Clusters in the Wilderness: Knowledge Spillovers based on Outdoor Recreation

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Smaller cities like Boise wishing to reap the benefits of clusters should play to their strengths, and creating an urban ecosystem conductive to high-trust informal social interaction may be one underexplored area of competitive advantage. In my research, I examine how widespread participation in informal, high-trust, non-work activities can lead to increased knowledge spillovers in the formal economy and drive increased and sustainable economic success by looking at outdoor sports interactions between key players in the economy around Boise, Idaho. In this paper, I look at background factors and examine the literature, and provide initial analysis.

INTRODUCTION

"All business is done on the golf course." –*Golfer's Adage*

"There is no bond like the brotherhood of the rope." –*Climber's Adage*

In an increasingly interconnected and competitive world, the idea that clusters can form around high value industries in a concentrated geographic location holds high appeal for firms wanting in on the action, individuals working in these industries, and governments looking to capture economic benefits. Global cities, such as New York, Hong Kong, London, and elsewhere often contain clusters of clusters with multiple industries located in a single geographic setting, and increasingly attract and retain the lion's share of global economic activity (Castellani and Santangelo, 2016). Clusters have captured the attention of scholars, business leaders, and policy makers alike and have generated a good deal of often conflicting research. As Saskia Sassen, who coined the term "Global Cities" at the University of Chicago nearly twenty years ago noted, the true centers of global economic activity are located behind the mirrored glass of the towers that line the landscape of the global cities (Sassen, 2016). But where does this leave smaller, lesser-known cities without all of these advantages? What, if anything, is left for the "99%," and how can they capture it? There is widespread agreement that clusters exist and bring economic benefit, but not a clear consensus on how, why, or who will attract and retain them beyond the usual Global Cities suspects. I will argue that all cities large and small have their unique, non- economy based resources and attractions, and these are precisely the kinds of absolute advantages beyond sheer size that will attract and retain the dedicated cadre of talent needed to base a cluster on.

Clusters are not intuitive, as they put competitors literally back-to-back, both incentivizing and depending on them to share resources, ideas, and talent through what Jaffe (Jaffe, 1993) described as

knowledge spillovers. A knowledge spillover is a kind of positive externality, or benefit that accrues to everyone in proximity, in which a discovery in one space tends to influence and spread around the surrounding space. This in turn gives firms incentives to work in close proximity insofar as the benefits from the spillovers overcome the disincentives—such as staff leaving to competitors, secrets leaking, or competing for scarce resources, and they often do as is seen in clusters around the world from movies in Hollywood to finance on Wall Street to aerospace in Toulouse to turbines in Wuxi.

To begin to look at the issue, we look at this quote:

> "We do not fully understand the relationship between amenities, quality of life, and rural economic growth" Further, the same resources (slopes, lifts, and trails) are increasingly being used to support "off season" activities such as mountain biking, hiking, and horseback riding. The implication of this result is that rural areas that can take advantage of these combinations of natural and developed resources are in a position to expand their local economy." (Deller, et. al, 2001, p.357)

In my theory, this entails that smaller cities must appeal to their strengths and these often lie in leisure activities. I will concentrate on mountain towns, in this case Boise Idaho, to show how leisure (in this case skiing) brings people across different groups together. In my research, I look at why, how, and where cluster participants share knowledge outside the formal structures of their professional affiliations and argue that informal networks based on a high degree of trust can serve as a key driver to building these networks. These informal networks can be derived by non-work ties and shared interests outside of purely economic motives—hobbies, passions, beliefs, and extracurricular activities. People participating these activities in them share core beliefs, values, and goals that transcend a vision of mankind as a pure economic animal, and the relationships formed around them can lead to bridges between unconnected social groups, creating social capital. This social capital, in turn, can become a key source of competitive advantage to smaller areas looking to derive growth, quality of life, and tax benefits from clusters without the resources of the Global Cities. Examples of these informal networks range from alumni of noted business schools (more on the formal side) to members of the same Church (somewhere in the middle) to skiing and rock climbing partners (more on the informal side.) For this first piece of research, the focus will be on skiing. In Boise, Idaho.

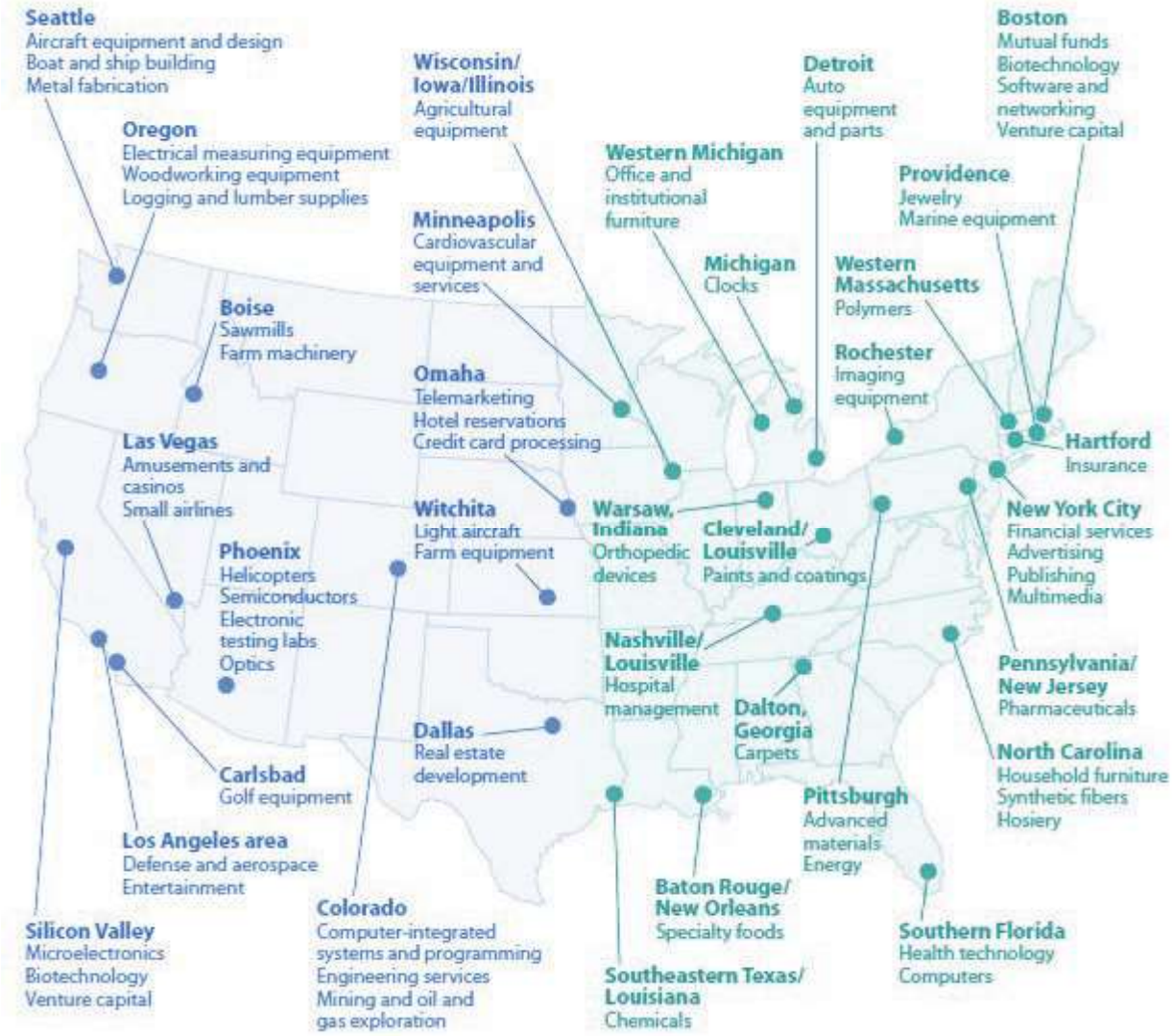
LITERATURE REVIEW

I would like to take a look at three areas of literature. First, we will examine some of the history on economic agglomeration and clusters as well as the literature about optimum cluster size and location. Then, we will look at the literature on informal networks and trust based ties, particularly in terms of how this can lead to knowledge spillovers. Finally, we will take a brief look at some of the history of informal cluster formation in the State of Idaho which has paved the way for my research case of contemporary Boise.

Grouped Together, is Bigger Better?

The idea of positive externalities from clusters or agglomeration is nothing new, dating back to Marshall's (Marshall, 1920) work showing that firms benefit from access to a pool of specialized labor, specialized input providers, and spillovers of technology by competitors. Marshall showed that firms indeed do often find that the advantages outweigh the disadvantages which has driven the sheer global number and diversity of clusters, and since this time clusters have continued to thrive both in their inception, the level of competition to attract and retain them by governments, businesses, and investors, and the amount of research that they generate (a Google Scholar search on "economic clusters" generates 1,450,000 results). Here is a recent US cluster map by the US Department of Commerce and Harvard Business School:

FIGURE 1
ECONOMIC CLUSTERS ACROSS THE UNITED STATES



From: http://www.clustermapping.us/content/clusters-101.

A number of interesting questions have grown out of the work on agglomeration revolving around the optimal size of a cluster as well as how information flows between competitors to produce these agglomeration effects. Much work has supported the "bigger is better" theory that backs global cities and industry clusters. Sassen (Sassen, 2001) argues how new forms of globalization helped drive concentration in the global financial services industry across New York, London, and Tokyo and the implications of these clusters. This work has been further supported by a number of scholars including John Friedmann's World Cities (Friedmann, 2005) as a staging point for global capital, studies to show "spikiness" across dimensions (Florida, 2005), and many others. In terms of attracting foreign direct investment, bigger often is better and Castellani and Santangelo recently found that over 80% of cross border investments accrue to the top 100 global cities. This leaves a staggering number of smaller cities competing for the remaining 20%, and many of these projects tend to be research and development intensive making them amenable both to a strong knowledge talent base (Castellani and Santangelo, 2016)

as well as to a strong lifestyle base. I believe that with such intense competition for scarce knowledge workers, lifestyle considerations can be a key factor in attracting and retaining.

Beyond the global cities, a parallel stream of research looks at how and why industries agglomerate into a single place beginning with Krugman's (Krugman, 1991) seminal study of the Dalton Georgia carpet industry, showing how it shares economic characteristics of more famous clusters such as Silicon Valley. Less "sexy" industries also tend to form clusters in less well known global cities. When asked how Wuxi, a well-off but not so well-known industrial city in Eastern China built a cluster around turbines and auto parts manufacturing, a local official remarked "Shanghai and Suzhou want to be the Silicon Valley of China. We are happy to be the Detroit" (Marr and Jones, 2007). Thus, size is just one factor.

Another challenge to the "bigger is better" view comes from Shaver and Flyer (Shaver and Flyer, 2000) who find that smaller, less leading foreign firms locating in clusters abroad tend to fail at a higher rate after eight years than already dominant firms who go it alone, indicating that stronger firms will attract less of a cluster effect and will do better going it alone. Folta, Cooper, and Baik (Folta, et. al., 2006) also find that there are increasing returns to cluster size but that diseconomies begin to form across important dimensions of knowledge and resource sharing particularly as weaker competitors begin to join the cluster and tip the balance of positive externalities. This seems to show particular promise for second and third tier cities particularly in attracting new industry participants.

Leaving aside the questions of size and concentration, what incentives exist for competitors to share resources within clusters? Much of the literature on the topic is concerned with the formal incentives that can be put into place to drive cluster formation. Michael Porter (Porter, 2000) looks at the economics and suggests policies around clusters, and these and related ideas have influenced governments around the globe from to local municipalities to China. My own research on attracting foreign direct investment to Chinese second and third tier cities conducted over 2006-2008 for the Economist Intelligence Unit showed that local governments had a tendency to copy and undercut other incentives in the hope of attracting key "tenants" to their clusters (Marr and Jones 2007, 2008). As a result, businesses would play them off of each other and tend to make decisions more based on the logic of their supply chains and the availability of talent (one manager remarked that all of the incentives in the world did not make a difference if you had no access to talent and had to spend half of your managerial time training employees in basic skills such as using a sit toilet that were generally taken for granted, creating significant hidden costs. (Marr and Jones, 2007). Furthermore, the more "vanilla" and top-down the cluster was the higher the rate of attrition among employees both skilled and unskilled, driving up costs, creating production inefficiencies, and jeopardizing intellectual property.

Initial investigations and interviews at the time found that smaller cities with higher quality of life—such as East China's Hangzhou and Nantong as compared to larger Shanghai and Nanjing—were better able to mitigate these factors and were a key factor in both the cluster development as well as the emergence of star companies such as Hangzhou's Alibaba. As Jack Ma, founder and Chairman said in a 2006 interview I conducted with him:

"One major benefit for companies located in Hangzhou is that it is easier to be a big fish in a small pond. Many multinationals entering Hangzhou realize that it is much easier to get support of the local government, because Hangzhou is so aggressive about attracting foreign enterprises. So you have all of the economic openness of Shanghai, with much more attention and encouragement from the government, simply because there are fewer companies to compete with…Hangzhou is a paradise for attracting and retaining talent. Unlike Shanghai, where people tend to job-hop much more, employees in Hangzhou are more likely to stay loyal to an employer." (Marr and Jones, 2006, p. 92)

Porter Erisman, author of *Alibaba's World* and then Vice President of Marketing at Alibaba, added that being located in Hangzhou allowed employees to take frequent hikes in the mountains during working hours, helping add to their creativity and making it an attractive place to work, and that key talent was unhappy to leave for roles in the larger playing fields of Shanghai, Hong, Kong, and beyond (Marr and Jones, 2006).

The Brotherhood of the Rope: The (informal) Ties That Bind

In his seminal article on the characteristics of social networks in 1973, sociologist Mark Gravottener (1973)examined the data on widespread social networks to determine whether information spreads more diffusely through "strong ties" or "bonding ties" ie. people who see each other on a regular basis such as colleagues and family, or through "weak ties" or "bridging ties" ie, people whose networks only occasionally cross and see each other infrequently such as acquaintances or friends of friends. Gravonetter looks at the importance of weak ties in the developing of social networks and the dissemination of information and posits that weak ties as defined by individuals who have infrequent social interactions are ultimately more effective in diffusing information over wide networks than strong ties such as family and close friends due to the nature of networks. This finding is particularly relevant to smaller and more isolated cities with a fairly strong tourism industry such as their historical geographic isolation as defined by their distance from a major urban center. Gratovenetter (Gratovenetter ,1973) further finds that there is a degree of choice in how weak ties are formed based on preference and trust, giving smaller and isolated cities a good reason to "nudge" (Leonard, et. al., 2008) their communities into developing more weak ties particularly into highly sought after talent.

Anne Saxenian (Saxenian, 1994) looks outside the formal networks and relationships within firms to find that a complex network approach underlies the success of Silicon Valley and Boston's Route 128, underscoring the social ties that underlie the alchemy of cluster formation. Saxenian and Hsu also take this idea across global boundaries in comparing the success of Silicon Valley and Taiwan's Hsinchu, noting the importance of a generation of US-educated (often in the Silicon Valley area) Taiwanese entrepreneurs, who then took these social networks and knowledge back to Taiwan to create economic and innovation clusters such as Hsinchu outside of Taipei home to tech giants Acer and TSMC.

How do networks affect innovation? Jaffe et al (Jaffe, et. al., 1993) look at the geography of patent citations and find a strong local effect, indicating the strong presence of shared local knowledge across participants in heterogeneous firms helps to drive innovation. Almeida and Kogut (Almeida and Kogut, 1997) look at patent data to find that small firms tend to innovate in less crowded spaces and conclude regional knowledge networks are a greater knowledge driver than the internal activities of large firms, indicating the importance of such networks to entrepreneurial success. Finally, Acs et al (Acs, et. al., 2007) find that this is particularly important to smaller firms, emphasizing the importance of knowledge spillovers for start-ups.

Trust across bridging ties, which in my theory can be developed and strengthen by people through leisure activities with a shared passion, is key to this network formation. The importance of trust in organizations and divergent relations has also been established by a number of scholars. Putnam (Putnam,2000) looks at this in terms of social capital, which can drive both bridging across groups and bonding within groups. Bonding represents strong connections within homogeneous groups that often exclude interaction outside the group. Bridging, on the other hand, entails interaction between different social groups, and looser bonds between actors. Hoyman and Faricy (Hoyman and Faricy, 2008) claim that strong bonds between members of homogeneous groups may hinder innovation since these bonds make the members more complacent and isolated from impressions outside of their small circle of social interaction. These strong bonds therefore generate conformity and a strong obstacle to innovation. Florida (Florida ,2002) connects the "bridging" form of social capital with what he calls the creative class and connects innovation to loose bonds between different social groups, which contributes to an open society, and Kramer and Tyler (Kramer and Tyler , 1996) show why trust-driven relationships are often preferred to the rational-choice driven self-interest. The industrial revolution model, which in this case is being supplanted, is well described by Hammar and Svensson (Hammar and Svensson, 2000) in terms of the relationship between one dominant employer (the "mill") and loyal workers, controlling the scope of the worker's economic activity. This encourages innovation between members with "weak ties" (Grantivettner, 1985) taking advantage of "structural holes" (Burt, 1992) to mobilize social capital into areas of desire. The Boise ski network provides examples of both bridging and bonding ties, which I will show spans a network of influential individuals.

Bridging and Bonding, or Faceting and Rounding

In snow science, stability of a slope is determined by the relative strength of snow crystals in a particular patch of snow as driven by storm cycles. Snow can either become more faceted, pushing itself away from other crystals, or more rounded, by bonding more strongly (AIARE, 2016). Similarly, in the study of social networks, bonding refers to strong connections within a homogeneous set of actors and deters action outside the group (Patnam, 2000). Bridging entails looser interactions between groups as defined by weak ties (Granovetter, 1973) or structural holes (Burt, 1992) with the bridge acting as "a line in a network which provides the only path between two points" (Granovetter, 1973) The interaction between bridging and bonding in social networks can promote collaboration and creativity (Slotte-Kock and Coviello, 2010, Daskalakim 2010, Lin et. Al. 2010).

In this paper, we will not focus on the shared learning aspects of social capital as we will assume that by definition all of the actors have satisfied the prerequisites that a number of authors (Beugelsdiik and Van Schiak, 2005 and Hauer, et. al. 2007) have established as exhibiting a positive relationship with innovation and economic growth in a region. Critiques of previous research have pointed out that purely quantitative research does not augment the actor dimension in social capital (Huber, 2009) and that this can be a critical factor as a starting point (Mayntz, 2004).

METHODOLOGY

In this paper, we build a case around the importance of skiing in Boise, Idaho, both in terms of how it bonds by attracting and retains talent as well as how it creates bridges by creating intra-regional networks connected to a large global network of key players in economics, politics, and the social world. We begin by looking at the demographics of Boise, then at how Sun Valley, Idaho was a shaper in this process worldwide, then at how Boise pulls beyond its weight on the happiness to income comparison, then look at how the skiing network spans both the Boise area as well as key partner areas, and finally look at how a new entrant group—namely Chinese expatriates working largely in the high-tech sector— value the lifestyle and outdoor recreation of Boise above other opportunities.

CASE STUDIES AND RESEARCH FINDINGS

Boise, Getting Better all the Time

Boise, Idaho is a thriving city of around 215,000 people in 2016 with around 680,000 in the nearby Boise City-Nampa, Idaho Metropolitan Statistical Area (MSA) locally known as the Treasure Valley. Boise has a number of advantages making it amenable to having a cluster. First, Boise is the State Capitol of Idaho and hosts the seat of Government. Next, Boise is home to Fortune 500 Firm Micron, one of the US's largest semiconductor and memory firms, and Simplot, an agribusiness giant both of which having strong local ties and pride. Next, Boise is home to Boise State University, a metropolitan research University with strengths in engineering, business, and other fields. Finally, Boise also has a thriving startup community with a number of startup spaces, accelerators, and other institutions designed to create the conditions for successful startup businesses around technology, and has done so already with firms such as Clickbank, Clearwater Analytics, Cradlepoint, and Micron itself to name a few. However, none of this precludes the ability to create a successful tech startup cluster.

At the same time, Boise is surrounded by the 2.2 million acre Boise National Forest directly to the North and the 485,000 acre Snake River Birds of Prey National Conservation Area directly to the South, with easy access to skiing, mountain biking, fly fishing, river running, climbing, and almost any outdoor activity imaginable. *Outside* magazine in July 2016 ranked Boise as one of the Top 10 Big Cities in the US for Active Families, Best for "Playing in the Rockies" (Outside, 2016). Many conversations across many industries and jobs involve references to outside activities, and many Boise citizens participate in such outings.

Star Clusters in Sun Valley

Idaho has a long history of this kind of outdoor sports oriented cluster production dating back to the founding of Sun Valley in 1931. Sun Valley, the first "European" style resort in the Western United States, was founded by W. Averell Harriman, later Secretary of Commerce. Harriman, an avid skier, heard of frequent avalanche activity on one of the trunk lines near Ketchum, Idaho, and upon investigation found a powder paradise on the beautiful, sun soaked slopes of the Pioneer mountains. According to Annie Glibert-Coleman (Glibert-Coleman, 2004), the resort attracted such luminaries as Earnest Hemmingway and Gary Cooper, both of whom made their homes there for much of the year, and was frequently visited by the Kennedy family, Marilyn Monroe, Lucille Ball, and other stars of the era. This booming ski town also gave rise to two major players in the optics industry, Smith and Scott. Both began their business in ski goggles and later expanded into sunglasses and other optics. However, rising costs pushed both companies to eventually pack up shop and relocate.

More recently, Wall Street based Allen & Company, a venture capital and private equity firm focusing on media and technology investments, has created the "Sun Valley Annual Meeting." The meeting offers a chance for key investors, entrepreneurs, and government leaders to gather and discuss the evolution of technology and media. Recent attendees have included former Microsoft Chairman and Founder Bill Gates, Apple CEO Tim Cook, Facebook CEO and Founder Mark Zuckerberg, Tesla and SpaceX Founder and CEO Elon Musk, Chinese media entrepreneur and Youku Founder Victor Koo, Hollywood Producer Harvey Weinstein, Dreamworks CEO Jerffery Katzenberg, Warner Brothers CEO Kevin Tsujihara, News Corp Chairman Rupert Murdoch, Canadian Prime Minister Juistin Trudeau, and Argentenian President Mauricio Marci. As we will see, this has spillovers precisely through skiing relationships that extend to Boise and connect it to this truly global network.

(Relatively) Poor, Happy, and Hardworking in the Mountains

Boise joins Bozeman, Bend, Boulder and others (the 'B' towns) as a group of small cities with high innovation and high outdoor sports cultures with relatively lower "happiness thresholds" to larger cities. Kahneman and Deaton (Kahneman and Deaton , 2010) found that above an income of about USD $75,000 per year, there is little increase in emotional well-being. Taking this base case and adjusting for the local cost of living index (Wall Street Journal, 2010) shows a stark difference in the income needed to be happy by geography:

TABLE 1
COST OF LIVING VS. HAPPINESS SALARY IN VARIOUS US CITIES

City	Cost of Living Index	Adjusted Happiness Salary
Boise- Nampa	93	$67,950
Bend	100	$75,000
Boulder	124	$93,000
Austin-Round Rock	94	$70,500
San Jose- Sunnyvale- Santa	158	$118,500
New York- North Jersey- Long Island	218	$163,500

From: http://blogs.wsj.com/economics/2010/09/07/what-salary-buys-happiness-in-your-city/

Clearly, these lower salaries are attractive to new businesses when combined with cheaper real estate costs particularly if the requisite level of talent is available. As my data on the Boise Chinese expatriate Chinese community indicates, people will stay despite lower salaries.

FIGURE 2
MODEL OF LOCAL SKI VALLEY SOCIAL NETWORKING

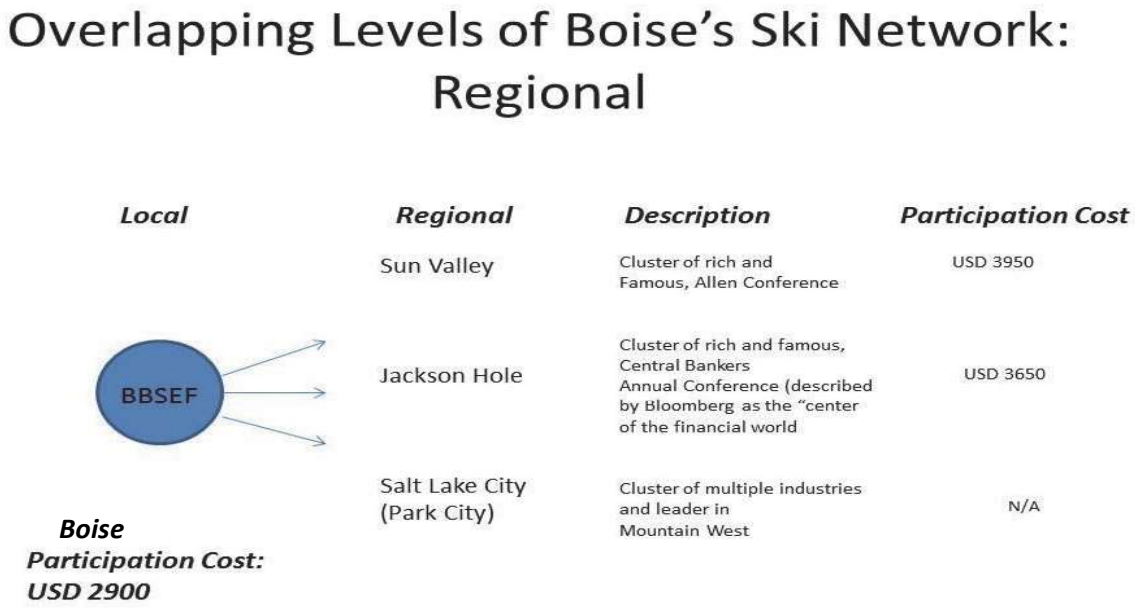
Boise Overlapping Networks

To describe the formal/informal interaction of individuals in Boise's network, I look at the structure of the Bogus Basin ski network. Bogus basin is a ski area near to Boise, with one of the lowest season pass and daily ticket prices in the nation. Ski Magazine (1991) rated Bogus Basin as the world's top urban ski area due to low lift ticket prices, close proximity to the city, and acreage of terrain. It is also a social point of networking, from the board to season pass holders to irregular visitors.

This, as reflected in the Chinese community research, allows for a geographical space for the exchange of ideas and building of ideas. As one Associate Board member remarked, Bogus Basin is a place to meet and greet all walks of life in the Boise community.

Beyond this, through the BBSEF (Bogus Basing Ski Education Foundation) , and additional network of bridging relationships is made to other key mountain town locations. Sun Valley, as previously described, Jackson Hole, famed for its annual conference of global central bankers as much as for its steep skiing, and Salt Lake City, the regional hub. Boise, too, is able to hold costs down to local citizens compared to wealthier neighbors, giving a step up effect. These other places, in turn are globally networked and provide and exchange of people between places that would not likely otherwise be visited.

FIGURE 3
MODEL OF REGIONAL SKI VALLEY SOCIAL NETWORKING



The Boise Chinese Community—Small, Networked, Learning Groomers, and Growing

For this case study, we will focus on the motivations of a small but specific group in Boise, namely the expatriate Chinese community in Boise. The Treasure Valley has a small but growing community of Chinese residents spread across the communities of Boise Proper, Nampa, and Eagle. Unlike cities on the West Coast, such as San Francisco, Portland, and Seattle, Asian residents including Chinese are still a relative rarity in the region.

TABLE 2
POPULATION BY RACE AND ORIGIN

City	Boise	San Francisco	Los Angeles	Portland	Seattle
Population	206,100	805,195	3,792,662	583,800	684,451
White	89.0%	48.5%	49.8%	76.1%	69.5%
Hispanic or Latino	7.1%	15.1%	48.5%	9.4%	6.6%
Black or African American	1.5%	6.1%	9.6%	6.3%	7.9%
Asian	3.2%	33.3%	11.3%	7.1%	13.8%
Total Population Growth Rate	4.7%	7.4%	11.3%	8.3%	12.5%

From: http://www.census.gov/quickfacts/table/PST040215/0644000,0667000,5363000,1608830,4159000

Chinese societies have traditional been driven by a strong networking orientation described by the *guanxi* system (Wang, 2001). Therefore in a small community like Boise there is a strong impetus to build networks outside the confines of work. The Boise Chinese expatriate group provides an interesting source of data as many of them work for or are family members of those who work for three large and unrelated multinationals with a large Boise presence, Micron and Simplot (both Boise based) and HP (whose printer division is located in Boise).

In a survey taken among participants at the Boise 2016 Chinese New Year's gala, we found that along with work and culture, outside sports/nature and the perceived reputation for safety were the key drivers attracting Chinese residents to Boise:

FIGURE 3
CUMULATIVE RESULTS OF SURVEY OF IDAHO CHINESE EXPATRIATE COMMUNITY

February 2016

Why did you choose Idaho? Please	**N=53**
rank from 1 (most important) to 14 (least important)	
M/F	**52%/48%**
_____	
__ Work reasons/ 工作	**1102**
__ University Study or Graduate School (including exchange students)/ 大学及研究生学院学习（包括交换生）	**927**
__ Boise Safety/ Low Crime Reputation/ Boise 城市安全性/犯罪率低	**589**
__ Idaho Clean Air/爱达荷州新鲜空气	**561**
__ Access to Nature and Outdoors/ 自然与户外天堂	**514**
___ Kid's Education/ 小孩教育	**335**
__ Relative/Friend/Spouse in Idaho/ 亲戚/朋友/夫妻一方在爱达荷州	**316**
__ Boise City Reputation/ Boise 名声	**253**

__ Relative/friend lived/worked/ studied in Idaho recommended/爱达荷州住过/工作过/学习过的亲戚/朋友的推荐	**196**
__ Financial Reasons or Scholarship /金融/奖学金原因	**139**
__Purchase property/ 买房	**109**
__ Relatives had large influence on decision /亲戚在决定权上有很大影响	**107**
__ Boise Chinese Community Reputation/ Boise 华人社区名声	**88**
__ Immigration or Permanent Residence in US / 移民	**46**

In this data, the reasons for coming to Idaho beyond work and study as the primary drivers are Boise Safety/ Low Crime Reputation, Clean Air, Access to Nature and Outdoors, and Kid's Education. Added together, however, factors around outdoors outscore other nonwork considerations. Furthermore, for example, we interviewed an informal group within this group of skiers, taking advantage of the low cost season passes at nearby Bogus Basin ski resort. Many comments were around how it gave access to differing social groups as well as giving access to an activity considered the province of the very rich in China and adding a status element. This helps keep thee talents in town at major innovator firms such as Micron, HP, and Simplot, as well as at up and coming firms such as Clearwater Analytics and Cradlepoint.

CONCLUSIONS AND IMPLICATIONS

Further understanding how, why, and how informal social networks can drive the success of an economic cluster is important to the organization, formation, and ongoing nurturing of the cluster. Boise, Idaho provides a good case study through the author's access and proximity to the participants, and can serve as an example of how informal relationships create the channels for knowledge spillovers into more formal channels.

If this thesis is correct, there are managerial and policy implications for cluster participants to try to incentivize informal social participation in whatever activities are proximate to the cluster and are likely to generate that elusive quality that drives knowledge sharing across formal channels. Governments as well as ambitious investors and entrepreneurs in out of the way areas wishing to reap the benefits of clusters built around high value knowledge industries would be wise to look to their own local strengths beyond economic development plans and sets of economic incentives to attract and retain the people and resources to make those plans happen.

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