firms and universities, firms and venture capitalists, mature firms and venture firms, and governments and support groups are observed. It calls attention to the multiple parties needed to stimulate entrepreneurial ecosystems (Van de Ven 1993), and addresses a more recent call for investigations into regional and contextual influences on entrepreneurial innovation (Autio, Kenney et al. 2014). It does so by mapping the ecosystem with a revealing visual and quantitative examination of entrepreneurial ecosystems' knowledge-seeking behaviours and by highlighting the various constituent groups including entrepreneurial firms and mature corporations.

Lastly, this work extends previous network theory study of Silicon Valley venture capitalists by the sheer number of data points and breadth of constituents. It is composed of 1281 individual persons, 681 different organizations and 14** person-to-person appeals for communication. Moreover, the directional nature of the arcs in the model means that the size of an organization's node cannot be influenced by their own activities. Therefore, the analysis permits the vigour of various actors to emerge -- rather than their relative importance being prescribed – thereby adding intensity to its conclusions.

There are many other research opportunities using network theory and entrepreneurial ecosystems. Other research may answer questions about the mix of qualities that are necessary for successful ecosystems and provides opportunities for comparison. Is there more or less focus on university, or professional support, or venture capital funding, or incubators or accelerators in the winning regions compared to those less successful ones? Are the new ventures spanning boundaries, or occupying the space of structural holes? Is it influence, contacts, and networks that drive successful ecosystems, or is it capability of a number of key players that lubricate them? Is there a critical mass of venture capital required to grease an entrepreneurial ecosystem? Is there a critical mass of people working in a similar area that drives a cluster to become an innovation network? And if so, what is that critical mass? Future research may seek to investigate these areas.

At present, a collection of scholars are preparing to conduct similar surveys of eight different cities to replicate the research, extend its breadth, and make additional data for useful comparisons.

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