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THE THEORY AND PRACTICE OF THIRD WAVE REGIONAL ECONOMIC DEVELOPMENT STRATEGIES

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THE THEORY AND PRACTICE OF THIRD WAVE REGIONAL ECONOMIC DEVELOPMENT STRATEGIES

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ABSTRACT

In an environment of globalization and rapid technological change, entrepreneurship and innovation have become important objectives of state, regional, and local economic development policy. Entrepreneurial focused economic development strategies target state and regional efforts towards policies –such as cluster development, business incubators, regional trade associations, and developing local entrepreneurs and small businesses. If it is imperative that states and regions pursue these strategies, researchers must begin to classify the types of programs that states and localities are using, as well as analyze and document the impact of these policies on knowledge economy variables. This research proposes to add three new and additional elements to this relatively young research stream. This dissertation will address three distinct components of entrepreneurial development policy effort.

Manuscript one clarifies and defines a research agenda on business incubators. Applying the incubator concept to the economic theories of network and agglomeration economies offers new insights concerning incubators and local economic growth. From this a research agenda based on a framework of applied economic theories is developed, along with a detailed outline of important future research questions. The second manuscript explores the scope of local and regional entrepreneurial development efforts across South Carolina. This paper reviews the relevant entrepreneurial literature and discusses the entrepreneurial landscape in South Carolina. A statewide survey and appropriate statistical modeling techniques are used to better understand the factors that

influence the probability of a community having/not having an entrepreneurial development program. The third paper begins with a review of the literature on the economic benefits of municipal investment in advanced ICT infrastructure investment, small business uptake of advanced ICT and e-business technology, and an overview of the legal barriers that states have enacted that restrict local and regional investments in advanced ICT infrastructure. Further, a series of panel regressions are used to estimate the impact of ICT policy restrictions on state small business growth and entrepreneurial activity. Overall, if our nation and each state are to fully embrace a "knowledge-economy," understanding the impact the policy environment may have on a variety of economic development indicators is important for the ongoing research agenda.

DEDICATION

This dissertation is dedicated to the following people:

- My husband, Keith P. Housand, who has been an unfailing source of love, comfort, therapy, and encouragement. He has been my biggest cheerleader.
- My children, Ally, Tim and Sam, who have sacrificed six years of time and experiences with their mother but have remained my constant cheerleaders in spite of it. They have also grown into three wonderful young people—I am honored to be their mom.
- In memory of my grandmother, Bonnie Jordan Dickes, who emphasized the importance of education for men and women and led the way by being valedictorian of her 1942 Coleridge, Nebraska high school class.
- My father, Allen L. Dickes, who has been my academic role model and who has always encouraged and supported my intellectual pursuits. I could not have done this without his on-call professional and academic advice.
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- My aunt, Barbara D. Halgren, who has been a constant source of love, support, and words of encouragement. She is always willing to be my on-call therapist. Her love anchors and sustains me.

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CHAPTER ONE

INTRODUCTION

In today's global marketplace, evidence continues to mount that economic development models emphasizing industrial recruitment, or "smokestack chasing", do not provide the benefits that states and communities hope for (Shaffer et al., 2004). Further, there is increasing evidence that these strategies are a "zero-sum" game as states and communities compete to provide the "best" incentive" packages for new firm recruitment. The rapid pace of technological change, the competitiveness of the global marketplace, and unique qualities of individual communities and regions further suggest that a community cannot depend on one economic development program. In order to achieve long-run sustainable economic development, most communities will require a combination of key development strategies, a boutique approach, where the development plan is tailored to individual community needs and assets.

Historical drivers of economic development focused on improving a region's export base through industrial restructuring and/or enhancing firm scale economies through cost competition. Strategies of economic development from the 1950's to the 1990s focused on financial incentives, industrial consolidation, industrial parks and other forms of cost reduction. In the 1970's and 1980's economic development strategies largely emphasized "tax abatements, investment credits, low-interest loans, land write-downs, and labor-training grants to reduce labor and operating costs and lure manufacturing plants (Turner, 2003)." Bradshaw and Blakely (1999) call this period of "smokestack chasing" the first wave of industrial recruitment efforts. As the 1980's wore on, "second wave" development strategies, including business creation support, development of business incubators, increasing investment capital, and providing other types of technical assistance to local, existing businesses increased in popularity (Bradshaw and Blakely, 1999). As second wave development approaches have taken hold, industrial recruitment strategies have continued to evolve and remain a popular policy tool.

As the 1980's ended and the 1990's began, economic development strategies adopted a more entrepreneurial spirit (Turner, 2003). Regional scientists argue the forces of industrial restructuring and globalization precipitated a new wave of economic development, the so called "third wave" of economic development. In today's third wave of economic development all communities must create and maintain a competitive advantage in the face of dynamic, persistent change. Innovation and entrepreneurship are argued to be the major drivers of regional economic growth and development. Strategies for achieving regional competiveness emphasize business creation, firm clustering and innovative research and development. Eisinger (1988) observes that this shift in economic development policy generated additional support for research and development facilities, export promotion, technology transfer programs, and investment in venture capital funds.

Entrepreneurial focused economic development strategies target state and regional efforts towards policies –such as cluster development, business incubators, regional trade associations, and developing local entrepreneurs and small businesses. Moreover, traditional indicators of regional economic competitiveness (e.g. natural resource endowments, labor costs, taxing policy, cheap capital, and traditional infrastructure) are giving way to new innovation-focused indicators (e.g. number of patents, research and development expenditures, and the availability of knowledge workers). The keys to success in this new era of development highlight the importance of leveraging unique regional assets, including human capital, educational resources, and/or natural amenities among others. Dabson argues that "competitiveness is not the exploitation of location, natural resources, or low-cost workers; rather, it is converting these assets into intellectual capital and added value (2007, p.27)."

The importance of intellectual capital, or knowledge, in this economic era is one of the reasons it has also been classified as the "knowledge economy." This economic environment rewards individuals and firms that leverage knowledge resources in to value added production of goods and services. Moreover, knowledge, or intellectual capital, has potential spillover impacts across firms and regions as individuals and firms interact in informal and formal networks. The emphasis on intellectual capital and knowledge spillovers has the potential to further stimulate an environment of innovation and entrepreneurial activity.

One of the critical features of the new economy is that there is not a one size fits all strategy for local and regional economic development. Regional scientists and policy makers are increasingly advocating locally-based or "home-grown" innovative solutions to local and regional challenges. The notion of locally centered, community economic development is backed by a growing body of theory and research that critically examines the “bigger is better” model and emphasizes the organizational depth and breadth of small-scale, locally controlled economic enterprises (Piore and Sabel, 1984; Tolbert et al. 1998: Robinson, Lyson, and Christy, 2002). The ideas of asset-based community development supports similar conclusions concerning the strength and importance of local assets for successful economic development efforts (Kretzmann and McKnight, 1993). Entrepreneurs have always been an important component in a community’s economic profile, but their move to the front and center of local economic development is a paradigm shift. This thinking suggests that locally driven entrepreneurship development efforts are critical for reversing stagnant economic conditions and sustaining long term economic growth and development by creating wealth and jobs through locally owned and operated firms.

The role of entrepreneurs throughout United States (U.S.) economic history has been well documented (Suarez Villa, 1989). Academic research on entrepreneurship can be traced back to Schumpeter’s (1934) ideas on the dynamic nature of economic growth. In Schumpeter’s model of creative destruction, entrepreneurs destroy a market’s static equilibrium as they introduce new ideas, products, and processes into the marketplace. Interest in entrepreneurship continued at Harvard University in the 1920’s with business history studies (Soltow, 1968) and the creation of the Research Center in Entrepreneurship History in 1948. With the exception of Schumpeter’s early work, much of the work on entrepreneurship throughout the first half of the twentieth century was focused on the role of individual entrepreneurs and less on the relationship of entrepreneurship to economic growth and development.

The dramatic increase in entrepreneurship research is driven by growing evidence that entrepreneurs are critical sources of local economic growth and innovation. Reynolds et al. (1999) argues that entrepreneurship explains one third of the difference in the economic growth rates between countries. The OECD (2003) reports that high-growth small and medium-sized businesses create the majority of new jobs throughout the world. Autio and Hancock (2005), as a part of the Global Entrepreneurship Monitor (GEM), define and analyze High Expectation Entrepreneurial activity (HEE). HEE's are defined as new businesses that expect to have a minimum of 20 employees within 5 years. In their analysis, these firms represented 9.8 percent of the total sample, however, they are estimated to be responsible for 75 percent of the total jobs created by all new start-up firms. However, these studies also caution that the wealth and income benefits of entrepreneurship will only come from approximately 1 in 10 or 1 in 20 new ventures.

Davis et al. (2005) indicate that entrepreneurial firms are a critical part of U.S. business activity. They argue these firms are the nexus of future employment opportunities and are often the fastest growing firms in the economy. From 1990-2003, the U.S. Census Bureau reports that small firms with fewer than 20 employees created almost 80 percent of net new jobs and employed 18.4 percent of all U.S. workers. Small business start-ups over this same time period represented approximately 13 percent of total new job growth among small firms (Edmiston, 2007). Similarly, the Council of State Policy and Planning Agencies (CSPA) estimates that "88 percent of net new job growth in the rural U.S. came from new businesses" (CSPA, 1989, p1).

However, the nature of small business growth is not as clear as this research indicates. In 2000, of the 21 million employer and nonemployer firms in the U.S., approximately 76% were nonemployer firms, but these firms only represented 4 percent of total business revenues (Dabson, 2007). Similarly, small business represented 25 percent of total employer firms and less than 5 percent of business revenues, while young businesses (less than four years old) represented approximately 35 percent of employer business and less than 20 percent of revenues. From a job quality perspective, the evidence is unequivocal; large firms offer better jobs and higher wages than small firms (Bureau of Labor Statistics, www.bls.gov, 2006). Mills and Bhandari (2003) find that small business owners and their employees are considerably less likely to have employer-based health insurance policies. The Bureau of Labor Statistics National Compensation Survey (2006) reports that workers at small firms are generally likely to receive lower retirement benefits, reduced insurance benefits, and reduced eligibility for disability and worker's compensation insurance (www.bls.gov). Research also reveals that small firms often experience greater volatility in their job offerings, which results in greater turnover and more job separations or dissolutions (Anderson and Meyer, 1994; Davis, Haltiwanger, and Schuh, 1996; Groothuis, 1994).

While job creation and job growth are often the main priorities of economic development, one of the identified benefits of entrepreneurship is the resulting innovation that can be stimulated in an entrepreneurial environment. This is the classical Schumpterian (1942) argument of entrepreneurship. It is through the process of creative destruction that old goods and services, tired businesses and inefficient or ineffective organizations are swept away and in their place the forces of innovation create new products, services, businesses and organizations. Edmiston (2007) reports that small businesses are often held to be more innovative than larger companies because they have less bureaucracy and more flexible employment, operate in more competitive markets, and may provide stronger personal rewards to entrepreneurs and their employees. Vossen (1998) contends the productivity benefits from small firm production can be substantial when compared against medium and large firm counterparts. Confirming this, the research concludes that small businesses produce more innovation per given amount of research and development than large firms.

Research supports that both small and large firms are innovative but in different ways and in different industries. Schumpeter (1942) asserted that in industries with high degrees of concentration (pharmaceuticals, automotive, etc.), larger firms would be better positioned to invest in innovations. This largely stems from the ability of these firms to invest substantial resources in research and development. However, large firms are often more effective at leveraging innovations to a final product and generating network synergies because of easier access to the people and technology that support an innovative environment (Vossen, 1998). The reality is that all sizes of firms are critical to business dynamics. There are also important synergies between large and small firms that are critical to enhanced innovative activity and small and large firm productivity. Entrepreneurs in the Silicon Valleys of the world leave big firms to start spin off companies; large firms buy innovative ideas and products from small firms and create marketable products and services; and small firms often benefit enormously from the basic or foundation research and development of large firms that allow for specific types of spin-off innovative activity. Just as Schumpeter described, the process of creative destruction, at its best, generates a synergistic, virtuous cycle of both large and small firm innovative activity.

At an individual level, being a successful entrepreneur is largely determined by wealth, education, and age (Bates, 1993). Psychologists indicate that entrepreneurs exhibit Type A characteristics, and have a high tolerance for risk taking and ambiguity (Gladwin, et al, 1989). While every population contains some proportion of entrepreneurs, the extent of entrepreneurship in any community or region is also dependent on the cultural, financial, and educational support that entrepreneurs receive within a community. Friedman (1986) upholds that state and local support of any or all of these key variables can impact local and regional entrepreneurial development.

Every location has entrepreneurs and each segment of the population has a percentage of individuals that are entrepreneurial. However, entrepreneurship clearly varies across states and regions and not all places are equally able to support and enhance the cultural, educational, financial, and institutional needs of local entrepreneurs (Birch, 1987). Moreover, individuals have different motivations and goals in becoming entrepreneurs. There are several different models that examine why individuals become entrepreneurs. According to Sherrard Sherrarden et al. (2004), traditional human capital theory does not adequately explain why individuals become entrepreneurs. Friedman (1986) argues that individuals become entrepreneurs because of some critical need or unrecognized opportunity. The argument is often made that people become entrepreneurs when they have lost a job or had some other major life change. Those who seek to become entrepreneurs because of an unrecognized opportunity often do so for a variety of reasons including the desire for personal autonomy, flexibility, personal satisfaction and growth, and professional freedom (Sherrard Sherrarden et al., 2004). In addition, there are also local-hero entrepreneurs who take an unrecognized opportunity and turn it into the next "big idea." These individuals start new business to "appropriate the expected value of their new ideas, or potential innovations (Audretsch, 2002, p26)." No matter the reasons, every entrepreneur can make a substantial positive impact on their local and regional community.

There have been a variety of classifications describing the types of entrepreneurs and their related goals and motivations for entrepreneurship. Table 1.1 describes the five different types of entrepreneurs highlighted by Dabson et al. (2003) in their description of rural entrepreneurs. Even though these are descriptions of rural entrepreneurs, these types can be identified in any community or region. It is important not to disregard the impact of 'aspiring', 'survival', or 'lifestyle' entrepreneurs, but it is 'growth' and 'serial' entrepreneurs who are of the most interest to economic development professionals. Growth and serial entrepreneurs have the potential to yield the Schumpeterian benefits of innovation, high growth, and high return on investment. Moreover, these are the entrepreneurs who have the potential to generate the most substantial benefits to the community and region. No matter what the type or reason for entrepreneurship, the objective for policy development is to encourage entrepreneurs who will participate in promoting and sustaining regional growth and development. As well, all entrepreneurs have the potential to be important contributors to creating a local climate of entrepreneurship and stimulating the local pool of entrepreneurs in the region.

Table 1.1: Rural Entrepreneurial Types

Entrepreneurs	**Characteristics**
Aspiring	Want to create a firm but have yet to do so.
Survival	Create a business to supplement existing income or because of few other employment options.
Lifestyle	Create a business to live in a specific location or have a certain lifestyle.
Growth	Create a new business with the goal of growing the business to create wealth and jobs.
Serial	Career entrepreneurs, turnover over and sell businesses once they become profitable.

Source: Dabson, B., Malkin, J., Mathews, A., Pate, K., and S. Stickle (2003). *Mapping Rural Entrepreneurship.* Battle Creek, MI: W.K. Kellogg Foundation, and Washingotn DC: CFED.

As the research on entrepreneurship has evolved, a related stream of research focused on entrepreneurial development policy has emerged. This area of research is not as well established as those focused on areas such as entrepreneurial traits, the characteristics of entrepreneurial regions, reasons for entrepreneurship, types of entrepreneurs, and the factors of success and/or failure of entrepreneurs among others. However, it is well established that entrepreneurs are not successful in a vacuum and that a variety of social, cultural, and institutional variables may impact individual entrepreneurs or the climate of entrepreneurship more generally. For example, research supports the idea that the culture of a community and local community institutions can support and enhance local and regional entrepreneurship (Hustedde, 2007; Lyons, et al., 2007). This leads one to consider what communities may be doing to increase local entrepreneurship? Further, if communities are actively engaged in this policy activity, what is the scope and breadth of local and regional entrepreneurial development efforts?

There is considerable publicity and discussion about entrepreneurship at the state and federal levels, but entrepreneurship is local and regional; what is happening from a policy perspective at these lower levels? If there is a place for public policy in entrepreneurial development, a related corollary asks how local economic development policy can contribute to local entrepreneurship and moreover, what policy efforts yield the highest private and social returns.

A burgeoning research stream has begun focusing on types of entrepreneurial development policies, along with assessing the strengths and potential outcomes of these policy efforts. Pages and Poole (2003) define entrepreneurial development as “the practice of encouraging the creation and growth of start-up companies (2003, p1).” As states and regions have pursued entrepreneurial oriented policies, they have utilized a diverse spectrum of policy tools. As a result, there is not a well defined core of entrepreneurial development best practices. However, Pages (2006) upholds that most entrepreneurial development programs share one, or some combination, of policy objectives: 1) increasing new businesses; 2) increasing the rate of growth of new businesses; and 3) enhancing the entrepreneurial climate. Additionally, several policy areas have emerged as major themes for entrepreneurial policy: 1) access to financial capital; 2) business incubators; 3) reform of business regulations; 4) technology development and infrastructure and 5) education and entrepreneurial awards (Pages, 2006). With this said there remains no clear definition of entrepreneurial policy and little understanding of policy best practices.

If it is imperative that as states and regions pursue these strategies, researchers begin to classify the types of programs that states and localities are using. Additionally, it is imperative to begin to analyze and document the impact of these policies on knowledge economy variables. This research proposes to add three new and additional elements to this relatively young research stream. This dissertation will address three distinct components of entrepreneurial development policy efforts through the three manuscripts described below.

This manuscript helps address these questions by exploring the scope of local and regional entrepreneurial development efforts across South Carolina. The first section of the paper reviews a wide and diverse range of literature on entrepreneurship, entrepreneurship policy, and industrial recruitment policy. This is followed by a comparison and discussion of how South Carolina fares in state rankings of entrepreneurship and innovation. While state rankings have their methodological problems, they provide a basic foundation for understanding how states are faring in the new economy relative to other states and regions. The third section of the paper outlines the methodology and reviews statewide survey results. The final section of the paper presents a logit model and discusses results of factors that influence the probability of a community having/not having an entrepreneurial development program. This research begins to clarify the nature of entrepreneurial economic development policy in local communities. Equally as important, this research begins to describe the types of barriers that may exist for local and regional communities in implementing "new economy" development strategies.

The overwhelming majority of states have invested substantial time, financial and human capital resources towards the development of organizational capacity to manage state and regional business incentives. As well, the competition for firms among states often takes on a game theoretic framework which makes many states reluctant to give up the game. State and local development officials confirm they are increasingly concerned with the effectiveness of business incentive policy but the nature of interstate competition makes these policies difficult to reduce or eliminate. As a result, industrial recruitment continues to play an important role in state economic development policy. However, paradigm shifts in economic development have resulted in substantial policy transitions over the past several decades. Old fashioned industrial recruitment continues to remain an important part of a state's economic development profile but a whole range of additional policy approaches are now held to be an important part of a region's economic development toolbox.

Industrial restructuring over the past several decades has resulted in a dramatic shift away from large scale manufacturing and traditional natural resource-based industries. At the same time, globalization and technological change have created opportunities for increased specialization within and across industries. Globalization has led to intense worldwide competition for profit and market share. It has also forced a transition in the way that economic activity is organized. This new industrial order is characterized by smaller, flexible manufacturing, smaller production runs, and increased specialization. The utilization of technological business processes in increasingly specialized, niche manufacturing markets is rewarded. The nature of this economic activity is arguably more conducive to small flexible firms that can rapidly meet the changing demands of consumers and suppliers.

Supporting this argument, Goetz et al. (2010) use a Kuznet's type process to outline the economic changes that occur as an economy evolves from an agricultural based economy to a manufacturing economy and then to an innovation, knowledge-based economy. Factor, agricultural- based economies are characterized by mundane entrepreneurs where self-employment and proprietorship are the primary forms of organization (Julien, 2007). Figure 1.1 provides evidence of this Kuznet's type curve

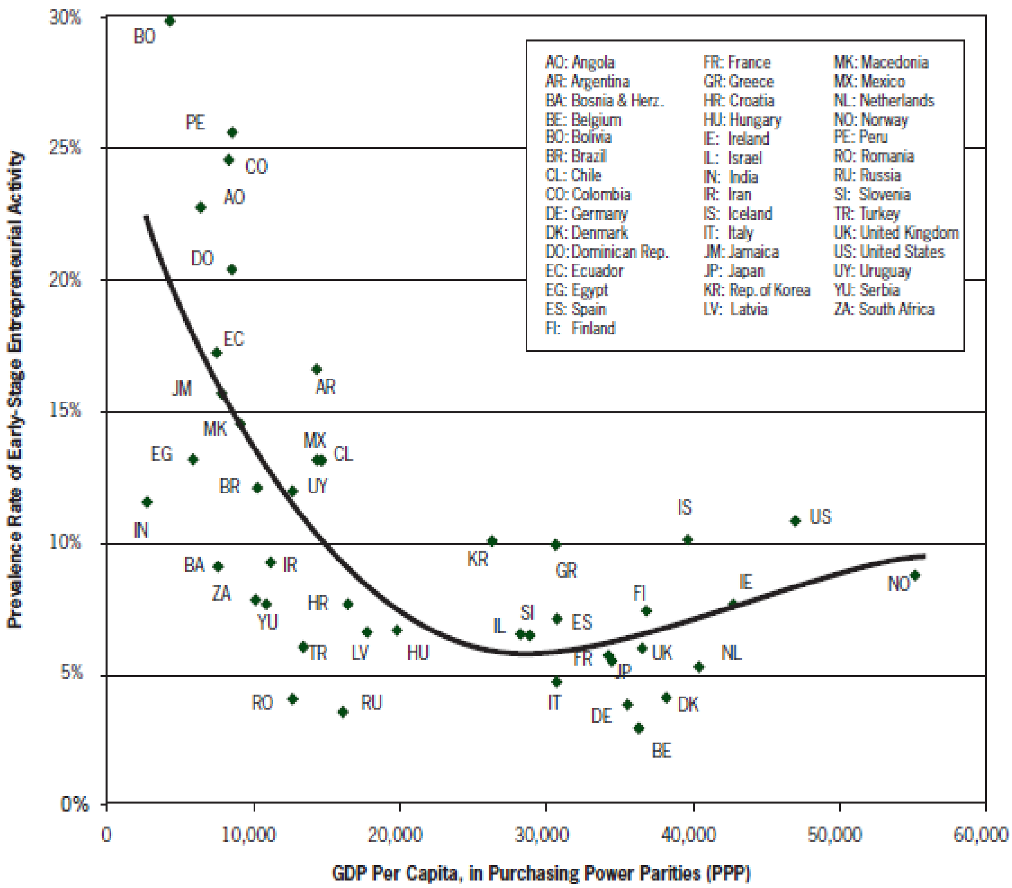

Figure 1.1: Early Stage Entrepreneurs as GDP Per Capita Rises.

Source: Figure 8 in Bosma et al., GEM 2008, p.22: Data are from GEM Adult Population Data and IMF. http://entreprenorskapsforum.se/swe/wp-content/uploads/2010/02/GEM-Global-Report_2008.pdf.

Entrepreneurship

Since the early 1970's, the changing economic landscape of communities across the nation has led to an increase in entrepreneurship research. Walzer and Athuyaman (2007) indicate that from 1969 to 2007 a general search for entrepreneurship on the EconLit database yields 1388 records. Moreover, research on entrepreneurship runs across academic disciplines; economics, management, psychology, sociology, and others. Low (2001) classifies entrepreneurship research as a potpourri of themes and orientations that ultimately makes consistent classification difficult.

Research Description

Manuscript One

With dramatic changes in regional and national economies around the world, Pulver's (1986) community economic development strategies remain unchanged; "attract outside investment, improve the efficiency and competitiveness of existing business, and encourage the creation of new enterprises (Markley and McNamara, 1995, p.1259)." However, industrial restructuring and globalization have put increasing pressure on regions to find the economic development panacea of the day. Industrial recruitment and other popular development strategies of the past remain in widespread use, but there is increasing emphasis placed on a new generation of policy tools. These policy measures continue to emphasize traditional economic development goals like job creation, economic diversity, competitive advantage, workforce development and others but seek to achieve these goals through policies that emphasize entrepreneurship and innovation as opposed to [a] relying exclusively on business attraction and/or retention efforts. The policy efforts that are increasingly used to support and enhance entrepreneurial activity and innovation include, but are not limited to, business incubators, cluster development, specific educational training programs and technology infrastructure investments.

Business incubators are one of the development approaches that are increasingly used to facilitate new venture formation, job creation, and an enhanced entrepreneurial climate. The idea of firm incubation is not new, but the systematic and often, public investment in business incubation is a relatively new phenomenon. Business incubators seek to capture the potential benefits of localization and/or agglomeration economies within the business incubator itself. Additional benefits of business incubators include job creation, an enhanced local entrepreneurial climate, the formation of formal and informal networks, increased local specialization depending on the type of incubator, increased local economic diversity and competitive advantage. While, incubators may yield substantial economic benefits to a region, they are long-term investments and often do not yield the returns that communities hope for in the short term. As well, because incubators are often recipients of short and/or long term public investment, it is important to understand the potential economic returns that these investments can provide to a community.

Existing research on business incubators is limited in several important ways. The National Business Incubator Association (NBIA) has sponsored and completed a number of studies characterizing and assessing the performance of incubators (www.nbia.org). However, as the NBIA is an international organization whose revenue depends upon the promotion of this policy tool, their research results should not be exclusively relied upon and should be considered in the context of a larger research agenda. Third party research is also critical to ensure a more complete, unbiased picture of incubator performance and assessment. Even taking account of NBIA studies, there remains a significant void in the quantitative analysis of incubator performance. Additionally, Bergek and Norrman (2008) argue there is a missing theoretical base from the literature on incubator performance and evaluation. The literature has also lacked an appropriate foundation in economic theory. As a result, there are ongoing research gaps in the incubator literature; gaps that with a thorough research agenda could be filled by future research on business incubation.

Manuscript one will clarify and define a research agenda on business incubators. The first section of the paper provides an introduction to the concept of incubators, followed by a review of the relevant literature. Next, key literature on the economic theories of network and agglomeration economies is reviewed. These two approaches offer opportunities for new insights concerning incubators and local economic growth. Finally, a research agenda based on a framework of applied economic theories is developed. Conclusions give further thought to these theoretical approaches and the research agenda that could result. The primary objective of this effort is to enhance the existing understanding of this economic development option and lay the groundwork for an improved understanding in the future.

Manuscript Two

As evidence continues to mount regarding the characteristics of successful communities and related development, it has become increasingly evident that regional economic development necessitates a boutique approach; one that utilizes a variety of measures deemed most appropriate for a specific community or region. Research also supports the idea that economic development must be targeted to the local assets and liabilities of each individual community and region. Even though the majority of communities will continue to engage in traditional industrial recruitment strategies; what additional policy measures are included in a state and region's economic development portfolio remains an increasingly pertinent research question. For example, are communities actively engaged in other economic development strategies such as business retention efforts, entrepreneurial development, labor training programs, or small business development?

As communities, states and regions have attempted to fully embrace the knowledge economy, entrepreneurial economic development strategies have become recognized as a legitimate and distinct regional development approach. These are strategies that are increasingly considered a primary component of state and regional economic development efforts. As a result, many states now have a variety of entrepreneurial initiatives, networks, and centers to promote this development strategy (National Governors Association (NGA), 2004; Williams, 2004). While states may have entrepreneurial programming in place, questions remain concerning what type of entrepreneurial programming takes place at a local and regional level. Local development officials may view entrepreneurship strategies as too difficult or out of reach for their community. As well, if communities already have access to small business development centers or other small business related organizations, they may view additional measures as unnecessary or redundant.

Additionally, the perceptions of local economic development officials with respect to state policy emphasis and economic development resource allocation may impact the practice of local entrepreneurial development. Policy perceptions and their influence on policy practice may be instructive as there is ongoing evidence that many communities continue to engage in traditional industrial recruitment even as evidence mounts that these approaches may not provide the benefits that communities believe they will. For example, if local and regional development officials perceive a strong bias towards industrial recruitment at the state or federal levels, there may be little incentive to pursue alternative development strategies with much vigor. If the "new economy" demands that communities shift their economic development focus, understanding whether communities are doing so and if they are not, why, is critical for a more complete understanding of the policy landscape and the incentives behind it.

Manuscript Three

The adoption and use of advanced Information Communications Technology (ICT) has permeated modern society and the academic literature in many fields for several decades. New growth theory economists brought to the forefront the importance of the addition of technology to the traditional factors of production of land, labor, and capital for regional economic growth. More recently, studies dealing with the adoption, use, and access to information communication technologies (ICTs) have come into the forefront. Broadband access, in particular, is receiving much attention since most computing applications with promise to deliver competitive advantage to firms and regions require it. It is argued that affordable high-speed Internet access and a tech-savvy workforce are essential elements, even prerequisites, to knowledge economy economic development strategy success.

As community, regional, and state economic development professionals begin to recognize the importance of advanced ICT infrastructure for their long-term economic success, there remain ongoing concerns of a national, regional, and local digital divide. Broadband access and use has dramatically expanded since the late 1990's but there remain un-served and underserved communities all across America. The digital divide exists within and across regions, among income groups, across educational attainment, and across race and ethnic groups. Part of the reason for this digital divide is that incumbent providers of these services often find it difficult or impossible to provide adequate service, or service at all, to areas that may not meet their estimated revenue requirements. It is argued that the duopolistic or monopolistic characterization of these markets will result in many communities remaining un-served or underserved without additional community options for Broadband infrastructure.

As a result, many communities, reeling from the effects of the twin forces of globalization and urbanization, are beginning to consciously take steps toward enhancing their access to advanced ICT infrastructure and enhancing the human skills to effectively use this technology. These communities have begun to explore and undertake substantial ICT investments believing that this is a requirement for their community to remain competitive in the twenty first century. While, there are examples of successful community Broadband projects, there continue to be substantial state barriers to these investments. To date, there are sixteen states that have existing barriers to community investments in advanced ICT and in some cases, states prohibit them outright. Additionally, each year for the past several years, states without these restrictions have proposed new restrictive legislation and states with existing legislation have sought to increase restrictions. If this technology is critical to the success of states and regions, this leads one to question the impact of these restrictive state policies. Further, how do these restrictive state policies impact the ability of communities to leverage this technology to realize the benefits from entrepreneurship, small business activity, innovation, and other "knowledge economy" variables? Do states that have restrictive technology realize less activity or reduced growth of knowledge economy variables? All of these questions and many others are important for current and future research.

This manuscript begins by reviewing the current literature on the economic benefits of municipal investment in advanced ICT infrastructure investment. This is followed by an overview of the legal barriers that states have enacted that restrict local and regional investments in advanced ICT infrastructure. A case study of the unique legal and policy environment in South Carolina is presented as an example. The final section of the literature review is a discussion of small business uptake of advanced ICT and e-business technology. The second section of the paper presents a brief case study of the policy implications of South Carolina's technology restrictions on local municipal investments. This case study is based on a survey of South Carolina's electric cities. The third and final section of the paper presents a model and results of a state level regression analysis estimating the impact of ICT policy restrictions on state small business growth and entrepreneurial activity. In conclusion, this research hopes to clarify the impact of the state policy environment on a state's ability to realize success with new economy indicators like small business growth, patent activity, and technology companies. If our nation and each state are to fully embrace a "knowledge-economy," understanding the impact and relationship between the policy environment and these variables is critical to the ongoing research agenda.

Each of these three manuscripts begins to address critical issues related to entrepreneurial economic development policy. The first paper outlines a research agenda for business incubation that is well grounded in economic theory. The research seeks to lay the groundwork for future research on the types of economic benefits generated from the entrepreneurial environment of business incubations. The second manuscript describes the results of a state case study on the scope and breadth of local entrepreneurial development efforts. Additionally, the analysis of survey results begins to provide evidence of the variables that increase the probability of local entrepreneurial development efforts along with potential barriers to these efforts. Finally, the third manuscript summarizes the results of a case study concerning the potential impact of state policy on municipal investments in advanced ICT infrastructure. This research also begins to address the potential outcomes of state policy restrictions on state small business and entrepreneurial activity. Overall, these three manuscripts highlight the importance of understanding a variety of theoretical and policy variables in our search to further understand the potential of entrepreneurial economic development. This research, and others like it, has the potential to increase our knowledge of the costs and benefits of entrepreneurial policy efforts and their ability to increase local economic growth and development.

CHAPTER TWO:

A THEORY CENTERED APPROACH FOR BUSINESS INCUBATORS: A RESEARCH AGENDA FOR THE FUTURE

Introduction

Industrial restructuring and globalization have put increasing pressure on regions to find the economic development panacea of the day. While development approaches of the past remain in widespread use, increasing emphasis has been placed on a new generation of policy tools. This set of policy tools emphasizes job creation through entrepreneurship and innovation as opposed to job creation exclusively through business attraction and/or retention. With increasing emphasis placed on the importance of small business development and entrepreneurship, policy options to facilitate this process have become increasingly popular. Business incubators are one of the development approaches that are increasingly used to facilitate new venture formation, job creation, and an enhanced entrepreneurial climate.

To fully understand which development approaches are most successful across communities, it is necessary to have a well-developed body of literature on each development program alternative. The current body of literature on incubator programs is limited in several important ways. While there is a significant void in the quantitative analysis of incubator performance, Bergek and Norrman (2008) argue there is also missing theoretical base from the literature on incubator performance and evaluation. More generally, incubator analysis has lacked appropriate foundations in economic theory. Presented here is a theory-based research agenda for business incubator programs.

Ultimately, we hope for improved understanding of this economic development option.

The first section of the paper provides a brief introduction to the concept of incubators, followed by a review of the relevant literature. Next, key literature concerning network and agglomeration economies is reviewed. These two approaches offer opportunities for new insights concerning incubators and local economic growth. Conclusions give further thought to these theoretical approaches and the resulting research agenda that could result.

A Conceptual Model of Incubation

The idea of business incubation is not new. It has its roots in ideas like the planned industrial districts of the 1920's and 30's in large cities across the United States (Lewis, 2004). However, by the 1970's, the concept of business incubation, as it is known today, took hold in the United States (www.nbia.org). While there is much agreement concerning the fundamental objectives of business incubators, there continues to be definitional ambiguity over the concept of business incubation itself. Hackett and Dilts arguably provide one of the better and more thorough definitions:

> A business incubator is a shared office-space facility that seeks to provide its incubatees (i.e. “portfolio” or “client” or “tenant-companies”) with a strategic, value-adding intervention system (i.e. business incubation) of monitoring and business assistance. This system controls and links resources with the objective of facilitating the successful new venture development of the incubatees while simultaneously containing the cost of their potential failure (Hackett and Dilts, 2004, p.57).

Since the 1970’s, the use of business incubators as a tool for economic development and new firm creation has spread across the U.S. and to other countries around the world. As business incubators have become more popular, so to have other similar organizational types such as science /research parks and business innovation centers. As a result some research has treated incubators synonymously with these other organizational types (Lindelof and Lofsten, 2004; Tamasy, 2007). At the same time there appears to be confusion over whether an incubator is a distinct organizational unit or a general entrepreneurial milieu. Phan et al. (2005, p.168) argues "there has been a recurring problem of definitions in which science parks and incubators can encompass almost anything from distinct organizations to amorphous regions." Given the ambiguous distinction between an incubator and other similar organization types, it is important to distinguish between the role of science/research parks and business incubators.

The majority of research assumes that business incubators are primarily used as economic development tools for job creation, often with additional goals of stimulating entrepreneurial and innovative activity. However, new firms are created everyday and the majority of these will never use an incubator. We could find no research to confirm this but we hypothesize that very few new or young firms, relative to the total number of firms created in year, ever go through the incubation process. Given this, why is business incubation a popular development tool and one even worth considering for future research? As communities across the country continue to recover from the ongoing effects of industrial restructuring, globalization, and recessionary impacts, development tools, like incubators, clusters and innovation centers, that have the potential to yield long-term, sustainable employment, income, and community benefits are increasingly popular. As such, incubators are seen as one method of enhancing an already established local entrepreneurial climate. Or, for communities with a weak entrepreneurial climate, incubators are held as an important tool to jump state local and regional entrepreneurship.

One of the primary assumptions is that business incubators add value to their communities by creating an environment for enhanced start-up firm activity and fewer business failures. The baseline assumption is that incubators can be support organizations for young firms (typically up to three years old) that will facilitate and encourage their business success. Figure 2.1 provides an illustration of the role of business incubation relative to the life-cycle of a firm. Research supports the idea that most incubators take clients whose firms are in the early or start-up phase of the life cycle of a business (see e.g. Aernoudt, 2004; Bhabra-Remedios and Cornelius, 2003; Grimaldi and Grandi, 2005; Hackett and Dilts, 2004a; Lindelof and Lofsten, 2004). One of the rationales given for incubators is grounded in the knowledge that the majority of small, new firms will fail.

According to Brooks (1986), incubators can be used to bridge the gap between the idea phase of a young firm and the formal start-up phase. Arguably, incubators can provide the appropriate platform for new firms to succeed by providing the needed support mechanisms through the difficult start up phases of a business. Overall, a business incubator’s main objective is to support successful incubatees by improving their chances of long term success and growth (Allen and Rahman, 1985).

The same cannot be consistently said for science and research parks or business innovation centers. While these organizations may have fledgling start-up firms, they often include firms that could be classified across the full spectrum of a business life

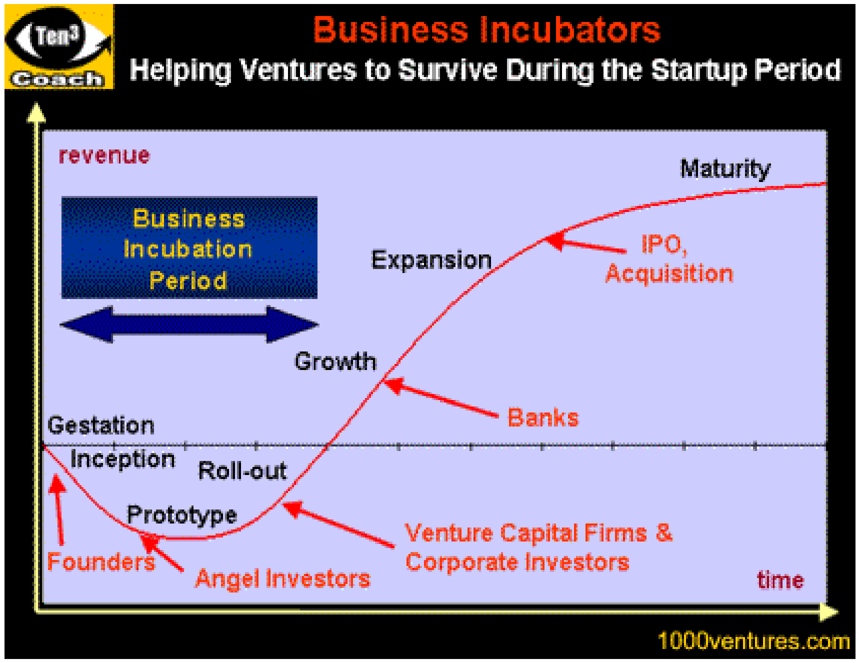

Figure 1.1: Firm Life Cycle and Business Incubators

Source: Vadim Kotelnikov, Ten3 Business e-Coach,
http://www.1000ventures.com/business_guide/business_incubators_main.html

cycle. Chan and Lau (2005) make no mention of the size or life cycle orientation of the firm in their definition of a science park. Specifically, three of the six firms included in their case studies are at least four years old, with one eight years old. They further define a Science Park "as an area that allows agglomeration of technological activities, leading to positive externality benefits to individual firms located on the park (2005, p.1216)." Further, Westhead (1997) argues that the role of science parks is to create an entrepreneurial environment such that basic science research can be transformed into commercially viable innovations. As further clarification, Westhead (1997) argues that the implication of Science Parks is that technological innovation and related entrepreneurship originates from "pure" scientific research. A European Commission

(EC) study (2002a) classifies science parks as either development tools for technology transfer and enhanced production systems or property development ventures that comprise both a real estate function along with a scientific relationship with a university. While these characterizations indicate the importance of entrepreneurship, they make no mention of the size and/or life cycle phase of the firm.

As these different organizations have gained popularity as policy tools for promoting regional development and innovation, additional clarification of their differences and type of use was outlined in a 2002 study by the European Commission (EC). Figure 2.2 illustrates a two dimensional characterization of different business organizational units based on technological level and management support. This framework classifies an incubator as one where the technological level of the firms and the management support provided by the incubator is high. Based on this typology, Innovation Centers, Business and Innovation Centers, and Technology Centers can all be classified as business incubators.

Based on the European Commission's description, science parks are generally not business incubators, while other organizational types might be considered as such. Hansson et al. (2005) review the three primary characteristics of science parks as outlined by the UK Science Park Associations: (1) A formal organizational relationship to a university or other institution of advanced research; (2) Intended to promote and support innovative and knowledge based businesses; and (3) Has a management objective to actively advance technology transfer and advanced business skills to science park firms. With this background, there does appear to be enough agreement to conclude that science

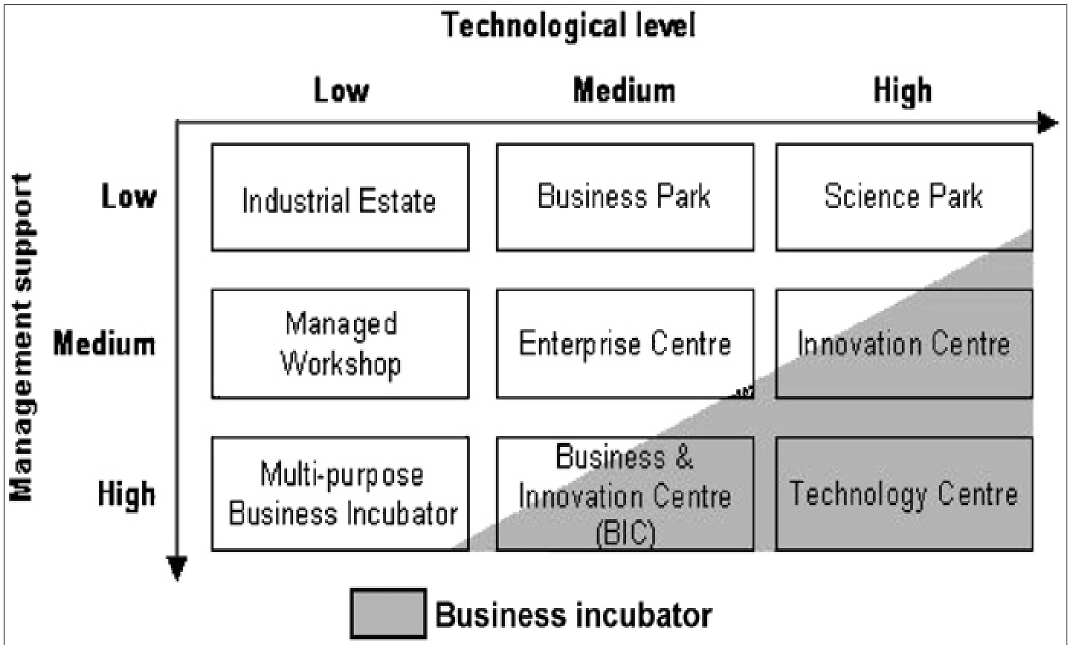

Figure 2.2: Position of the Business Incubator.

Source: European Commission, 2002a. Benchmarking of business incubators, Brussels, p. 6.

parks are characterized both by physical space and an organizational objective that emphasizes the transfer of knowledge and innovations between industry and academia (Gower and Harris, 1994).

In contrast, there is considerable agreement in the incubator literature that business incubators are characterized, at a minimum, by four critical components (Aernoudt, 2004; Allen and McCluskey, 1990; Bollingtoft and Ulhoi, 2005; Brooks, 1986; Chan and Lau, 2005; Clarysse et al., 2005; Collinson and Gregson, 2003; Colombo and Delmastro, 2002; Hackett and Dilts, 2004a; Hackett and Dilts 2004b; Hansen et al., 2000; Hsu et al., 2003; Lyons and Li, 2003; Mian, 1996a; Nolan, 2003; Peters et al., 2004; Phillips, 2002; Rice, 2002; Rothschild and Darr, 2005; Smilor,1987a; Smilor, 1987b; von Zedwitz, 2003). These include: (1) Shared office space at below market rents;

(2) Shared office support services; (3) Professional business mentoring and specialized support services; and (4) Opportunities for professional networking[1]. The most common business support services offered include general entrepreneurial training, business development assistance, and specific business services like accounting, legal, marketing, advertising, and financial management (Bollingtoft and Ulhoi, 2005; Chan and Lau, 2005; Lalkalka, 2003; Lyons and Li, 2003; Mian, 1996a). A survey of fifteen U.S. rural business incubators (Adkins, 2002) indicates that over 70% of incubators provided the following services: federal procurement assistance, assistance with noncommercial loan access, personnel training, access to resources at higher education facilities, marketing and advertising assistance, accounting and financial management, assistance with accessing commercial bank loans, and general business planning basics.

Additionally, an important function of incubators is facilitating networking both among client businesses and between clients and the business community in general. Networking can range in form from formal market buying and selling linkages to informal cross-firm exchanges of information. In fact, many successful incubators create an environment with strong interaction (market or nonmarket) between incubator clients (Adkins, 2004). However, the interaction between clients is a function of the type of incubator and the client mix[2]. Connecting clients to appropriate sources of financing is, of course, critical to growth and the continued existence of clients as well as the

[1] One noteable exception are virtual incubators where number one and possibly number two are eliminated (vonZedtwitz and Grimaldi, 2006).
[2] There is anecdotal evidence that certain types of incubators where clients are in similar industries or in direct competition do not exhibit this cooperative, collegial environment. For example, as later discussed certain high technology incubator clients may see each other as “non-trusted” rivals.

incubator. Thus, successful incubators have relationships with both collateral (e.g., traditional bank loans) and equity-based sources of capital such as venture capital or angel network funds. Some incubators even provide seed capital directly, such as through a revolving loan program.

While the incubator literature continues to lack agreement on a consistent definition, we contend that the four primary characteristics mentioned prior must be in place for an organization to be classified as an incubator. Equally as important is the idea that the primary function of an incubator is to take on business ventures that are in the early stages of development and assist them as they develop into viable young firms. While, it is true that some science/research parks may have characteristics that could classify them as incubators, we generally do not believe that science/research parks or business innovation centers are synonymous with business incubators.

The Landscape of Business Incubators

Even given the above distinctions between business incubators and other organizational types, it is true that incubators come in a variety of organizational structures, management types, size, focus, and served business clients. Some argue that "no two incubators are alike (Allen and McCluskey, 1990, p. 64)." Business incubators are both private, public, or even public/private partnerships. Many also have close ties to universities, small business development centers, or other community development organizations. The National Business Incubation Association (NBIA) is an international organization with over 1,900 members, whose goal is to advance business incubation and entrepreneurship through education, research, advocacy, and access to networks of resources and information (NBIA website, www.nbia.org). The NBIA estimates that, in the U.S., forty-nine percent of incubators are public or private non-profits, thirteen percent are affiliated with an institution of higher learning, eighteen percent are hybrid efforts among government, non-profits, or private developers, and twelve percent are private for profit enterprises (NBIA, 2005).

Many incubators focus on specific sectors of the economy. For example, various business incubators specialize in serving clients in areas such as food processing, medical technologies, space and ceramics technologies, tourism, and software development (Adkins et al., 2001). Alternatively, other incubators have a diverse set of business clients. In some, mostly rural regions, such as west Texas (Terry, 2006), incubator networks have been established, with incubator facilities in different towns in the region sharing management expertise and other resources. As the use of incubators has spread, regions and localities have customized incubators to fit their needs in an attempt to maximize the probability of their success.

Hackett and Dilts (2004b) note that much of the current literature on incubation can be divided into taxonomies that allow for an easier comparison of incubates to non-incubated firms. Research at the incubator level (Kuratko and LaFollette, 1987; Smilor, 1987b; Temali and Campbell, 1984) has focused on the primary financial sponsorship of the incubator, as well as the business focus of the incubator. The literature (Plosila and Allen, 1985; Sherman, 1999) at the incubator firm level has emphasized either the business focus of the incubatee or the type of firm (spin-offs or new start-ups).

The popularity of incubator programs has ebbed and flowed over the past forty years. During this period, information has been gleamed about the characteristics of successful incubators. The National Business Incubation Association (NBIA), has supported several incubator surveys over the years to determine challenges and assess successes and failures. Survey results indicate the success of various types of incubators (those found in rural and urban areas, those owned by public and private entities, and those with or without a target niche). What makes incubators successful are strong community support, appropriate partners, proper financial plans, and a clear idea and plan of executable objectives.[3]

An important contribution to the incubation research has been the recognition that the incubator itself is a firm with its own developmental life-cycle. Allen (1988) advances the incubator life-cycle theory in more detail. The start-up phase begins as a community seriously considers an incubator and continues until the incubator is fully occupied. As the incubator matures, the incubator manager and incubatees have increasing interaction and the incubator has stable and consistent demand for incubator space. If the incubator reaches a point where the demand for space outstrips what it can supply, the incubator has reached a mature business development stage. It is this stage that some research identifies incubators as real estate development efforts. Ultimately as incubators grow and change, they make important contributions to their communities and the entrepreneurs within those communities.

[3] Methodologically there are always ongoing questions of selection bias in these studies: 1) failed (closed) incubators are not included in the analysis of operating incubators; 2) NBIA has strong vested interested to promote the concept and its potential for success.

One of the ongoing concerns of business incubation is whether incubators can become self-supporting. Incubators are relatively expensive to develop, the development phase may take as long as five to six years (Weinberg, 1987). Thus, communities should consider incubators a long run economic development tool at the outset. Moreover, the nature of business incubation has made the evaluation of success or failure quite difficult. Most studies have used traditional measures of job and/or firm creation as the primary measures of success. Evaluation of programs after two, three, or even five years may find these measures to be positive but small and as a result may not adequately capture the potential long run benefits of the incubator. There are potentially positive spillover benefits (improved entrepreneurial climate, enhanced community social capital, knowledge spillovers, and others) associated with incubators that are not properly accounted for in the existing research. As well, given the nature of the incubation process, incubators may not be self-supporting in the short-term.

There is considerable agreement that business incubators can generate direct employment and income impacts from the creation of new small business activity (Markley and McNamara, 1995, Sherman and Chappell, 1998). Where public investment is involved, the generation of small impacts and concern over the timing of self-support lead to questions concerning the net benefits of incubation. However, incubator firms can also generate positive indirect and induced economic impacts on their local economies over time (Markley and McNamara, 1995, Sherman and Chappell, 1998). Campbell and Allen (1987) argue that broader measures of incubator success are likely to capture a more complete picture of incubator benefits. Measures like the development of incubator-related networks, the percentage of startups related to existing businesses in the incubator, and the nature of incubatee synergistic relationships among others could be instructive. Exploring additional measures of incubator success may begin to capture a wider scope of net benefits related to business incubation.

In the end, the issue of self-sufficiency is not absolute. Incubators in larger, economically diverse regions are more likely to be self-supporting, while incubators in smaller, rural regions are likely to require ongoing subsidization. However, given the diversity of communities and the nature of the measurement of net benefits of business incubation, each community must carefully evaluate the potential of this economic development tool.

Given the potential of business incubators, there is increasingly a renewed interest in incubation type programs as an economic development policy tool. Nations and individual communities around the world have enthusiastically supported incubation programs.[4] The OECD (1999) informs that communities around the world are using incubators as a policy instrument to promote local and regional economic development, innovation, and entrepreneurship. As this development tool gains popularity there is an opportunity to evaluate the success of incubators as a development tool with a clearly defined research agenda. We begin by outlining a picture of the current body of literature on incubator performance and evaluation.

[4] Tamasy (2007) reports that there are over 200 incubation "environments in the UK and approximately 180 incubator facilities in Germany. As well, many Asian nations have begun to use incubator programs as a policy tool.

Examining Business Incubators

The number of incubators grew ten-fold from 1984 to 1991, with a substantial increase in the number of rural incubators (Stenberg, 1993). The National Business Incubation Association (NBIA) estimates there are over 900 incubators in North America and 3,500 operating globally (NBIA, 2005). The NBIA further notes that these programs have served over 13,000 clients, affiliates, and graduates (ibid).

The literature on business incubators can be classified into three categories: (1) descriptive research focusing on definition and characterization; (2) prescriptive research emphasizing the role of incubators in economic development and possible best practices; and (3) evaluative research concentrating on incubator performance measurement and evaluation of incubator effectiveness (Albert and Gaynor, 2001). Hackett and Dilts (2004b) review of the incubator literature highlight five incubator research streams: (1) incubator development studies; (2) incubator configuration studies; (3) incubate or client development studies; (4) studies analyzing the potential impact of the incubator on the potential success of clients; and (5) theoretical analysis of the incubator/incubation process.

As incubator research has evolved, a number of qualitative studies have attempted to characterize the nature of evaluating incubator performance. A handful of studies have also attempted to quantify incubator performance by first clarifying the critical outcome measurements necessary for incubator success. Research has identified the following outcome measurements as important for determining incubator success; firm occupancy, jobs created, firms graduated, tenant revenues, number of patent applications per firm, effectiveness of management policies, effectiveness of value added service, and number of discontinued businesses (Allen and McCluskey, 1990; Chan and Lau, 2005; Colombo and Delmastro, 2002; Mian, 1996a; Phillips, 2002; OECD, 1997).

Sherman and Chappell's (1998) research illustrates the challenges inherent in evaluating the outcomes or effectiveness of business incubators. They argue that current research has not gone far enough in evaluating these impacts. They present several key challenges to incubation research. Because the entrepreneurial process is complex and new businesses have diverse needs, assessing outcomes in a standardized manner is difficult. Standardized assessments are in part problematic because incubators do not operate in a standardized fashion, as each incubator must cater to specific regional characteristics and needs. Moreover, there is inherent selection bias in research the compares the performance of incubator tenants with non-tenants. As a result, research to date has focused more on process than on measurable outcomes. They suggest quasi experimental, macroeconomic modeling, and stakeholder analysis as possible ways to assess the impacts of business incubators on local economies.5

Tamasy (2007) also confirms the challenges in quantifying incubator outcomes. One of the main challenges cited is that there has not been a widely accepted method or set of variables used to test and measure the overall effectiveness of business incubators. Phan et al. (2005) cautions that variables like firm survival rate have little methodological value because of intrinsic enodogeneity. The incubator is created with the primary purpose of enhancing individual firm survival. Tamasy summarizes that, to date,

[5] Hackett and Dilts set form a research agenda in their synthesis (2004) of the literature. We discuss their approach in detail in the final section.

empirical incubator analysis can generally be divided into studies that quantify performance at an organizational level and studies that analyze the performance of businesses located within the incubator. There are also very few studies where there is a designated treatment group, with firms that have been incubated, compared against a control group, firms that have not been incubated. Without this type of analysis it is very difficult to accurately quantify the potential benefits of business incubation. Another important consideration with incubation research is the focus on intended versus unintended outcomes. It is critical to clearly identify the intended measures of incubator success and further, to compare the intended (predicted) impacts of an incubator against any positive or negative unintended outcomes.

An additional dilemma is that incubators often communicate different goals and objectives depending upon their sponsor's interests or other identified priorities (Mian, 1996b; Bollingtoft and Ulhoi, 2005). Bergek and Norman (2008) argue that ongoing weaknesses in the evaluation literature are that models measure incubator performance without relating these measures to the goals and objectives of the incubator. As a result, their research defines "incubator performance as the extent to which incubator outcomes correspond to incubator goals (Bergek and Norman, 2008, p. 22)." Incubators often have a diversity of stakeholders each with their own unique interests and objectives for the incubator. As well, because different goals correspond to different performance measures it is imperative to understand the priority objectives of each incubator.

Keeping the unique goals of each incubator in mind, (Bergek and Norman, 2008) have developed a framework characterizing three key incubator model components;

selection, business support and mediation. Research has confirmed the importance of incubatee selection in relation to the success of the overall incubator (Colombo and Delmastro, 2002; Lumpkin and Ireland, 1998; Peters et al., 2004). Hackett and Dilts (2004a) indicate that incubator managers must have an advanced knowledge of the entrepreneurial process to successfully identify promising new or young firms.

Bergek and Norrman (2008) propose a two dimensional/four field selection matrix to explain different incubator selection approaches. They argue that most incubator selection processes fall into one of four categories; "picking the winners and idea, picking the winners and entrepreneur, survival of the fittest and idea, and survival of the fittest and entrepreneur (2008, p. 26)." These different categorizations characterize the overall approach for selecting incubatees (idea versus entrepreneur) and also the stringency of the selection process for incubatees (winners versus survival of the fittest). Business support services are generally agreed to be a critical component of the incubator model. However, the business support services offered varies and use by incubatees appears to vary as much as services offered.

Bhabra-Remedios and Cornelius (2003) argue that client success is determined not only by what services are offered but also on how those services are supplied. Hackett and Dilts (2004a) also note that the intensity of time, comprehensiveness, and level of quality of business service provision differ greatly among incubators. Given this understanding, Bergek and Norrman (2008) simplify the component of business support as a variable that classifies the incubator's role in the process of business incubation. They define business support as strong intervention where incubator staff provides substantial support and interaction in the incubation process and as laissez-faire support where incubatees have significant autonomy and are provided minimal assistance in the incubation process (2008, p. 24).

Research also clearly agrees that incubators provide varying degrees of access to internal and/ or external networks for incubates. Peters et al. (2004) classifies this role for the incubator as a mediator or intermediary. Mediation may also include access to networks of information and knowledge, as well as internal or external actors (Collinson and Gregson, 2003.) The importance of both internal and external networking for new firm success is documented by a variety of researchers (Aernoudt, 2004; Bhabra-Remedios and Cornelius, 2003; Bollingtoft and Ulhoi, 2005; Brooks, 1986; Clarysse et al., 2005; Collinson and Gregson, 2003; Colombo and Delmastro, 2002). Hackett and Dilts (2004a or b) also indicate that incubators may help incubatees maneuver the complex institutional demands and processes of venture formation. There is additional evidence that the mediation activities of incubators can be characterized by geographic scope; local, regional and even international mediation activities (Carayannis and von Zedwitz, 2005; Clarysse et al., 2005). Bergek and Norman (2008) classify different incubator models according to the type of innovation system they are intermediaries for; regional/national innovation systems (RIS), technological innovation systems (TIS), or general clusters of economic activity.

While the specific objectives of incubators can be varied, most research assumes that the main purpose is to serve as an economic development tool for job creation, although they may additionally allow for greater small business success (Fry, 1985;

Kuratko and LaFollette, 1987; Lumpkin and Ireland, 1988; Markley and McNamara, 1995a; Markley and McNamara 1995b; Rice, 1992; Udell, 1990). Early research efforts are careful to make the distinction between incubators as real estate development efforts or incubators as business development efforts (Brooks, 1986; Smilor, 1987b; Smilor and Gill, 1986). Table 2.1 illustrates Allen and McCluskey's (1990) continuum of incubation. These ideas are derived from Brooks (1986) two-stage continuum, where new firms enter a business development incubator early in their start-up and in later phases of their

Table 2.1: Allen and McCluskey's (1990) Continuum of Incubator Development

	Real Estate	Value-Added Through		Business Development
	For-Profit Property Development Incubators	Non-Profit Development Corporation Incubators	Academic Incubators	For-Profit Seed Capital Incubators
PRIMARY OBJECTIVE	Real estate appreciation Sell proprietary services to tenant	Job creation Positive statement of entrepreneurial potential	Faculty-Industry collaboration Commercialize university research	Capitalize investment opportunity
SECONDARY OBJECTIVE	Create opportunity for technology transfer Create investment opportunity	Generate sustainable income for the organization Diversify economic base Bolster tax base Complement existing programs Utilize vacant facilities	Strengthen service and instructional mission Capitalize investment opportunity Create good will between institution and community	Product development

Source: Hackett S.M., Dilts D.M. (2004b) A Systematic Review of Business Incubation Research. Journal of Technology Transfer 29: 55-82 business development enter a real estate incubator. Allen and McCluskey argue that the incubation continuum is clearly centered on the value added provided by incubators, which they examine in four major categories of incubator organizational structure.

Campbell et al. (1985) create a framework that examines the areas in which incubators create value. This research illustrates that incubators have the ability to diagnose business needs, recommend and/or provide key business services, provide access to financing opportunities, and provide access to an incubator network. Additional research (Smilor and Gill, 1986; Smilor, 1987a; Smilor, 1987b; Hisrich, 1988) cites the importance of incubators for developing a climate of entrepreneurship and innovation. Incubators also improve the credibility of incubates and reduce the entrepreneurial learning curve. The entrepreneurial learning curve can be reduced by facilitating improved access to a network of entrepreneurs that allows for a more efficient solution to business problems.

More specifically, Sherman and Chappell (1998) indicate that incubators can make a significant impact on local employment, income, and sales. While early research (Campbell and Allen, 1987) suggests that incubators are not very good job creators, Markley and McNamara (1995b) argue that incubators are particularly well suited to the goal of new job creation. Existing small and medium size firms are major sources of job creation and incubators may be particularly well suited to assist these firms in their development. Markley and McNamara used input-output analysis to demonstrate that business incubation programs can induce significant positive employment and income effects. While these results are positive, Tamasy (2007) points out that studies have estimated gross net job changes due to incubators programs but accurate depictions of net job changes across a wide range of skill types are rare. This may be especially problematic when incubators are being sold by politicians as critical pieces in a communities economic development plan.

Science park6 research confirms this mixed review of performance outcomes in organizations of this type. Monck et al. (1988) find that, even after taking the age of firms into account, off-park firms generate a higher level of employment than on-park firms. Westhead (1997) conducted a similar study of UK science park firms. This analysis found no statistically significant difference between on and off-park firms in terms of the ability to introduce new patents and products, spending on research and development, and intensity of research and development focus. In contrast, Lofsten and Lindelhof (2002) find that the job creation of Swedish on-park technology firms is significantly better than off-park firms. Lofsten and Lindelhof, however, argue that the difference in performance cannot be attributed to any unique science park characteristics but instead are attributable to the nature of the sample of science park entrepreneurs. Their results confirm that selection bias in incubation research is an area of ongoing concern.

Additional research (Weinberg, 1986; Tamasy, 2007) has focused on the general challenges faced in developing a business incubator. Major constraints on success can include a limited client pool (especially in rural areas), a lack of professional services available to clients, and difficulties in obtaining client financing, especially in the form of seed capital. Financial support for the incubator itself can also be a major constraint.

[6] While we do not believe that science parks can necessarily be considered incubators, the similarity of these organizational types makes the research important for comparison.

Stenberg (1993) argues that the start up costs for incubators can be prohibitive and, as of the early 1990's, few had achieved self-sufficiency. In this regard, self sufficiency leading to adequate operating funds is an important factor for incubation success.

Weinberg and Burnier's (1991) research on the role of community colleges in supporting business incubators provides additional insight into why incubators succeed or fail. Reasons for failure include rushed implementation without appropriate planning; an inability to locate and hire an appropriate manager (a prerequisite for success); and an inability to demonstrate the value (direct and indirect) that incubators provide to clients. Tamasy (2007) concludes that businesses in “science park” type incubators are not necessarily better informed about university level research. Evidence also indicates that science parks have not been effective in establishing network relationships between university researchers and science park firms (Bakouros et al., 2002; Monsted, 2003). Hansson et al. (2005) confirms that “first generation” science parks may have weak systematic ties to universities and has thus led a number of researchers to question the importance of proximity to these institutions as a value added measure.

In contrast, there is considerable research documenting the potential importance of university proximity and access for the success of incubators. Generally, research has found that universities make an important contribution to employment and economic activity in their regions (Bleaney et al., 1992; Brownrigg, 1973). More specifically, cooperation with university professionals can provide access to the most up to date knowledge and information, which may further reduce development costs and stimulate innovation (Lockett and Wright, 2005; Markman et al., 2005; Nouria et al., 2005). Access to a variety of skilled labor is an added advantage of university proximity (Barrow, 2001).

Additional research (Westhead and Storey, 1994; Colombo and Delmastro, 2002) indicates that access to university services and facilities (computers, libraries) and cooperative research and development efforts is utilized at a higher rate by incubator firms generally, compared to similar non-incubator firms. There is also evidence that universities/incubator relationships may provide an intangible benefit in that they provide enhanced credibility to associated incubatees (McAdam and McAdam, 2006). Weinburg and Burnier (1991) argue that institutions of higher education should consider developing incubators in partnership with other community development groups. In general, incubators with substantial and effective community and regional support have a greater likelihood of success.

Likewise, Honadle (1990) argues that community extension services also have a role to play in developing incubators. Especially in rural communities, the extension service may be able to provide assistance in the form of feasibility studies, management analysis, and marketing analysis for specific projects. Perhaps more important, extension personnel can often provide links to key internal and external resources and stakeholders.

In their 2004 survey of the literature, Hackett and Dilts (2004b) focused on the source of incubator financing, the approach of the incubator to business niches, and whether the incubators primarily supported spin-offs from existing firms or completely independent start-ups. They found successful incubators in a variety of support systems and business niches and types. The results indicate that incubators can succeed as these variables change. Some researchers argue that given the potential for economic growth and development due to incubators, there should be a strong public role in helping to provide capital and other forms of support. The research, however, is mixed at whether public support is warranted and if it is, in what types of circumstances.

Almost fifty percent of U.S. incubators are at least, in part, publicly supported. For European incubators, the most important sources (eighty-one percent) of funds are tenant service fees and rent. However, national and regional governments financially support over sixty percent of all incubators (K. Aerts et al., 2007). Moreover, the European Union or some other international organization sponsor one-third of incubators. Given the large public investment in incubators as an economic development tools, clarifying the costs and benefits associated with these programs is an important public policy objective.

Allen and Weinberg's (1988) research illustrates two simple models concerning possible public support of incubators. Government can be a catalyst by encouraging local action through incentives and partial financing in partnership with local development authorities and community stakeholders. The alternative model of public support is a more comprehensive approach, covering the full scope of incubator development of activities. Among other things, this may include ongoing operating funds, management assistance, development of regional or local networks, and other types of government involvement. Even in states or regions where this approach is unlikely, it is possible that governments may provide more comprehensive resources in the initial development phase of an incubator.

As early as 1985 in the United States, a number of state governments supported incubator development as an important economic development tool (Allen and Weinberg, 1988). Tamasy (2007) reveals from a study of largely European incubators that municipalities are often involved in the introductory phase of an incubator and have a key sponsorship role towards the incubator as well. Earlier research (2001) by Tamasy further illustrates that in approximately one-third of German technology oriented incubators the municipality is the sole shareholder.

The literature further suggests that business incubators can prove to be a cost effective economic development tool, when compared to alternative economic development options that are available to communities (Markley and McNamara, 1995b; Sherman, 1998; Sherman and Chappell, 1998). A recent joint study (2005) by the NBIA, the University of Michigan, Ohio University, and the Southern Technology Council estimate that business incubation programs create jobs at an average cost of $1,109 per job. Yenerall states that "each new job created with the assistance of a publicly supported incubator saves about $1,000 as compared to other strategies" (2008, p.6). Compared to other economic development programs, this cost estimate is an encouraging sign of the effectiveness of these programs. However, critics reply that many business incubators, especially those in rural and inner city areas, struggle to attract business clients and are either forced to close or continue to seek large levels of permanent public support (Barkley 2003). Research also reinforces that development policies must reflect the strengths and weaknesses of the local area, region and possibly even the entire state. This allows regions to further clarify the potential costs and benefits of any economic development program, including business incubators.

Tamasy (2007) argues that technology-oriented incubators in particular should not receive public support and should be self-supporting private organizations. This research reports that these incubators are poor public investments as they appear to have a low motivating effect on the creation of new business establishments. As well, empirical results raise questions as to whether incubators increase the likelihood of firm survival, innovativeness, and growth. There is additional evidence that the level of incubator funding is positively correlated with costs. An earlier study (Tamasy, 2001) reported that public funding of incubator facilities in Germany appeared to generate incentives for expensive buildings. Given this evidence and ongoing questions about incubator outcomes, Tamasy (2007) concludes that there is no reason to support the use of public monies for incubator projects.

Alternatively, many authors (Sherman and Chappell, Markley and McNamara, for example) support the idea that incubators can create an enhanced entrepreneurial climate in a region. For example, Rushing (1995) notes that as incubator firms mature and graduate or move out, the incubator can continue to be an important training ground for effective management and the mature knowledge of business operations. Supporting this idea, Sternberg et al. (1997) finds that approximately two-thirds of incubator graduates relocate in the same city as the business incubator and another twenty-three percent locate within thirty kilometers from the city where the incubator is located. Thus, activities such as periodic trainings and seminars can be used to maintain linkages with clients who have graduated and with the local business community in general. Further anecdotal evidence suggests that a strong local business incubator helps enhance the appeal of outside firms to a region even though the majority of these firms have no plans to locate in the incubator. Rather, the existence of the incubator demonstrates the area's commitment to business support in general and entrepreneurial support in particular.

In sum, the value of business incubation lies in its ability to provide benefits to local, young firms, the incubator itself, and the community at large. If incubators are successful at least some of their incubatees must also be (have been) successful. There is a mutually beneficial, symbiotic nature with the incubator/incubate relationship. Incubators themselves derive value from the rents they charge clients, their direct and indirect local employment and income impacts, and additional services they offer the larger business community. If the incubator is successful in retaining graduating firms to remain in the local community and grow their business, it also derives value from its ability to ensure the retention of local firms. Accurately measuring this value may be challenging as it requires knowing of which firms would have left the community without the incubators' presence. The symbiotic relationship with incubatees makes measurement of benefits more complicated, but there is little doubt that a successful incubator has the potential to generate positive value for itself and the community at large.

It is the incubatee where research has traditionally focused on the value created by the incubator process. If the incubator provides a valuable process and service then incubated firms should have a higher survival rate than similar non-incubated firms. Thus, the value of the incubatee is the additional employment and income effects generated relative to similar non-incubated firms. As well, if the incubatee graduates from the incubator and chooses to stay in the community as it grows, the incubatee derives value from these additional employment and income impacts. Each incubatee is unique and may therefore possess unique characteristics that further add to the value the firm provides. For example, incubator environments with dynamic incubatees may realize important knowledge and/or innovation spillover benefits that are critical to the success of other incubator clients. While these benefits are more difficult to measure, this remains an additional benefit that incubatees may provide in an incubator environment.

Finally, the incubation process has the potential to generate benefits (and therefore, derive value) for the community at large. The most obvious and, measureable, benefits are derived from indirect and induced employment and income effects from the incubator and incubatees. The employment and income generated by the incubator and incubatees, generates indirect employment from the resource and input needs of these firms. This indirect employment generates induced income benefits to the community at large as these employees spend their money in the local economy. If the incubator provides business services to the community at large there are also positive, knowledge spillover and networking benefits the incubator may generates. These benefits may improve the local social capital environment and the general entrepreneurial climate of the region at large. It is further hypothesized that successful incubatees who graduate and stay within the community have the potential to enhance the business and entrepreneurial climate of the region. These positive spillover benefits may be more challenging to quantify, but, once again, the incubation process has the potential to bring substantive benefits to the local community and region.

Spatial Economics and Networks

Insights about networks first arose from ideas about the nature of the firm. Ronald Coase (1937) proposed that in certain cases it may be more efficient for an organization to operate as smaller subunits in a market, as opposed to one larger organization. This is arguably the case due to the importance of transactions costs in evaluating the efficient size of the firm. Both Coase and Williamson (1981) explored the idea of transactions costs in great detail. Cheung (1987) argues that transactions costs are those that arise simply due to the existence of institutions. Search costs, bargaining costs, and enforcement costs are all examples of the kinds of transaction costs that firms may experience due to the existence and nature of institutions. Currently, transactions costs are seen as key in determining when a highly integrated organization is more efficient than smaller market based units. When transactions costs are too high, it is advantageous for a firm to organize as a larger unit to minimize these costs. For example, firms form as hierarchical units because the transactions cost of repeatedly negotiating between labor and capital in a market setting would be highly inefficient (Alchian and Demsetz (1972) and Williamson (1979)). Willamson (1975) also proposes that outsources functions of a firm may minimize transaction costs.

Johansson and Quigley (2004) argue that economic transactions have exclusion and interaction costs. It is these interactions costs that drive the integration of firms and the formation of networks. Interaction costs can involve a variety of issues across buyers or sellers, including legal, technological, search, and contractual issues, many of which involve information costs of some magnitude. They define “an economic network is an organization of interlinked agents combining some features of a firm and of the pure market. It internalizes some interaction costs and includes, at least implicitly, contingency agreements of the kind we find in market contracts (p.169)." Under their definition, partners in a network are not anonymous; they have repeated interactions with one another. Examples of such inter-firm networks include wholesale producers and their suppliers, industrial supply chain systems, and networks formed for just in time delivery systems. If buyers and sellers organize in an effort to reduce transaction costs, they have formed an external or "inter-firm" network.

McCann and Shefer (2004) indicate "that the spatial transaction costs faced by modern firms are primarily of two types, namely transportation and information costs" (p. 183) Under these conditions, intra-firm networks may efficiently operate on a global basis because of widespread adoption of information technologies, which has, for example helped drive the process of global out-sourcing. In such situations, face-to-face contact through co-location may not be necessary or even very important (McCann and Shefer, 2004). However, it remains an open question as to the degree of co-location or "near" location required for intra-firm or inter-firm cooperation.

A more relevant concept for incubators is the previously mentioned inter-firm networks, especially when such networks are informal. Marshall (1919) describes the importance of direct and unplanned interaction among firms in his early discussion of industrial districts. For less formal networks, co-location probably remains a key element for success, because interactions rely on trust and reciprocal actions rather than formal contact-based relationships. Storper and Venables (2004) maintain that face to face (F2F) contact continues to be a critical component in the transfer of knowledge among firms and individuals in our economy. Even as communications technology appears to reduce the importance of F2F interaction, new innovations and activities develop that require F2F contact for the transmission of complex and unique information.

F2F contact allows for multidimensional communication, verbal, physical, intentional, that provides for a more efficient and profound transfer of complex, tacit knowledge. Tacit knowledge is argued to be an critical prerequisite to the growth of a firm (Dettwiler, 2006). F2F interaction also plays a critical role in building trusting relationships, thereby reducing free rider and incentive difficulties among individuals and/or firms. Inter-firm networks, in theory, allow for more consistent observation of individuals and firm behavior, which therefore creates low-cost, “multi-layered”, trusting relationships. Co-location of firms or individuals in a business setting further enhances this socialization effect. (Storper and Venables, p325, 2006)

Storper and Venables (2004) further argue that F2F contact also provides screening opportunities for individuals and firms to identify exactly those parties with which they want to establish relationships. While formal screening procedures exist across society (examinations, degrees, certifications, etc), less formal procedures exist in the form of informal networks. As informal networks are created, members develop trusting relationships that allow for formal and informal screening of current and future members. These informal networks create and environment where relationships are based on reciprocal actions or “trading favors”. With these informal arrangements co-location (as provided by incubators) is critical. Unless trust is very well established, firms have to be physically close to monitor the behavior of the other party. If firms are not physically close, the transactions cost of interaction are often prohibitively high. If sufficient social capital is established, informational links between clients who are not co-located can be maintained. In the case of market transactions, social capital is much less important as transactions are based on established contract law.

The Incubator as a Network

A network model of incubators can be approached on several different levels. First the incubator itself can, in effect, be considered a “quasi-firm.” or, using Williamson’s term, a hybrid organization. Information and resource sharing among incubator clients lowers transaction costs for individual firms. (Williamson, 1975). Moreover, transactions costs are further reduced as the incubator serves as the outsourcing agent for a variety of firm functions. An incubator establishes direct links with its clients and with other community and regional resources. This quasi-firm thus becomes an incubation network when it successfully supports an environment of innovation and commercialization of ideas.

Successful incubators strongly encourage interaction or network formation between clients through facility design (forcing the use of common entrances, exits, elevators, and break facilities for example) and through joint activities (such as business seminars) (Adkins, 2004). Research by Nohria and Eccles (1992) argues that the critical contribution of incubators is the organizational structure and processes that create the environment for these types of network formation. An incubator facility that systematically encourages the co-location of expertise and enterprise creates and environment that encourages network formation.

The incubator facilities role in enhancing network economies should not be underestimated. Horgren (2001) highlights the importance of transforming workspaces as the needs of firms change over time. Dettwiler (2006) propose that the facilities management structure of business incubators and science parks encourages the interaction and effective use of necessary services for entrepreneurial firms. Their comparison of Swedish on-park and off-park firms reveals that facilities management and differences in contractural agreements are important contributors to the superior performance of on-park firms. The unique facilities solutions that an incubator provide, create a network opportunity for start-up firms that further enhances the prospect of firm success.

Studies (Adkins) indicate that client interaction is a sign of incubator success. This research and the behavior of successful incubators provide empirical evidence that client interaction (or network formation) in part explains the higher survival rate of incubator firms over other new and small businesses. Rothschild and Darr (2005) confirm that both informal and formal networks are critical for entrepreneurial success. Additional research (Lichtenstein, 1992) cites intra-network relationship building as one of the most important contributions of incubators. Interactions can range from mentorship and idea sharing to market-based buying and selling of services or products between clients. The key, however, is that incubator client interaction builds linkages that would likely not form otherwise and which, more importantly, contribute to client firm success.

An additional way to approach incubators as networks is to focus on network building between incubators that facilitate information exchange. Network creation and information spillovers are enhanced with F2F communication and co-location of firms. Storper and Venables (2006) describe a model of a "buzz" city or a "buzz" environment that is a useful framework for understanding the network effects of incubation. In a buzz environment people "interact and co-operate with other high-ability people, are well placed to communicate complex ideas with them, and are highly motivated. To be able to reap these benefits in full almost invariably requires co-location, rather than occasional interludes of F2F contact (Storper and Venables, 334, 2006)." Individuals and firms in these environments are productive, cooperative, and interact more frequently with universities and businesses in their region. They argue further that there is likely a "super-additivity" effect of these interactions in a buzz environment.

Incubators have the potential to create a buzz environment as described by Storper and Venables (2004) and thus to become a buzz incubator. Incubators have the benefit of co-location and an organizational structure that encourages cooperation and interaction. These network environments provide a platform for new firms to leverage new technologies and knowledge competencies (Ford et al., 1998; Lorenzoni and Lipparini; 1999). As this interaction improves knowledge spillovers and cross fertilization of ideas among incubates, there is the potential for the creation of new marketable solutions and enhanced firm productivity.

To fully leverage these benefits, incubators, like buzz environments, are often affiliated with or collaborate with universities or other specialized professional networks.

These interactions can further enhance the potential of the incubator and its incubatees. Incubators and their clients may also derive an important intangible benefit from the enhanced credibility that university sponsorship and/or access provides. Proximity to a university or other specialized professional networks can lower firm development costs, provide access to skilled labor, and improve the flow of the most up to date knowledge and technology (Barrow, 2001; Lockett and Wright, 2005; Markman et al., 2005; Nouira et al., 2005). If the nature of incubation is meant to improve economies of scale through, among other things, shared space and services, all of the aforementioned additional characteristics have the potential to enhance agglomeration economies. The organizational structure, alone, also has the potential to create this "additive" effect described by Storper andVenables.

Today, some rural incubators are regional, with several small incubation facilities linked together through shared resources and management.7 This arrangement is analogous to an intra-firm network. It has the potential for increasing the efficiency of incubator operations through obtaining scale economies, and hence boosting incubator and client survival rates. Networked incubators can also share established and/or best management practices, with better managed incubators serving as mentors for new or less successful efforts. Luger and Goldstein (1991) argue that incubators can overcome locational disadvantages with effective leadership, careful planning, and a little good luck. In addition, the NBIA serves as a type of formal inter-firm network for business incubators, where information is exchanged through conferences, workshops, their

[7] The West Texas A&M Enterprise Network is multi-site business incubator serving 32 counties in the Texas Panhandle.

website, and printed materials. Less formal networking between incubators at the regional level may also be occurring, although this remains a topic for future research.

O-Ring Theory Viewed from a Network Lens

Another potential application of network behavior can be described with O-ring theory. O-ring theory originates from the idea that labor productivity can explain large differences in income between nations. The O-ring production function (Kremer, 1993) is a tool by which small differences in worker productivity generate substantial differences in wages and productivity of complementary inputs. The model assumes that it is the way in which resources are utilized that is critical to production and innovation. Alchian and Demstez (1972) argued that "efficient production using heterogeneous resources is not a result of having better resources but knowing more accurately the relative performance of these resources" (Oerlemans et al., 2001, p. 344).

The results of the model illustrate that high skilled workers will be matched with other high skilled workers, while low skilled workers will also cluster together. Another important implication of the theorem is that the productivity (value) of a given level of skill in a particular task goes up if the other tasks are done by more skilled workers. This result indicates that the productivity of an individual performing a certain task is enhanced if other tasks are performed by workers possessing greater skills. Hence, if a worker migrants to an area where skill sets are generally greater, their own productivity (and rewards) can be enhanced, even though their own innate abilities remain the same.

The models results imply that firms that hire high (low)-skilled workers in one occupational category will also hire high (low) skilled workers in other occupational categories. For example, more-skilled computer support personnel will tend to work at the same firm as more skilled secretaries (Basu, 1997). These same results can also hold in a geographical context. Thus, if a worker migrates to an area where other workers are highly skilled, the migrants productivity will be higher, even though their own skill level stays the same. The knowledge spillover theory of entrepreneurship also maintains that human capital is a geographically bounded variable that may influence local entrepreneurial activity (Lee et al., 2004 Acs and Armington, 2006). This theory may explain income differences not only between countries but also between regions within a given country. In particular, the model may help provide an explanation for differences in real earnings between rural and urban areas and why industries experiencing more dynamic growth tend to locate in more densely populated areas.

O-ring theory has also been used to explain the importance of entrepreneurs in a regional economic development setting. Fabel (2003) uses the O-ring theory to explain the organizational structure of new spin-off entrepreneurial firms. This approach is especially relevant in the so called "New Economy," which witnessed a surge in the number of spin-off technology/internet firms. Much has been written about the importance of entrepreneurial interaction; thus, a better understanding of the organizational structure that supports this interaction is important. Similar to the outcome implied by traditional O-ring theory, high skilled employees or team members will be the ones to leave traditional firms for new entrepreneurial start-up firms. Fable concludes that after accounting for risk, information and enforcement problems, groups of individuals with superior entrepreneurial ability will be the creators of entrepreneurial firms. Entrepreneurs that are not identified in this process are left to work in traditionally managed firms. Overall, Fable's identifies a relationship between agglomeration in urban areas and the increased likelihood of high productivity, entrepreneurial start-up firms. Finally, this research also reveals the dynamic nature of these firms in further attracting and creating additional high skilled entrepreneurs and new spin-off firms.

O-ring theory illustrates a type of network formation that gives additional insight into local, regional, and national, agglomerations of skills and/or industries. Networks of individuals with specific skills and abilities are attracted to locations that have people and industries that support these types of skills and talents. It is likely that much of the interaction among professionals in these locations can be viewed as a classic network. One where agents are not anonymous has repeated interaction, and through face to face contact establishes trusting, low-cost relationships. Further, O-ring theories appear to assume that F2F interaction of workers and entrepreneurs creates an opportunity for knowledge transfers and productivity improvements. In sum, O-ring is an important extension of network theory that may explain concentrations of skilled and non-skilled workers, high productivity/high wage workers, and dynamic entrepreneurial regions around the world.

Incubators using an O-Ring Application

Viewing the incubator from an O-ring/network lens highlights additional key characteristics of the incubator. It is also useful to recall the incubator as a “quasi-firm” where the incubator, itself, needs to succeed along with the clients it serves. In order for an incubator to be successful it must first hire an experienced business manager. Many of the case studies published by the NBIA highlight the critical need for an experienced, knowledgeable incubator business manager. Incubator managers who clearly understand the entrepreneurial process and the unique issues that tenant firms face can play a crucial role in the success of the incubator, as well as tenant firms.

According to O-ring theory, a highly skilled incubator manager would tend to attract a highly skilled board of directors. The board of directors can serve as champions for the incubator involving the local business community and local government in policy formation and incubator support. Working with the board, a skilled incubator manager will be more likely to attract high quality service providers (attorneys, accountants, management, etc.) for their incubator clients with a greater likelihood of obtaining services on concessionary terms for incubator clients. In addition, the more dynamic and experienced incubator management is, the more likely that incubator clients will be dynamic firms with sound business ideas. One of the most important objectives of an incubator manager is to bring in solid incubator clients. Incubator management must ensure that client firms have sound business ideas with real possibilities for business growth. The success of the incubator is directly tied to the success of their incubator clients. Thus, incubators that have the strongest and most productive management, support staff, and service professionals are likely to attract the most dynamic and experienced incubator clients.

Using O-Ring theory as a lens to explain the business incubator process also highlights the importance of interaction among incubator client firms along with interaction between incubator management, client firms, and incubator service providers. However, the critical factor in an O-ring approach is not just interaction, but also the skill and productivity among all of the actors. It is the dynamic interaction of highly skilled and productive entrepreneurial firms that will, in theory, continue to attract similar skilled, new firms to the incubator. If these firms are concentrated in a specific industry or skill area, it is likely that new firms with these specialties will be attracted to the incubator. Hansen et al. (2000) claim that incubator specialization increases the potential for individual firm success.

O-ring theory also reveals that the skill and productivity of current incubator clients will likely determine the skill and productivity of future clients. In this environment, what we would expect to see is that the most successful, dynamic incubators are filled with highly effective incubator management, skilled and experienced service professionals, and innovative, young, entrepreneurial client firms. While individual firms in an incubator setting are faced with the same challenges as any new firm, incubator specialization is argued to increase the proficiency of incubator personnel and therefore enhance the value added to individual entrepreneurs (K. Aerts et al., 2007)

An additional inference from O-Ring theory is that incubator clients should work together in a shared, collaborative work environment. In a specialized incubator cooperative resource sharing has the potential to improve the competitive advantage of tenant firms over non-incubator firms (Chan and Lau, 2005). From this, a testable hypothesis from this inference is the conditions under which cooperation occurs and the degree to which it determines client growth and survival. While results from the NBIA indicate that intra-client cooperation is key, anecdotal evidence and theory indicates that clients who are competitors may be limited in their cooperative efforts. O-Ring theory provides a theoretical prism in which to examine this hypothesis concerning client behavior.

Agglomeration and Information Spillover

The traditional idea of external agglomeration economies lies in Marshall's emphasis on information spillovers, local inputs, and a skilled local labor supply. Agglomeration economies exist where there is a set of unique factors that improve business growth and productivity when firms are physically close. The traditional model assumes that a spatial competitive advantage is obtained when firms and consumers have frequent contact within an urban space, which further allows for reductions in transportation and information costs. Firms benefit from agglomeration in areas with high population density, where concentration allows for increasing returns and improved growth and productivity (Krugman, 1991).

Agglomeration economies also form the basis for industry clusters. Porter (2000) defines a cluster as "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in a particular field that compete but also cooperate in producing similar products" (p.15). Porter also emphasizes the concept of a "thickener" between clusters; as more firms with shared competencies are clustered together, the flow of knowledge and information is “thickened” in such a way to maximize the productive potential of individual firms (K. Aerts et al., 2007). As such, one of the main arguments used in support of clusters is improved access to specialized inputs, information, knowledge transfers, and publicly provided goods. Within industry clusters, groups of interconnected firms obtain agglomeration economies through critical linkages and networks. The locational concentration of related firms allows for readily available access to key factors of production and thus reduced barriers to entry for new firms. Finally, clustering of similar firms may help generate innovative ideas leading to innovative products and even firms.

Information transfers and exchange of ideas may occur more rapidly in clustering as compared to industries that are not geographically close (Oerlemans, et al., 2001). Audretsch (1995) and Acs et al. (2009) both propose that where there are clusters of entrepreneurial firms, knowledge spillovers can be important sources of entrepreneurial opportunities. Likely causes for this difference include the already discussed reasons concerning monitoring and other transactions cost and because employees with specialized knowledge can more easily move between firms that are geographically close. Knowledge spillovers improve the individual firms’ ability to create and sustain a competitive position. Van der Panne et al. (2003) argue that knowledge spillovers are critical to new and young firms as they allow for the dissemination of tacit knowledge, as opposed to the more readily accessible codified knowledge. Tacit knowledge is acquired through social interaction as it is largely un-codified and ill-documented. The critical relationship between knowledge spillovers and regional innovation dynamics has been established in the literature (Karlsson and Manduchi, 2001).

This relationship between agglomeration and knowledge spillovers is well documented in the Marshall-Arrow-Romer (MAR) model, where similar firms, especially new firms, benefit from locations in business clusters in large part due to the exchange of ideas and business information (Dumas, et al., 2002). This model also supports the idea that small cluster arrangements can benefit from information transfers in large clusters.

Glaeser et al. (1992) describes the MAR model as one where industrial concentration within a city or geographic region facilitates knowledge spillovers between firms. Loescsh (1954) refers to this type of industry concentration as industry localization. This model assumes that knowledge spillovers between firms are exclusive to firms within the same industry, while knowledge transmission across industries is assumed to be minimal or non-existent. Intra-industry knowledge externalities facilitate local and regional innovation, supported by regional concentrations of similar industries. The MAR model also upholds that local monopolies are superior to competitive models in relation to innovative firm behavior. While local monopolies will limit the transmission of new ideas, they will also generate the maximum value from their own innovations and ideas.

The MAR assumption that knowledge spillovers are restricted to firms within an industry disregards the potential importance of inter-industry knowledge spillovers and the importance of firm complementarities. This can occur due to generalized urban effects which enhance positive externalities resulting from a variety of firm and industry interaction. Jacobs (1969) argues that the key source of innovative activity is through knowledge spillovers across a variety of firms and industries in a region. Jacobs makes the argument that "the exchange of complementary knowledge across diverse firms and economic agents facilitates search or research and experimentation in innovation (van der Panne et al., 2003, p. 879)." This model further assumes that diverse firms interact across complementary industries with a common knowledge base that allows for the efficient transfer of ideas and the generation of new ones. Thus, the Jacobs model assumes that a diversity of firms, as opposed to specialization of firms, in a specialized urban environment is the primary driver of economic growth.

Jacobs' model further alludes to the importance of unplanned and chance interaction among firms. It is in this competitive environment of ideas and innovation that knowledge externalities are maximized. With this type of firm, interaction co-location can be especially important if firms are to realize the full benefits of these relationships. Proximity with respect to universities and specialized business services can be also critical to innovation. Oerlemans et al. (2001) uphold that "spatial concentration is related to the level of university and industry R&D spending, as proxies for knowledge spillovers" (2001, p. 340). Overall, co-location and/or proximity to key resources have the potential to further reduce the costs of knowledge transmissions and improves access for new and young firms by lowering screening costs of new entrants.

Incubators as "Quasi-clusters"

In the discussion of networks, it was noted that incubators are effectively "quasi-firms." An additional conceptualization is the incubator as a "quasi-cluster" organization. First, an incubator is a highly concentrated spatial cluster of firms. As well, many incubators are firms that share specializations or competencies across fields. Specialized incubators may provide this innovative thickening agent that Porter describes. Hence, the potential for agglomerative economies exist, especially if the incubator is targeted towards specific industrial or technology firms. It is in these specialized incubators that firms may benefit from Jacob's type innovation and knowledge spillovers.

As previously indicated, incubators replicate internal (to the firm) economies of scale through the use of shared services, such as office support activities and shared space. Subsidies that clients receive, such as below average market rents for space, simulate economies of scale as these subsidies lower firm costs and increase the potential of firm success. Arguably, the mentoring that clients receive from incubator staff is also a form of internal scale economies. Additionally, the incubator provides access to external specialized business services that further reduce firm costs as compared to other young entrepreneurial firms. Many of the services provided by the incubator and related firms are offered at a subsidized rate. However, even if some are offered at the market rate, young firms may still benefit from the resulting reduction in transactions costs that an incubator can provide.

As stated in the discussion on networks, one of the main arguments given for incubation is that client interaction can induce a variety of information spillovers effects. It is argued that the direct and indirect interaction of client firms will result in intentional and unintentional knowledge transfers. The incubator may also yield additional benefits of clustering. These may accrue if the credibility of this environment is such that outside professional service providers, like venture capitalists or other entrepreneurial resources, find these firms more attractive than non-incubator firms (Hannon and Chaplin, 2003; Hannon, 2005; Rothschild and Darr, 2005)

The importance of knowledge spillovers is critical in both the MAR's and Jacob's descriptions of industrial concentration. A growing body of research on the impacts of the MAR's and Jacob's models provides evidence that suggest potential impacts in a business incubation environment. Three studies examining the relative impact of productivity on urbanization and localization across cities find that while urbanization and localization economies are both present, localization is more significant (Nakamura 1985; Henderson, 1986; Henderson, 2003).

On the other hand, research that views this debate through the lens of diversity of firms and employment as opposed to city size yields different conclusions. Results indicate that employment diversity encourages growth in a region, stimulates new firm births and growth of high-technology firms (Glaeser et al., 1992; Henderson et al., 1995; Rosenthal and Strange, 2003). However, the prevalence of localization versus urbanization economies also varies among industries and may also change with product development or life-cycle of the firm (Duranton and Puga, 2001). As incubators are focused on the birth and early growth phases of a firm's life-cycle, further research should consider the importance of MAR and Jacob's economies at these specific life-cycle phases. Additionally, understanding the relevance of MAR and Jacob's economies within specific industry and firm types may be important for differentiating the benefits that accrue from specialized incubators versus incubators that service, young new firms more generally.

Much of this research implies that both MAR’s and Jacob’s economies can be useful for explaining the value in certain types of incubator/incubatee relationships. As noted earlier, incubators come in all shapes and sizes. Moreover, there does not appear to be a common or exact recipe for incubation success. Thus, incubators that accept clients in specific market niches are just as likely to succeed as those that accept incubatees from a diversity of firm types. Incubators that focus on firm within a specific type of industry may yield strong localization effects for locating firms. These MAR’s effects are likely to maximize industry innovation and value. Moreover, business incubators that support an environment conducive to localization economies are not precluded from the benefits of Jacobs type knowledge spillovers. Incubator firms within an industry could potentially generate important knowledge spillovers but this is largely dependent on the nature of the industry and competitive environment surrounding these firms.

The Jacob’s model, however, would argue that incubators that accept a diversity of firms have stronger potential for knowledge spillovers and maximizing firm value. Furthermore, these incubators may provide a more generally enhanced entrepreneurial climate and culture such that new firm activity and cross-fertilization of knowledge is enhanced. One of the potential downsides to more diverse incubation is that localization economies within the incubator are largely precluded.

There are several testable hypotheses that can be generated from the MAR’s versus Jacob’s debate. One testable hypothesis is the degree to which and under what conditions the MAR’s and Jacob’s theories provide explanations of agglomeration type effects, such as knowledge spillovers, for business incubators. Additionally, testing a hypothesis that clarifies the prevalence of MAR's economies in diverse incubators and Jacob's economies in industry specific incubators would provide evidence of preclusion or reduced economies in these specific environments.

In addition, the nature of an incubator provides an environment that can facilitate personal ties among tenant firms. Hu and Korneliussen (1997) find that the impact of personal ties on the cooperation and performance of small competing firms is significant. In smaller incubators, informal networks may be easier to manage and in this regard may be important for individual tenant firms (Rothschild and Darr, 2005). The economies of scale derived from large incubator type organizations have been documented (Williamson, 1975). A potential hypothesis to be examined is the comparative performance between small, medium, and large incubators.

In an incubator environment, the knowledge effects for new and young firms can provide invaluable information transfers. The interaction of dynamic entrepreneurs has been described as a potentially synergistic, cooperative, and trusting environment. These information spillovers could be simple water cooler advice or as important as direct mentorship in the areas of marketing or management issues. What is critical is that these knowledge spillovers would likely not occur, or at least not to the same degree, without the formal organization of the incubator. This interaction is a form of agglomeration economies completely analogous to information spillovers between co-located firms in standard models such as Porter's cluster theory, the MAR model, or Jacobs's model.

Thus, the jury is still out as to whether similar incubatees or a diversity of incubatees will provide the most value to the firm. As noted earlier, there is anecdotal evidence that there are incubator environments where there is more competition and less cooperation. A potential hypothesis for further analysis is that firms with similar markets (especially high-technology firms) will tend to be less cooperative. If this holds, the incubator client/cooperation model will not explain the success of these incubators. The synergistic effects of incubation that have long been held as a key benefit may in fact be a weakness in some incubators. What is known is that among the many different models of incubation, both the MAR and Jacob's theories have relevance in the effort to furthering our understanding of incubation success.

Networks and Agglomeration

The research on networks and agglomeration reveals similarities and complementarities among these different theoretical approaches. McCann and Shefer (2004) present three ideal types of geographical firm relationships and organization. This model allows for further development of agglomeration and network theory. The first model is illustrative of the Marshallian model of agglomeration, where firms choose to establish clusters in a typical urban location with relatively no market power for any one firm. These firms, in general, do not establish long-term relationships and derive benefit from the cluster due to the physical proximity of the other firms. That is, agglomeration economies exist, but not because firms network or act as a Porter-type cluster.

The second model is characterized by firms that require significant investments in physical capital and thus are often characterized by high entry and exit costs. Clustering in this second example does not demand proximity in the same region but requires networking of related firms within and across regions to minimize transportation costs (hence, this is more of a network model with little, if any, agglomerative effects).

The last model flows from the work of Granovetter (1973) and Williamson (1975). This social network model is built on a foundation of trusting relationships between key agents among firms. McCann and Shefer (2004) note that "these trust relations will become manifest by a variety of features, such as joint lobbying, joint ventures, informal alliances, and reciprocal arrangements regarding trading relationships (p.190)." These relationships develop over time and there is generally a common history and experience among firms and decision makers.

Synthesizing this approach with the theoretical constructs of agglomeration and networks has the potential for generating a richer understanding of a new approach to modeling incubation. Based on the analysis of McCann and Shefer (2004) and others, Table 2.2 illustrates that incubators have several of the characteristics of the social network approach. Incubators especially seem to fit this approach with regard to characteristics of relations, membership, and firm rent. An incubator is partially open in the sense that new firms must apply to belong to the incubator. Moreover, in theory, this process would be competitive with only the "best" young firms obtaining membership. As well, ideally the incubator is attempting to build an environment of cooperation and mentorship to maximize the potential of individual firm success.

However, as it relates to firm size, incubators and their client firms are a better fit for the agglomeration model. As described in Table 2.2, firm size in the agglomeration model is atomistic. Given the nature of firms attracted to business incubators, this is likely a better description of firm size within incubators than large or variable.8 Finally, with the notion of space, incubators run across all three models described in the table. There are successful models of incubation in rural9, regional, and urban areas. While these three models illustrate different perspectives for looking at clustering behavior; there is a clear relationship between these alternatives and business incubation

Table 2.2: Industrial Clusters

Characteristics	***Pure Agglomeration***	***Industrial Complex***	***Social Network***
Firm Size	**Atomistic**	**Some firms are large**	**Variable**
Characteristics of relations	Non-identifiable Fragmented Unstable	Identifiable Stable and frequent trading	Trust Loyalty Joint lobbying Joint Ventures Non-opportunistic
Membership	Open	Closed	Partially Open
Access to cluster	Rental payments Location necessary	Internal investments Location Necessary	History Experience Location necessary but not sufficient
Space outcomes	Rent appreciation	No effect on rents	Partial rent Capitalization
Example of cluster	Competitive urban economy	Steel or chemicals production complex	New industrial areas
Analytical approaches	Models of pure agglomeration	Location-production theory Input-Output analysis	Social network theory (Granovetter)
Notion of space	Urban	Local or regional but not urban	Local or regional but not urban

Source: McCann P and Shefer D (2004) Location, Agglomeration, and Infrastructure. *Papers in Regional Science* 83: 177-196

[8] What is meant by large or small is, however, in question and thus, depending on the specific definition of small or large firm, could change this classification.

[9] The research on rural incubation needs more development. To date, urban areas have more successful incubators than rural areas. Rural incubators tend to struggle more and are often more dependent on public support.

and an apparent inter-relatedness between these approaches and incubation.

A Research Agenda for Incubation

As shown in Table 3, Hackett and Dilts (2004b) provide an excellent delineation concerning further research needs in the area of incubators as an economic development tool. Further, Sherman and Chappell (1998) suggest quasi-experimental approaches, stakeholder analysis, and macroeconomic modeling are ways to carry the incubator research agenda forward. Combining the research agenda of Hackett and Dilts, the method-based suggestions of Sherman and Chappell, and the insights gleamed from the literature on networks and agglomeration economies a more complete research agenda can be developed. Using the outline given in Table 2.3, a future research agenda should focus on topic areas B through E. Any future research agenda should also use theoretical approaches as the nexus for additional research on incubators. A theoretical grounding is a critical starting point from which to frame the potential strengths and weaknesses of this and other economic development approaches.

Tables 2.4-2.6 summarize potential business incubation research questions that could be generated within specific theoretical frameworks. The additional categories of incubator configuration, incubator development, and impact studies are modeled after Hackett and Dilts (2004) descriptions. However, we propose impact studies should be more broadly defined to include incubator's impacts on general economic activity in a community, not just how incubators impact new firm survival. Table 2.4 highlights hypotheses that could be explored using a network economy approach. A formal

Table 2.3: Hackett and Dilts Research Agenda

A ***Incubator Development Studies***	**B** ***Incubator Configuration Studies***	**C** ***Incubatee Development Studies***	**D** ***Impact Studies***	**E** ***Theoretical Approaches to Incubation***
There needs to be additional clarity of definitions and concepts.	Move focus away from configurations of incubators to how and why the configurations work together	Develop a model to explain how and why incubation facilitates the development of client firms.	Focus research efforts on whether incubation impacts new firm survival rates.	Formalize a theoretical approach to incubation.

Source: Hackett S.M., Dilts D.M. (2004b) A Systematic Review of Business Incubation Research. Journal of Technology Transfer 29: 55-82

Table 2.4: Research Questions Using a Network Economies Approach

	Network Economies		
	Incubator Configuration	**Incubatee Development**	**Impact Studies**
Research Questions			
Do incubators mimic scale economies due to shared incubator services?	Yes	Yes	No
Does client interaction or incubator management contribute more to agglomeration benefits?	Yes	yes	No
Do incubator graduates have greater business success than other small business program graduates?	No	no	Yes
What is the mentoring contribution to incubatee graduate success as opposed to general business training programs?	Yes	yes	Yes
Do highly skilled and successful incubator managers and/or boards of directors have more successful incubator firms?	Yes	no	Yes
Does the type of incubator increase client interaction and cooperation?	Yes	yes	No
Does the type of incubator increase client success?	Yes	no	Yes

network-based modeling approach may be a fruitful method for exploring how and why clients network (Borgatti and Foster, 2003). Tables 2.5 and 2.6 summarize potential research questions using an agglomeration economies and economic impact analysis framework. Each of these hypotheses potentially explores incubator configuration, incubator development, and the general impact of incubators through a specific theoretical lens. Each of these theoretical approaches have benefits; however, each approach yields answers to specific types of questions. The rest of this section highlights specific questions and potential methodological approaches for future research.

More specifically, both networks and agglomeration economies hold promise for developing a model to explain how and why incubators support client development. Based on our previous discussions, a testable hypothesis is that incubators provide economies in two forms: 1) scale type economies, such as shared services and, arguably, subsidies that mimic scale economies in that costs of production are reduced and 2) agglomeration economies, which primarily occur through knowledge transfers between clients and from the incubator staff to clients. Given that such information is available, client level data could be used in testing these hypotheses. Such information could be used to calculate cost savings due to shared services in comparison to matched (similar) firms that are not incubator residents. Results would provide an indication of how much shared-services contribute to incubator support. Arguably, any residual difference in productivity between the matched pairs (incubator firms versus non-incubator firms) could be attributable to the advice from staff and from client interaction. Teasing out the effect of these two factors may require surveying clients to obtain at least an ordinal ranking concerning which two factors tend to be most important. While we would expect advice from incubator staff to be more important, situations can be envisioned where client interaction could be the greatest benefit from belonging to an incubator.

Such a research approach could also be used to explore whether business incubation impacts firm survival rates. Using a matched pair or quasi-experimental approach, a comparison could be made between similar firms that belonged to an incubator versus counterparts that did not. Differences in survival rates could then be calculated. Of course, the issue of selection bias still remains in that firms which are

Table 2.5: Research Questions Using an Agglomeration Economies Approach

	Agglomeration Economies		
	Incubator Configuration	**Incubatee Development**	**Impact Studies**
Research Questions			
Do incubators generate agglomeration economies?	Yes	yes	No
What is the primary source of these economies? Knowledge transfers?	Yes	yes	No
Do different types of incubators result in a prevalence of MAR or Jacob type economies?	Yes	yes	No
What is the success rate of different types of incubators, assuming some type of agglomeration economies?	No	no	Yes
What is the success rate of different types of incubator firms, assuming some type of agglomeration economies?	No	no	Yes
Is co-location of clients and management important to the success rate of the incubator and its clients?	Yes	no	Yes

better managed to begin with may seek out the opportunity provided by business incubators.[10]

A related issue concerns when certain aspects of business incubators are replicated by other programs, such as entrepreneurial group type systems (see Lyons, 2002), business training programs, such as Fastrac, and business resource centers. For example, entrepreneurial league type systems likely provide networking type opportunities and some of the mentoring provided by business incubators. Business training programs are potentially rich in mentoring activities and provide some networking opportunities (typically between members of the same training class). A comparison of graduates (similar backgrounds) of business training programs versus incubator graduates could provide the starting point for evaluating the contribution of mentoring versus client networking to business survival and growth. Likewise, comparing the growth and survival rates of participants in entrepreneurial league type systems to that of incubator graduates could provide a similar starting point for evaluating the relative benefits of strong mentoring versus networking.[11] Given the strength of results and number of participants involved, it might be possible to apply simple quantitative tests in comparing such matched outcomes.

Related to a research agenda focused on mentoring, one that considers the impact of the skills and talents of incubator clients, management, and boards of directors could

[10] In fact, businesses almost always must meet certain basic good business practices, such as having a solid business plan, to be allowed into an incubator. Such requirements impose at least a basic element of good management.

[11] Of course, a potentially compounding problem would be formal business training programs and entrepreneurial league-type systems in which incubator clients (past and current) are often at least strongly encouraged to participate.

answer important research questions. For example, a national or regional analysis of incubator and client success, given the experience of incubator management and staff could provide evidence of O-ring network type economies. Network economies and more specifically, O-ring theory, could also be used to test the relative importance of cooperation within specific types of incubators. Both of these could be accomplished with a mixed methods approach using surveys of incubator management and clients, followed by a quantitative logit or probit modeling of results.

O-Ring network economies could be further explored with the application of a longitudinal study of a series of incubators. The primary research question focuses on whether successful incubators and incubator clients are able to continue to attract highly productive and successful new incubator clients. If this is the case, the O-ring theory would be able document a "virtuous cycle" of entrepreneurship. Both of these could also be accomplished through a series of surveys over time (approximately 5-10 years), followed by specific quantitative analysis. However, given the data limitations of this analysis, it is likely that the incubator/client sample would not be large.

Another area of potentially fruitful research could be stakeholder analysis. If incubators do actually improve the overall local entrepreneurial climate, stakeholder analysis through focus groups, surveys, and other appropriate means may be able to "tease-out" whether this contribution to an improved entrepreneurial environment is perceived to be occurring and further, how the incubator is making such a contribution. This research could also provide an important foundation for general economic impact studies as well as provide possible evidence of any social benefits from business incubation.

In addition, more studies indicating the overall contribution of business incubators to local communities would be helpful. If conducted across different types of communities (and incubator structures) these studies could give policy makers considering incubators as part of a regional development plan a general idea of the potential contributions to local economic growth. Integrated input-output, labor market, and public service provision type models (Fannin et al., 2008) would be particularly instructive in providing policy makers with estimates of the net returns in net revenue to local governments (often funders of incubator development and continued support efforts). Such studies could be used to empirically test the recent assertion (Tamasy, 2007) that questionable public benefits do not warrant public sector involvement in incubator development and support.

Table 2.6: Research Questions Using an Economic Impact Approach

	Economic Impact		
	Incubator Configuration	**Incubatee Development**	**Impact Studies**
Research Questions			
Do incubators increase general employment and income in a region?	No	no	yes
Do incubators increase small business activity in a region?	No	no	yes
What are the indirect and induced benefits of incubators?	No	no	yes
What are the net returns of incubators on local governments?	No	no	yes

All of the above theoretical approaches could also be used to further develop the research agenda on rural incubation. As noted earlier, there continues to be evidence that urban incubators are more successful than rural incubators. Moreover, there is at least anecdotal evidence that rural incubators may require longer periods of public funding than their urban counterparts. Among the ongoing empirical problems are that much of the incubation research suffers from selection bias and that there continues to be a lack of dynamic analysis in the current literature. For example, it is difficult to get data on incubator failures, but this is critical to understanding the potential costs and benefits of incubators as an economic development tool. Moreover, using some of the research questions above to explore differences between rural and urban incubators could clarify the appropriateness of this development tool across different geographies.

Finally, a simple national tracking system concerning incubators would be instructive. For example, the overall batting average concerning incubator survival, say, five or ten years after inception, is not known because efforts to gather data tend to be piecemeal and rather ad hoc. A simple system sponsored by the NBIA and perhaps others with a few short questions (for example, when did the incubator close its doors and why) would be instructive.

In conclusion, using Hackett and Dilts (2004b) Objective E in Table 2.3, a formal theory-based approach to business incubation has been developed. Using their additional categories of research, each theory-based approach details whether it covers incubator configuration, incubator development, or general impact studies. Additionally, a variety of specific research approaches are described, along with potential methodologies for exploring these. Together, we believe that all of the potential efforts mentioned here, as well as other similar efforts, would help in meeting the objectives outlined by Hackett and Dilts (2004b) and the hypotheses detailed here.

Business incubation appears to be a development tool that will continue to have a presence on the development landscape for the foreseeable future. With a consistent set of best practices, coupled with a theoretical underpinning, business incubators have the potential to be one of the most comprehensive economic development strategies. By doing so, the cause of regional economic development in general can be advanced through more insightful applications of regional science. Additionally, incubators have the potential to enhance the core objectives of economic development; job creation, business diversification, new venture creation and broader community development.

CHAPTER THREE

THE IMPACT OF POLICY PERCEPTIONS ON LOCAL ENTREPRENEURIAL DEVELOPMENT IN SOUTH CAROLOINA

Introduction

The field of regional economic development, and the policy landscape associated with it, has undergone a number of transitions over the past several decades. Economic development policies of the past focused almost exclusively on industrial recruitment and, to some extent, business retention. As evidence continues to mount regarding the characteristics of successful communities and related development, it has become increasingly clear that a one-size-fits-all development strategy is not a sustainable or wise development approach for most communities and regions. It has also become evident that a mixed basket of development strategies that includes business recruitment, business retention, and entrepreneurship is preferable for sustainable economic growth in most communities.

Over the past decade, entrepreneurship has become recognized as a legitimate and distinct regional development approach, one that is increasingly considered a primary component of state and regional economic development efforts. As a result, many states now have a variety of entrepreneurial initiatives, networks, and centers to promote this development strategy (NGA, 2004; William, 2004). The proliferation of different approaches has made them difficult to define and classify but the trend is clear. One ongoing area of concern is that local development practitioners may view entrepreneurship strategies as too difficult or out of reach for their community. Moreover, if a community already has access to small business development centers or other small business related organizations, local officials may believe small business development efforts in this area are redundant and not within their policy purview.

Furthermore, there is increasing confirmation that many communities, especially small and rural communities, continue to engage in traditional economic development practices even in the face of mounting evidence that these approaches may not provide the benefits that communities believe they do. If the "new economy" demands that communities shift their economic development focus, why are communities not doing so? Moreover, it is important to clarify what types of development approaches communities believe are most important, along with understanding what they actually implement in practice.

Research continues to verify that entrepreneurial focused economic development is a critical driver for regional economic growth, while industrial recruitment policy continues to remain the most popular development approach for many communities. Such industrial recruitment strategies often result in net losses to communities when all of the incentives are balanced against the benefits from job creation, workforce development, and others.

This research explores the scope of local and regional entrepreneurial development efforts across South Carolina. This research begins to analyze the importance of policy perceptions of state and local policymakers on the implementation of entrepreneurial development policy. The first section of the paper reviews a wide and diverse range of literature on entrepreneurship, entrepreneurship policy, and industrial recruitment policy. This is followed by a comparison and discussion of how South Carolina fares in state rankings of entrepreneurship and innovation. The third section of the paper reviews the methodology and reviews statewide survey results. Finally, the last section of the paper presents and discusses logit model results of significant factors that influence the probability of a community having/not having an entrepreneurial-focused development program. In conclusion, this research hopes to clarify the role of entrepreneurial economic development policy in communities with diverse economic and social characteristics and to understand the barriers that exist for communities in implementing “new economy” development strategies.

Literature Review

Research has documented the importance of entrepreneurship for national economic growth and innovation (Reynolds et al., 1999). The U.S. Small Business Administration (2005) highlights the importance of entrepreneurs for the generation of new ideas and innovations. The OECD (2003) and the U.S. Census Bureau (Edmiston, 2007) report that the majority of new jobs created in the U.S. and around the world are in small and/or medium sized firms. Reynolds et al. (1999) argue that as much as one third of the variation in global rates of economic growth may be accounted for by differing rates of entrepreneurship among nations.

The dynamic nature of entrepreneurial activity allows for the creation of local jobs, wealth, the innovative use of local assets and resources, and enhanced local and regional economic growth. Research documents the importance of entrepreneurship for local and regional employment growth (Birch, 1987; Shaffer, 2002 and 2006). Acs and Armington (2003) find a strong correlation between entrepreneurship and long-term regional employment growth. This relationship is confirmed for rural areas as well (Birch, 1987). Acs and Armington (2005) find an association between firm formation rates and differences in human capital, local population growth, local income growth, and industry specialization. Acs and Storey (2004) uphold the premise that entrepreneurship also improves the allocation of resources throughout an economy.

Basic regional development theories, whether demand side or supply side, assume that regions possess strong social capital (Porter, 1998; Rubin, 1994) and a regulatory environment that ensures well-functioning markets (Deininger, 2003). Acs questions whether the growing body of research confirming the role of entrepreneurship and innovation in local and regional economic growth and development applies equally to affluent communities and low-income and/or rural communities. Compared to low-income communities, affluent communities have high quality human capital, adequate financial capital, and appropriate social capital (Acs and Armington, 2006; Acs and Plummer, 2005; Bresnahan and Gambardella, 2004; Florida, 2002; Acs and Varga, 2005, Acs and Storey, 2004) Table 3.1 illustrates Acs description of the supply and demand side of development policy in affluent versus low-income communities.

This comparison indicates that low income communities have substantially weaker assets when compared against affluent communities for the use of demand or supply side economic development approaches. This raises questions of causality with regard to which came first, affluence and successful development policy or vice versa. , The question that Acs and others have raised is whether entrepreneurship-focused economic development strategies deliver successful economic development outcomes for communities without the strong assets that many affluent communities possess.

Table 3.1: Economic Development Assets in Affluent and Low-Income Communities

	Community	
	Affluent	**Low-Income**
Theory		
Supply	Quality human capital Financial capital Infrastructure Leadership	Low-quality human capital Limited financial capital Poor infrastructure Limited leadership
Demand	Strong export demand Backward linkages Tradable goods	Weak export demand Weak backward linkages Few tradable goods

Source: Acs, Zoltan, State of Literature on Small and Medium Size Enterprises And Entrepreneurship in Low-Income Communities,

Research on social capital and civic infrastructure concurs with some of the conclusions made by Acs. Burt (1992) and Granovetter (1973) argue that weak social ties are one of the weakest areas of community and economic development. In many communities this weakness restricts local entrepreneurship and business expansion as business opportunities are missed or overlooked. The World Bank (1999) defines social capital as the "institutions, relationships, and norms that shape the quality and quantity of a society's social interactions…Social capital is not just the sum of the institutions which underpin a society—it is the glue that holds them together (www.worldbank.org)." Research documents both the direct and indirect role of social capital in improving community and economic development. Social capital can influence political institutions and policymakers, improve local organizational capacity, and enhance internal and external connections that promote entrepreneurial and other business opportunities (Gittell and Thompson, 1999; Vidal, 1992). Social capital can also enhance community access to financial capital through peer lending programs, credit unions, and other local and regional credit and loan programs (Gittell and Thompson, 1999). Halpern (2009) argues that communities with a good stock of social capital are likely to benefit from a wide range of community and economic strengths, like lower crime, better health, improved educational outcomes, and stronger overall economic performance.

Woolcock (2001) further distinguishes between three types of social capital; bonding, bridging, and linking. Bonding social capital characterizes ties between people that are related, close friends, or neighbors. Bonding tends to be more protective and inward-looking but can also enhance the communication and informal cooperation necessary to pursue common objectives (Van Oorschot et al., 2006). The nature of bonding social capital is that individuals and groups share personal, social and/or cultural characteristics like race, class, ethnicity, religion, etc. While these shared qualities can enhance community relationships, they can also be used to exclude community members that do not share these characteristics.

Bridging social capital occurs through loose social networks of friends, acquaintances, and work colleagues. Van Oorschot et al. (2006) describes bridging networks as those that encourage relationships among those with more distant ties via outward looking, civic oriented organizations and institutions. Bridging social capital is crucial for building relationships that support community problem solving, information sharing, and management of community resources. Finally, linking social capital refers to reaching “out to unlike people in dissimilar situations, such as those who are entirely outside of the community, thus enabling members to leverage a far wider range of resources than are available in the community (Woolcock, 2001, p.13-14).” Linking social capital includes networks of individuals and organizations that have ties across states or nations. Moreover, and possibly most important, linking social capital includes members of diverse social and cultural standing, as well as different positions of power and influence.

The three types of social capital serve different functions in different community settings and impact whether social capital has a positive or negative influence on economic and community development. While bonding can be an important community social safety net, it can also serve to perpetuate dysfunctional and nepotistic community relationships. Similarly, bridging networks allows communities a broad range of access to institutions and organizations that they would normally be unable to access. Strong bridging networks provides communities with access to resources and institutions that otherwise would not be available. While Putnam (2000) describes bonding social capital as “a kind of sociological superglue, whereas bridging social capital provides a sociological WD-40 (p.22-23).” Woolcock (2002) explains that rural communities often have high bonding, low bridging, and no linking. Similarly, poor communities often have significant bonding with no bridging or linking. Thus, similar to Acs, Burt (1992), Gittell and Thompson (1999), Granovetter (1973), Halpern (2009), Woolcock (2001) and others are likely to argue that rural and poor communities often have a weaker asset base as it relates to the implementation of economic development policy.

Local Economic Development and Entrepreneurship

There is a growing research stream documenting the importance of critical regional drivers of local and regional entrepreneurship and the public policy measures that can be important contributors to entrepreneurial development success. Several key studies highlight the relationship between local economic development and entrepreneurship. All of these studies verify the important relationship between local entrepreneurship and local economic development activity. An analysis commissioned by the U.S. Small Business Administration (2006) by Innovation and Information Consultants (IIC) finds that changes in the number of small businesses is related to population, per capita income, diploma recipients per 1000 residents, real wages, share of non-farm proprietors' income, density of urban establishments, urban jobs per 1000 residents, and region of the country. Papadaki and Chami's (2002) examination of Canadian microbusiness finds that the level of high school completion of owners, the propensity of an owner to take risks, and the use of informal networks were all significantly related to business growth.

One of the ongoing questions in the entrepreneurial literature is how public policy can encourage and/or support an enhanced entrepreneurial culture in a community. Christofides, Behr, and Neelakantan (2001) analyzed the types of state programs that delivered the most significant local gains in employment, income, and number of establishments. Their results reveal that local business structure is largely the result of local and regional economic conditions. Walzer et al. (2007) define three variables as proxies for business structure; business density[12], growth in large businesses, and rural urban continuum codes[13]. These measures attempt to capture the endogenaeity of local and regional business activity. Business density and rural-urban continuum codes signify access and availability to local and regional markets. Business density may also signal opportunities for entrepreneurs to network and build relationships with other local businesses. Finally, growth in large business is an indication of the potential for entrepreneurial spin-off and the dynamic nature of the local business community. The current literature suggests the following causal sequence; entrepreneurship is affected by business structure in a region, where business structure is largely a determinant of overall regional economic conditions (IIC, 2006; Acs and Armington, 2005; Christofides et al., 2001).

Walzer et al. (2007) use these earlier studies as the foundation to build a model of the effects of contextual factors on entrepreneurship. The main objective of their research is to highlight the strength of the relationships between variables such as, economic climate, business structure, natural amenities and the potential for entrepreneurial activity in a given county. Their sample includes six Midwestern states representing a range of urban and rural settings, a diversity of economic bases represented, and different regional economic climates. Their results indicate that approximately sixty percent of the variability in county business structure is due to the economic climate of a region;

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[12] Business density is often measured as the number of firms per unit, such as 1,000, of the population. However, Walzer et al. defines business density as the number of microenterprises per 10,000 residents.
[13] Rural-Urban continuum codes are a classification system of the U.S. Department of Agriculture’s, Economic Research Service characterizing metropolitan areas by the population size of their metro area and nonmetropolitan counties by their degree of urbanization and adjacency.

wealthier counties had higher business density and business growth rates. The economic climate of a region is composed of tax effort[14], housing value, the wage rate, the unemployment rate, poverty, and population density. Their analysis further confirms that changes in natural amenities and perceptions of quality of life issues are positively related to the pool of potential entrepreneurs in a region. Additional research supports that amenity-based development strategies may also attract "creative class" workers to rural regions (McGranahan and Wojan, 2006; Florida, 2005; Dabson, 2007). In addition, the strong and positive link between business structure and entrepreneurship is confirmed. When business structure is combined with the pool of potential entrepreneurs, this variable accounts for over eighty percent of the variability in regional entrepreneurship. Overall, this research further confirms the importance of regional business structure and economic climate to the formation and success of new firms. (Walzer et al., 2007)

Henderson et al. (2007) provides additional evidence of the drivers of regional entrepreneurship in rural and metropolitan areas. By creating variables representing entrepreneurial depth and breadth, this research clarifies regional characteristics that determine spatial variation in the quantity of entrepreneurs and quality of entrepreneurial activity. Human capital, as measured by educational attainment, has a positive relationship with a region's ability to produce entrepreneurs that generate high incomes and high value-added in the region. Metropolitan areas have a strong relationship between human capital and high value entrepreneurial activity, while human capital in rural areas is strongly related to the breadth (variety) of entrepreneurs in a region. There

[14] Per capita taxes paid relative to income per capita.

are more entrepreneurs, as well as more high value added entrepreneurial activity in counties with higher densities of natural and scenic amenities. Rural entrepreneurial development appears to be especially sensitive to local and regional amenities.

Overall, this analysis finds that high-value entrepreneurial activity continues to be largely concentrated in metropolitan areas. High value entrepreneurs are critical resources for enhanced regional employment, income and growth. As such, clarifying policy measures that improve the ability of rural and/or micropolitan areas to leverage their entrepreneurial assets is important for long-term regional economic growth and development. (Henderson et al., 2007)

Entrepreneurial Policy

Pages (2006) argues the Chinese proverb "Let a thousand flowers bloom" may be the most appropriate way to describe the current landscape of entrepreneurial policy across the United States. While there appears to be widespread support for policies aimed at business formation and growth, there is little consensus concerning the policy measures necessary to achieve these objectives. Pages (2006) argues that the "dominant trend is that there is no dominant trend (p. 4)." The range of policy measures is astounding. There is concern that some policy measures are introduced under the guise of entrepreneurship but provide little or no measurable business development assistance. There is also concern that some states and localities may support entrepreneurship policy largely in words and less in actual deeds, or in substantive policy efforts.

Malecki (1994) describes the characteristics of an entrepreneurial region as largely intangible. Acs (2005) further argues that entrepreneurial activity is influenced by specific local and regional characteristics. For example, policies targeted towards labor force skill improvements may be more effective in regions with high take-up rates of skill based programming, such as urban or medium sized communities but will be less effective in rural areas with lower density. Additional research supports the idea that local economic development policy is more successful when it takes into account the size distribution of local and regional firms (Loveridge and Nizalov, 2007). Other research indicates that entrepreneurship policy may be less successful at creating new firms than helping them to grow and mature (Utterbeck et al., 1988; Weaver, 1986). Malecki (1994) further argues that entrepreneurship is greatly influenced by local culture, history, and infrastructure, among other variables. Successful entrepreneurship policy must therefore consider the unique strengths and weaknesses of each community and may thus necessitate the development of a unique set of policy measures for each community.

It is well documented that the development and success of entrepreneurs depends on a complex list of factors, including some that communities may have little or no ability to control. However, there is a wide range of policy measures that state government, federal government, and local communities can use to influence entrepreneurship development. The OECD (1997) reports that policies geared towards inner city and rural microenterprise creation and development have become popular policy options. Klein and Hadjimichale (2003) document a long list of policy measures that governments have used in an effort to encourage business creation; financing options, management assistance, marketing advice, mentoring programs and networking linkages, technology development programs, the development of business clusters or incubators, and others. Pages (2006) finds that the following entrepreneurial program areas appear to be receiving the most policy attention among states and localities; access to capital, business incubators and technology development, regulation, education, and entrepreneurial awards.

For the purposes of this research, public policy geared towards entrepreneurial support are grouped into four main classifications: human capital policy; policy focused on financial gaps; policies that address infrastructure needs; and policies that focus on internal/external network improvements (Malecki, 1994). Research has documented the positive role of human capital characteristics on new firm formation and local and regional economic growth and development more generally (Glaeser, 1995, Acs and Armington, 2004a, Acs and Armington, 2005). Birch (1987) proposes that improving educational resources generally is important for encouraging an entrepreneurial environment, but specific emphasis on higher education attainment and quality labor programs may yield the most significant benefits for local communities. Additionally, there is a significant positive relationship between states with a higher proportion of high school graduates and the level of small business creation (Bartik, 1989). Acs and Armington (2005) confirm a significant relationship between firm formation and the proportion of college graduates and the share of high school dropouts in a region.

The importance of technical or skill based education policy has also been documented in the research. Brusco (1989) argues that technical education may be more important than university education for new firm creation, especially considering the potential scope of its impact. Policy efforts that support human capital improvements in skill-based competencies have the potential to make a broader economic impact (Brusco 1989; Cooke and Imrie, 1989; Vartiainen, 1988). Maillat and Vasserot (1988) confirm that regions that invest in workforce skills across the full range of production will be more successful than regions that simply invest in research and technology. Henderson et al. (2007) make this same argument. Henderson (2004) compares the educational attainment of the self-employed to that of government and private sector workers. He finds that self-employed workers have more education than private sector workers but less than government sector workers. Self-employed workers are less likely than the general workforce to hold graduate or professional degrees but are more likely to have a technical education or some college. Research further suggests that a broad base of educational levels in a region may lead to greater entrepreneurial activity when compared against regions with a higher percentage of residents with higher education degrees (Acs and Armington, 2005). As a result, policy efforts geared towards increasing the overall level of education may be more successful than policy efforts aimed at increasing the level of college education (Acs, 2005).

Kayne's (1999) survey of state entrepreneurship policy finds that the majority of U.S. states have higher education programs in entrepreneurship. However, state support of K-12 entrepreneurship education programs is not as well developed. Forty percent of states indicate that entrepreneurship is mentioned in state standards or guidelines, while only thirteen states actually provide funding in support of entrepreneurship educational programming. Several non-profit organizations are also involved in the provision of K-12 entrepreneurship programming. The National Federation for Independent Business has created the Youth Entrepreneur Foundation to assist K-12 teachers with curriculum and instruction (Adkins, 2006b). The Kauffman Center for Entrepreneurial Leadership, Junior Achievement, and 4-H are all national organizations involved in some area of K-12 entrepreneurship education programming. Davis (2002) concludes that youth entrepreneurship programs are more effective if they are "integrated with educational policies, including the structure and content of school curricula, extracurricular activities, and after school programs. Vocational needs of young people should be central (p.19)."

Higher education institutions are increasingly involved in the provision of entrepreneurial education. The Harvard Business School reports that in 1967 only six business schools offered any entrepreneurship courses but by 1997 370 business schools offered some type of entrepreneurship coursework (Henderson, 2002). Solomon et al. (2002) (Inc.com) reports that more than 1,600 colleges and universities offer programming and courses in entrepreneurship (Adkins, 2006a). Today many colleges and universities also have centers for entrepreneurship that house both degree programs and entrepreneurial programming. The extension services of land grant universities are also working to improve the technical skills of entrepreneurs in their state. While the programming varies, it is generally geared towards small business training and/or technology training programs. Related to this, small business development centers (SBDCs) are one of the most common small business development programs in the United States and have a presence in every state in the nation (Henderson, 2002). SBDC's increasingly have working relationships with universities and community colleges in providing a range of business assistance from business planning to financial and market analysis.

Access to financing and sources of capital are well documented constraints for entrepreneurship. There is strong evidence of a spatial concentration of venture capital across the country (Florida and Kenney 1988a, 1988c; Malecki, 1990). A 1999 national survey of the states confirms the spatial discrepancies of capital for entrepreneurs (Kayne, 1999). Several states have noted there may be sufficient venture capital resources nationally, but the majority of venture capital firms are located in major urban centers and are not as inclined to make investments outside of their region. Evidence from Freear et al. (1996) confirms that most angel investors invest within a day's drive of their residence. These spatial discrepancies remain an ongoing entrepreneurial challenge and one that states and policymakers have begun to directly address.

To better meet the needs of rural and other underserved populations, nontraditional venture capital funds have been created to operate outside traditional venture capital markets. These funds are both publicly and privately managed but many of them "will accept lower rates of return on investment in exchange for social and economic benefits to the service area (Henderson, 2002, p59)." Barkley et al. (2001) find that the success of these nontraditional funds has been mixed.

Angel capital funds are another popular and increasingly common way to stimulate venture capital. Angel capital is start-up business capital, typically provided by a wealthy individual or group of individuals. This source of financing is often used by firms as a second round of financing, after seed capital funding from friends, family, and individual funds. Angel funding is typically less available than traditional venture capital funding but can be critical seed money for startup companies. While angel investing remains highly concentrated in areas like Silicon Valley and New England, other states have begun to establish their own angel networks focused on state entrepreneurship (Henderson, 2002).

Florida and Kenney (1988b) find that the ability to access and acquire venture capital largely lies in the ability to access local, regional and/or national networks of financial institutions, institutional investors, corporations, universities, and other entrepreneurial networks.

Malecki argues (1994) that it is difficult for the public sector to create and/or support such networks. Eisinger (1991) reveals that state level involvement in venture capital programs has met with only modest success when compared against private venture capital activity.

The inability to access venture capital may also be a function of a firm's inadequate capital readiness. Kauffman Foundation (1999) proposes that states may have more success with policy efforts that focus on enhancing a firm's capital readiness than on the creation of public financing programs. This research reveals that the majority of state financial assistance programs are focused on loan guarantees and direct loans, while less than ten percent of state programs involve any type of equity investment.

Related to entrepreneurial financing, state tax policy is another tool that states and regions may use to encourage entrepreneurial behavior. State tax policy in support of entrepreneurship is generally either a part of the state's general tax structure or targeted as tax incentives that encourage specific business practices. The National Governor's Association (NGA) 1999 survey found the following six tax policies were most often used in support of entrepreneurship: general tax reductions, targeted tax credits, research and development tax credit, capital investment tax credits, sales tax exemptions, and absence of income tax. Kayne (1999) reports that the majority of tax incentives offered by states do little to support entrepreneurial firms but most often benefit established firms with existing revenue and investment streams. States may also consider the impact on and incentives for entrepreneurs as they modify capital gains, inheritance taxes, estate taxes and tax compliance policy. However, the Kauffman Foundation further confirms that tax polices across most states do not differentiate between entrepreneurs and other types of firms. Kayne (1999) argues that as the United States economy continues to evolve towards one based on knowledge and innovation, current tax policies may constrain entrepreneurial growth and overall economic activity.

Public infrastructure investments (roads, sewers, power, and others) have long been important tools for business recruitment, as well as providing important benefits to existing firms in the region. Today, much of this physical infrastructure is assumed. However, with the rapid pace of technological change there is increasing evidence that advanced telecommunication infrastructure is an additional necessity for regional economic growth and development (Cohen and Zysman, 1987). Research from the Italian industrial districts in the late 1980's confirms that advanced technology opens up access to regional firms, suppliers, buyers, and wider access to regional and global markets (Fornengo, 1988, Mazzonis, 1989, Rullanu and Zanfei, 1988; Scott, 1988a).

Many entrepreneurial firms struggle with access to and affordability of physical infrastructure and services. Business incubators are one of the tools that can be utilized to assist new and young firms in overcoming some physical and service infrastructure barriers (Acs, 2001). Incubators provide firms with access to office space, often at below market cost, a variety of business services like copy and fax facilities, conference and meetings rooms, secretarial support, personal computers, business and consulting services, and specialized business services like accounting, finance and others. Access to a range of business infrastructure and services at a subsidized rate allows young firms the opportunity to focus more on business growth and development and less on the costs of operation and related search costs.

Lichtenstein and Lyons (2006) argue that incubators can assist in the transformation of entrepreneurs and can therefore increase the flow of entrepreneurs within a given region. Incubators can induce positive changes in individual entrepreneurs as well as in a region's entrepreneurial climate. In rural communities, incubator networks have emerged as an additional tool to enhance entrepreneurship. These networks seek to reduce the barriers of distance and location by improving the economies of scale and scope of both the incubator and the entrepreneurial climate.

Similar to business incubators are the development of university science and/or research parks. These organizations often call themselves business incubators, but have some distinct qualities. Science/research parks can be effective incubators for high-technology firms and the formation of informal networking relationships with university researchers (Gibb, 1985; Monk et al., 1988). A number of states have also made substantive public investments in university-based centers for excellence focused on specific industrial technology areas and/or faculty cooperative research policies. As one example, the Kentucky Science and Technology Corporation manages the Innovation Group, a network of six Innovation and Commercialization Centers located in universities across the state (Dabson, 2007). Efforts like these generally have the dual objective of enhancing innovation and increasing the commercialization of research. An additional goal of these organizations is to encourage spin-off firms that have promising ideas for commercializable research.

Public investment in traditional business incubators, science/research parks, and other higher education programming has increased dramatically over the past twenty years. As such, they have become an accepted policy method for encouraging and supporting the formation of local and regional small businesses (Goldstein and Luger, 1990).

An additional area of policy focus has been on the creation and/or support of external business networks. Research documents that developing a climate of entrepreneurship often lays in the effectiveness of business support networks (Dabson, 2001; National Commission in Entrepreneurship, 2001a; Malecki, 1994). Studies of microbusiness growth confirm the importance of informal networks for the success of the smallest entrepreneurial firms (Papadaki and Chami, 2002). Malecki (1994) argues that, while development policy may not be able to create these networks, public policy can help facilitate and support them. Policy can be used "to improve the external economies of the local system strengthening the network among local firms (Garfoli, 1990, p. 430)."

The importance of networks for business growth and development underscores the importance of access to information and knowledge spillovers. Firms that operate in dense, agglomerative environments are more likely to receive these benefits, but regions without these benefits can utilize community and economic development policy to improve external networks and related agglomeration economies (Malecki, 1994).

A number of states and regions have developed their own organizations in an effort to enhance internal and external business networks. The Appalachian Regional Council (ARC) developed the Entrepreneurial Initiative which focuses in part on the development of entrepreneurial networks and clusters (Dabson, 2001). Research on this initiative (Brandow, 2001) reveals that since the program began business retention rates have improved and survival rates of new firms are higher than the national average. Minnesota has created several network building programs that may be important models for enhancing statewide entrepreneurship. The Minnesota Rural Angel Investor Networks (RAIN) seeks to find and encourage angel investors in rural areas of the state. The Minnesota Rural Partners created a Virtual Entrepreneurial Network with the purpose of creating an online entrepreneurial network with access to advanced technology and communication tools (Henderson, 2001).

Rural business development may be especially dependent on the creation of external networks. Acs (2001) reports that Farmington, New Mexico generated the third-highest share of high-growth entrepreneurs in the nation in the early 1990s. This success can be largely attributed to the cooperation of surrounding community and business leaders who were able to collaborate to overcome labor market challenges and business obstacles to rural economic development. Rural communities that work together to create and enhance networks improve economies of scale, access to resources and technology, and local and regional cooperation and communication (Anesi et al., 2002).

Portugal and the United Kingdom have had positive experiences with community business liaisons that provide technical expertise to area businesses and thereby enhance the knowledge base in the region (Andrade, 1989; Britton, 1989a, 1989b). The Japanese Kohsetsushi centers provide regional expertise for small and medium firms on a range of technical, training and research issues (Shapira, 1991). Malecki (1994) argues that local and/or regional governments may be important facilitating agents for the creation of local networks. Government agencies can sponsor local business events for informal meet and greets, topical business sessions, and other business related events. Local and/or regional agencies can be important gatekeepers and intermediaries in encouraging the development of community networks.

Internal or informal networks can be equally as important to an entrepreneur's success as external networks. These networks are critical to improving the transfer of knowledge and overall flow of information for entrepreneurs (Malecki, 1994). It is understood that informal networks and the information environment of an area can vary substantially across a state or region. Malecki (1994) argues that government policy cannot create these important interpersonal networks but proposes that policy efforts can be used to facilitate these connections. Thus, local governments may encourage local strategies that support the creation of networks by facilitating local small business events and gatherings of people. These types of efforts may not require explicit policy changes and may provide a cost effective mechanism for enhancing local networks.

Public policy can also be used to provide intermediaries or business liaisons to improve small business access to business services and advice (Hull, 1990; Britton, 1989a; Kelly and Brooks, 1989; Sweeney, 1987). Portugal and the United Kingdom have both had a positive experience with the use of business liaisons (Andrade, 1989; Britton, 1989a; Britton, 1989b). Turok and Richardson (1991) argue that when compared against other European and/or Asian developed nations these types of policy efforts are weaker in the United States, the United Kingdom, and Canada. From a policy perspective creating and/or supporting “creative” regions is difficult. However, there are a number of “network oriented” public policy measures that have been used successfully to enhance and support regional innovation and entrepreneurship.

The Status of Business Recruitment

Even with apparent paradigm shifts in economic development policy, old fashioned industrial recruitment remains a substantial tool in states economic development tool boxes. The 2000 State Business Incentives Report by the Council of State Governments describes current and future trends in state and local business incentives. This report is based on a national survey of economic developers and business leaders in all fifty U.S. states. Over the five year period from 1994-1999, thirty-two states saw an increase in the number of business incentives offered to new firms, only two states reported a decrease , and sixteen states reported no change. Thirteen states also reported that over the next five year period, from 2000-2005, they expect to see an increase in business incentives offered to new firms. Thirty-five states indicated business incentive offerings would stay approximately the same and only two indicated a probable decrease in business incentives offered over the next five years.

Figures 3.2 and 3.3 break down business incentive policy into the more detailed categories of financial and tax incentives. These figures support the conclusions from Figure 3.1 and confirm the broad trend of increasing business incentives across all types of incentive categories. Chi (1997) documents a long list of policies that states use for industrial recruitment efforts. Examples include reduced taxes, changes to tax codes, creation of enterprise zones, special tax policies for manufacturing inventories, job training, tax credits for business investment, state/local bond financing programs, direct loans for construction, equipment, and machinery, guaranteed loans, venture capital programs, and special financial incentives for poor and distressed communities, among others. The reality of incentive policy is that firms are usually offered an incentive package, which may include incentives from state, local or county governments, local or regional development agencies, community colleges or universities and others. Table 3.2 provides evidence of the broad range of economic development organizations involved in development activities.

To gain a broader picture of incentives it is important to also characterize the incentive trends for local and/or regional governments. The International City/County Management Association (ICMA) surveyed 3703 municipalities and counties in the fall of 2004 and spring of 2005 to gain a broader understanding of economic development policy and practice in communities around the country.

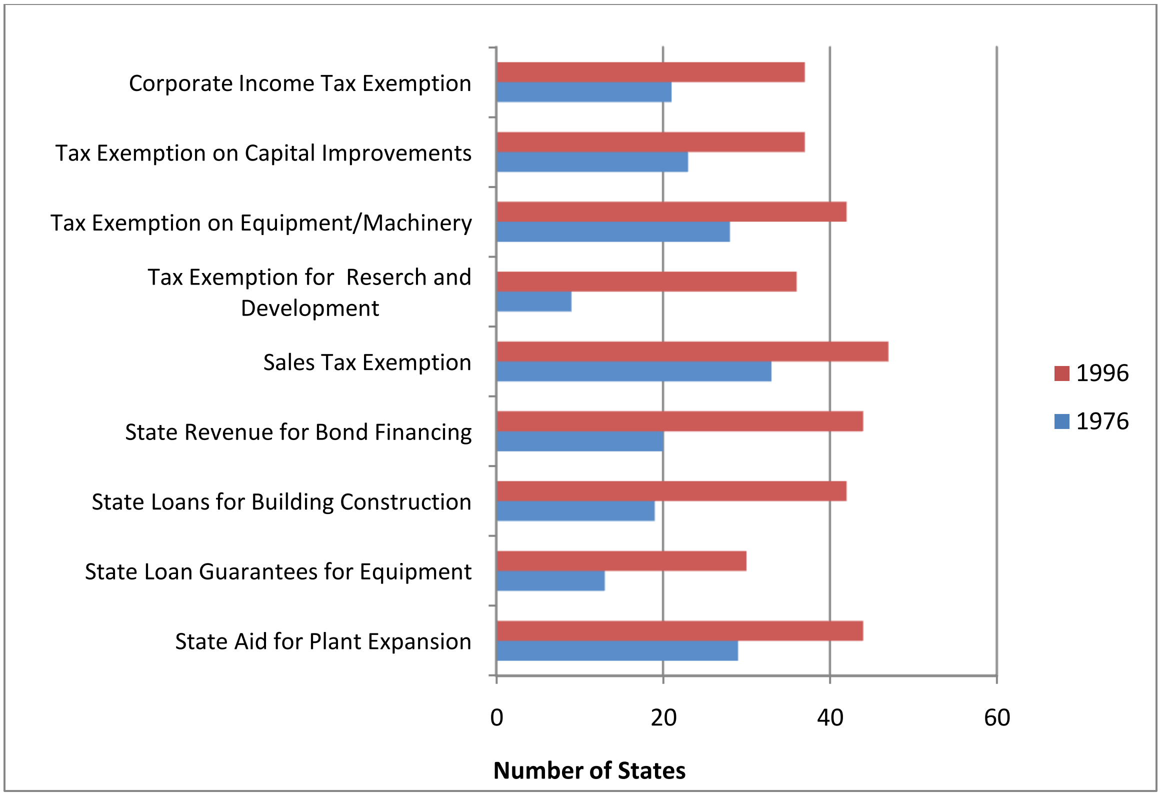

Figure 3.1: Number of States Using Specific State Economic Development Incentives; 1976-1996

Source: Chi K. 1997. *State Business Incentives: Trends and Options for the Future*. Council of State Governments Lexington, KY: 1-6.

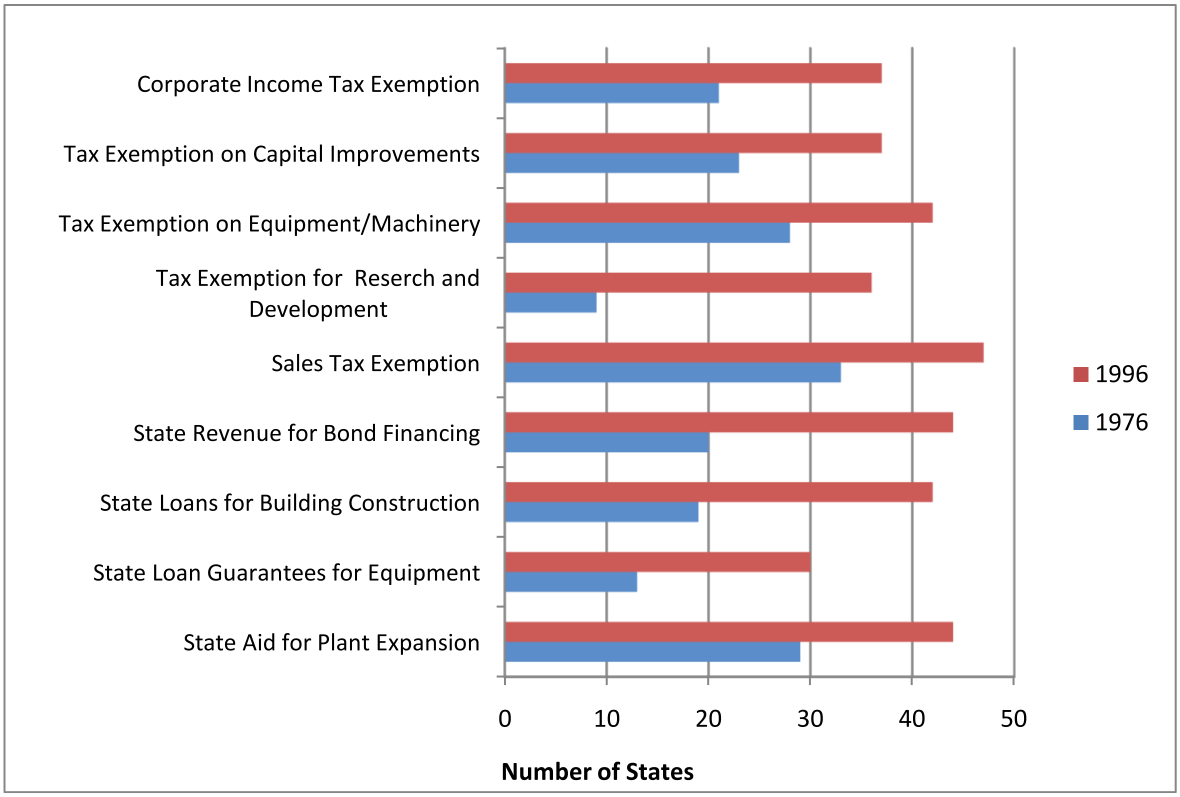

Figure 3.2: State Tax Incentives for Business: Changes between 1977-1998

Source: The Council of State Governments from January/February 1978 and October 1998 issues of Site Selection, Conway Data, Inc.

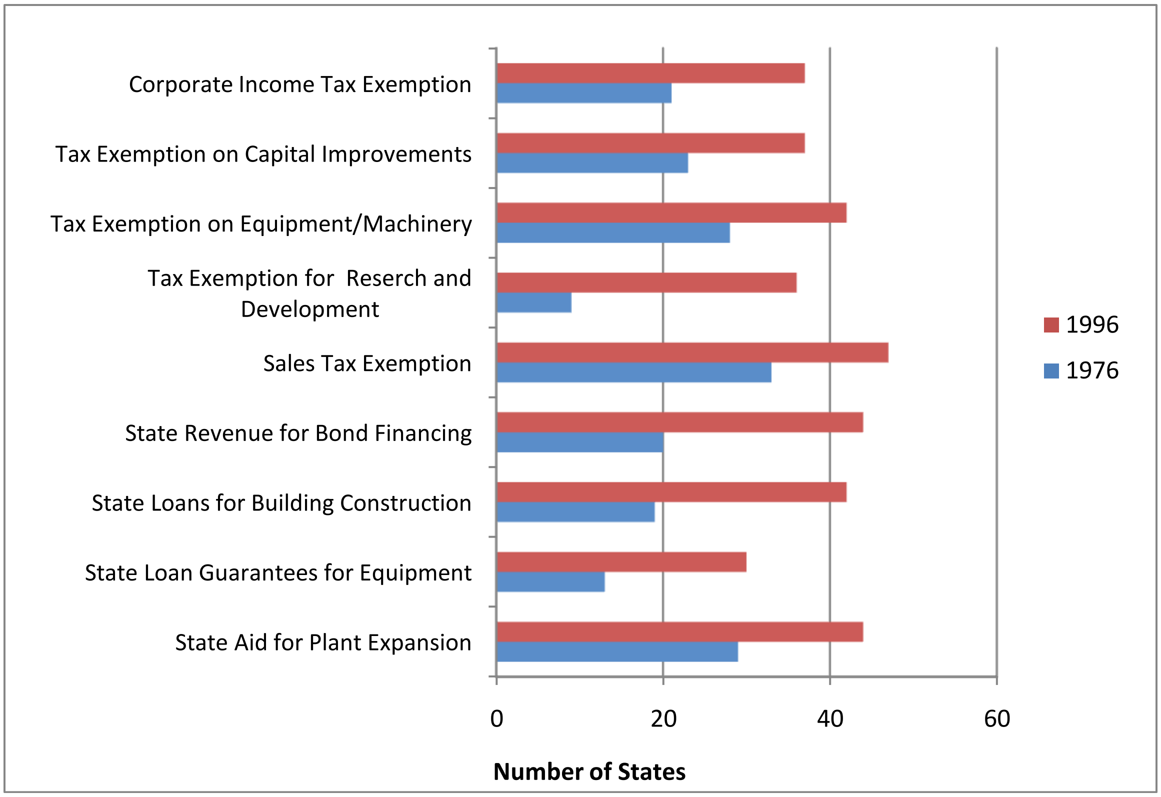

Figure 3.3: State Financial Incentives for Business Attraction: Changes between 1977-1998

Source: The Council of State Governments from January/February 1978 and October 1998 issues of Site Selection, Conway Data, Inc.

Almost sixty percent of communities indicated the focus of their economic development efforts was manufacturing and/or retail service. As well, close to one hundred percent of respondents indicate they want to recruit and attract new business, while only thirty percent of respondents say their community has a formal plan of business recruitment. In addition, over seventy percent of respondents offer some type of business incentives for business recruitment. Table 3.3 provides a sample of the incentives that respondents mentioned most frequently. This reveals that most communities are offering business incentives geared towards a more traditional industrial recruitment approach.

Table 3.2: Participants in Local Government Economic Development Activities

	Percent of Respondents
Participation in Local Government Economic Development Activities	
City	93.0
Chamber of Commerce	69.9
Citizen Advisory Board/Commission	38.4
College/University	34.4
County	53.2
Economic Development Corporation	47.2
Federal Government	10.5
Regional Organizations	39.7
Private Business/Industry	44.7
Public/Private Partnerships	38.4
State Government	35.2

Source: International City/County Management Association, 2004 Economic Development Survey, http://icma.org

Though communities increasingly recognize the importance of entrepreneurial and innovative economic activity, there is concern that many communities have few policies or resources in place to support this type of development activity. The ICMA 2004 Development report confirms that the majority (83.1%) of municipalities and counties do not have a small business development plan for their community. For those communities that offer small business development programs, Table 3.4 illustrates the types of small business and entrepreneurial programs available in these communities. Compared against business incentive policy, there are fewer respondents who offer small business oriented incentive programs.

Table 3.3: Local Government Incentive Offerings

	Percent of Respondents
Local Government Incentive Offerings	
Zoning/Permit Assistance	68.4
Infrastructure Improvements	66.9
Tax Increment Financing	58.3
Tax Abatement	57.1
One-stop permit Issuance	41.4
Grants	38.1
Low-Cost Loans	33.6
Federal/State Enterprise Zones	33.1
Free Land or Land Write Downs	30.8
Training support	29.3

Source: International City/County Management Association, 2004 Economic Development Survey, http://icma.org

In addition, over three quarters of respondents indicated their community does not have a formal business retention plan. While communities mentioned a number of business retention efforts, these results reveal that the business retention policy focus is geared more towards mentoring and network building and less on providing concrete (financial, infrastructure, equipment) types of business assistance. While generalizations from this report and others like them maybe misleading, they may still serve as an instructive tool for regional scientists in understanding and clarifying the economic development policy profile of our nation’s cities and counties. Overall, states, regions, and localities continue to actively practice industrial recruitment and do not appear to be making substantial reductions in industrial recruitment efforts or significant improvements to alternative development programs. States have invested substantial time, financial, and human capital resources towards the development of organizational capacity to manage state and regional business incentives. Additionally, there are often individual benefits to third parties involved in these negotiations and little accountability to the public as to how these public dollars are spent. As a result, it is difficult to imagine that incentive policy for industrial recruitment will be reduced and/or eliminated anytime soon.

Table 3.4: Local Government Small Business Assistance

	Percent of Respondents
Local Government Small Business Assistance	
Small Business Development Center	54.9
Revolving Loan Fund	48.3
Marketing Assistance	33.8
Business Incubator	28.9
Matching Involvement Grants	28.3
Management Training	20.8
Microenterprise Program	18.2
Executive Mentors	10.1
Vendor/Supplier Matching	8.4

Source: International City/County Management Association, 2004 Economic Development Survey, http://icma.org

Community Development Corporations

Many communities are now also influenced by the economic development activities of Community Development Corporations (CDCs). Historically, most CDC's began their work in the area of community housing development, the past decade has witnessed a dramatic expansion in service activities of these community non-profit organizations (Glickman and Servon, 2009). Yin (1998) states that "Over the last three decades, the story of CDC's has progressed from that of the single organization doing specific work in the community to that of participation in a complex web of partnerships (p.138)." While housing services still dominate CDC efforts, they have expanded into general economic development activities, community organizing, and other social services.

Glickman and Servon (2009) survey 218 CDCs nationwide to better understand the scope and breadth of CDC funding and development activity. They classify three groups of survey respondents; community development partner funded CDCs (P-CDCs), CDCs without development partner funding (NP-CDCs) and a control group of community development organizations. Overall, they find that eighty percent of both types of CDC's are actively engaged in economic development activities. Over half of both types of CDC's are providing some kind of technical assistance or training to small businesses. As well, thirty eight percent of P-CDC's provide entrepreneurial training to firms, while thirty-five percent of NP-CDC's provide this type of business assistance. P-CDC's are also more likely to provide business lending services (24 percent as opposed to 15 percent) and microenterprise lending/development (25 percent versus 18 percent). On average, each P-CDC's reported the creation of nine new firms from 1995 to 1997, while each NP-CDC's reported the creation of six new firms over the period.

In addition to business development services, both types of CDC's are actively engaged in job training and job placement activities. Almost fifty percent of both P-CDC's and NP-CDC's provided some type of job training program. As well, almost fifty percent of both types of organizations have job placement programming. In 1997, the average CDC had over 100 job placements within their communities. Glickman and Servon's (2009) research documents the increasing role of CDC's in community economic development policy and implementation. Moreover, this research documents that CDC's are increasingly active in community entrepreneurship efforts. With respect to local entrepreneurship, CDC's may have unique insight into local business and community strengths and weaknesses. As such, it is important to understand the impact that CDC's may have on community entrepreneurship policy and its implementation.

Entrepreneurial Development

One of the criticisms of entrepreneurial policy is that it is often piecemeal and ignores important components of the entrepreneurial process.. Based on this criticism Lichtenstein and Lyon's (2004) research proposed a more holistic approach to entrepreneurship policy through the creation of Entrepreneurial Development Systems (EDS). Lichtenstein and Lyons (2010) suggest that the problem with the current climate of entrepreneurship policy is that it almost exclusively focuses on the provision of services and little on the development of actual entrepreneurs. Entrepreneurial development implies that entrepreneurs are made not born (Shefsky, 1996). Lichtenstein and Lyons acknowledge that entrepreneurship takes place in a diversity of settings, with entrepreneurial talent unevenly distributed across regions. They argue the most useful way to classify a region’s entrepreneurs is by their unique skills and their individual firm development and growth. However, very few entrepreneurial development programs classify entrepreneurial clients by estimates of ability, size and type. Current programming efforts generally fall into one of two categories: cookie cutter or individualized. Lichtenstein and Lyons advise that these two kinds of policy efforts represent a tradeoff between efficiency (cookie cutter) and effectiveness (individualized). A more holistic policy effort is one that systematically focuses on the unique qualities of entrepreneurs and acknowledges the transformative nature of the entrepreneurship process.

A successful EDS recognizes that entrepreneurship is a long term process requiring ongoing community support, enhanced interaction and mentorship between entrepreneurs and community and business professionals, and the creation of a favorable business climate and entrepreneurial culture. Lichtenstein and Lyons use quality management research over the past fifteen years to underscore the importance of clearly understanding a given process before one can improve a specific outcome (Crosby, 1987; Deming, 1986). As such, they argue that an EDS “must be organized around a set of processes and practices that can be implemented in a methodical, controllable, and reproducible fashion (Lichtenstein and Lyons, 2010, p.10).” The ultimate objective of this entrepreneurial system would be to create a steady supply, or pipeline, of entrepreneurs for a given region.

Using sports metaphors, Lichtenstein and Lyons characterize their EDS as a “farm system” for the ongoing creation of regional entrepreneurs. Entrepreneurs are classified into one of five categories; Majors, Triple A, Double A. Single A, and Rookie, based on their skill classification within four key characterization; technical skills, managerial skills, entrepreneurial skills, and personal maturity (Gerber, 1995; Lichtenstein and Lyons, 1996). Entrepreneurs in the same "league" are grouped together into teams that allow for efficiently addressing similar needs and problems, as well as permitting relevant peer mentoring and support (Sher and Gottlieb, 1989). The EDS customizes a plan for each entrepreneur based on the individual's level of personal and business development. In this way entrepreneurs are provided with a map to guide their business to higher levels of business growth and performance.

Goetz et al. (2010, p.26) succinctly summarizes the primary objectives of an EDS system:

> EDSs are designed to further economic development in lagging communities by: 1) developing and expanding the pipeline of entrepreneurs; 2) building institutional and other support systems for entrepreneurs (including coaching, access to capital and market information, etc); and 3) influencing state and local policies.

Additionally, EDS's attempt to be inclusive by supporting and encouraging the entire pool of a particular community's entrepreneurial base. EDS's also provide a method to overcome the current diverse and fragmented application of entrepreneurial development policy (Reynolds and White, 1997).

EDSs have been implemented in a number of locations across the country which allows for a preliminary investigation of their successes and failures. In 2004, the Kellogg Foundation funded six EDS's nationwide with a $2 million grant each over a three year period. Edgcomb et al., (2008) conclude that these investments enhanced community understanding and support of entrepreneurship. Their research also found that a statewide approach to these efforts is more successful than individual, community efforts. Arguably one of the most important conclusions is that these EDSs were able to develop the appropriate structure and solutions to ensure the sustainability of these systems (Edgcomb et al., 2008). However, entrepreneurship policy efforts are long term endeavors. Without additional support for these EDSs, $2 million is not likely to be enough to effect long term entrepreneurial change (Goetz et al., 2010).

The Appalachian Regional Commission (ARC) has also been investing heavily in policy efforts to improve the entrepreneurial climate across the Appalachian region. Since 1997, the ARC has invested $43 million towards entrepreneurial policy efforts (Goetz et al., 2010). Markley et al. (2008) find that, over this time period, these programs have increased the number of firms and jobs in the region. Moreover, new business sectors have emerged and overall, the entrepreneurial pipeline has improved and expanded. Additionally, several important lessons are highlighted in this research. Markley et al. (2008) stress the importance of local champions and leveraging local knowledge to improve the opportunities for success of these programs. The ARC's efforts also underscore the importance of a region's entrepreneurial climate and point to potential challenges that regions may have in improving the entrepreneurial climate. Finally, these researchers argue that standard economic development metrics should be reconsidered when evaluating entrepreneurial policy (Markley et al., 2008). Incorporating different entrepreneurial measures into these metrics could broaden our understanding of the success and failure of these policies, along with understanding when public support may be justified.

Similar to EDS's, regional innovation initiatives may be an important framework from which states and regions can include entrepreneurship policy (Pages, 2006). Placing entrepreneurship in the broader context of a regional innovation strategy may allow for entrepreneurship to be seen as the outcome of a broader set of inter-related strategies related to innovation, human capital, physical capital, and technology investment. Viewing entrepreneurship as a part of a regional innovation strategy may avoid unrealistic policy expectations. As one example, elected officials and other community stakeholders may understand that regional innovation initiatives, of which entrepreneurship is a part, require long-term community investment.

Pages and Poole's Understanding Entrepreneurship as an Economic Development Strategy: A Three State Survey

Research by Pages and Poole (2003) provides critical background for this and related research efforts. As the field of economic development has changed over the past several decades, economic developers have been asked to incorporate a wider set of approaches into their development tool kits. Entrepreneurial development activities have taken on greater importance for state, local and regional development professionals. Pages and Poole (2003) begin by defining entrepreneurial development as "the practice of encouraging the creation and growth of start-up companies (2003, p. 1)." Their three state (Maine, Nevada and Pennsylvania) survey begins to clarify the scope and breadth of local, regional and state entrepreneurial development programs. The economic development organizations surveyed in this analysis include state and local economic development agencies, small business development centers, regional technology councils, chambers of commerce, business incubators, university sponsored entrepreneurship programs, and other related non-profit agencies. The survey focused on entrepreneurial development programs that emphasize non-financial assistance and/or direct financial assistance. Examples include programs aimed at supporting new business development efforts through access to education, business counseling, and facilities and equipment. They also include programs that assist with the acquisition of equipment, technology, seed and/or venture capital programs.

There are a number of key findings that are important for the current research. Organizations that rate entrepreneurship as their highest priority are more likely to have entrepreneurial development programs and invest in them at higher levels. In addition, states and organizations with a longer and more substantial commitment to entrepreneurial development type programs are more likely to rate these policies and programs as a top priority compared to business attraction or business retention policies. In Pennsylvania, which has had active involvement in public sector economic development activities since the 1950s, over half of the organizations surveyed rated entrepreneurial development as their top priority. Comparatively, over two-thirds of Maine's organizations ranked business retention as their top priority, while Nevada respondents were split, respectively ranking 50 % business attraction and 50% business retention as the top priority. While these results may not be surprising, they do confirm that the level of actual and perceived importance a state places on entrepreneurial development policy may influence the local and regional practice of economic development[15]. Their research also confirms that entrepreneurial development continues to be a relatively new policy focus as over half of the programs documented here have been created since 1990.

Program services provided by these organizations vary depending on the type of organization and how they rate entrepreneurial development as an organizational priority. Those organizations that rate entrepreneurial development as their highest priority are more likely to implement business training and management/marketing assistance programs. Those that did not rate it as the highest priority were more likely to offer space and/or business permitting or regulatory assistance for new business. Pages and Poole provide evidence that most development organizations, even those that rate entrepreneurship development highly, utilize programming that is relatively lower cost and is focused on more technical, as opposed to capital intensive, activities.

Funding continues to be a significant barrier to the implementation of entrepreneurial development programs. States continue to remain the most important source of funding for these organizations. In an era of accountability, the majority of organizations surveyed practice at least a minimum assessment of their programmatic efforts. For entrepreneurial program evaluation, job creation remains the primary measurement used to track program success and/or failure. However, program managers and funders indicate they expect to see program results within 16 months. This reveals an

[15] There is an underlying causality question here. This relationship could also be working in the other direction; successful local and regional development policy influences the actual and perceived importance of entrepreneurial development policy.

underlying policy concern. Entrepreneurship is a long-term process; for those businesses that make it beyond the first few years, it may still take five years or more to turn a profit. Moreover, employment growth is likely to be small and gradual for new firms and may not properly reveal the potential long-term benefits of local entrepreneurship development. Unrealistic policy expectations could ultimately encourage both managers and customers to make choices that are not in the best interest of local economic development or the entrepreneurial firm.

Pages and Poole (2003) classify the majority of entrepreneurial development programs described in this research as adolescent in their development. The more formalized and institutionalized these programs are, the more likely the development organization is to make these programs a priority. In order for current programs to mature, Pages and Poole call for a number of changes to existing program operation and design. States should first consider regional policy efforts to enhance economies of scale and increase the opportunities for external funding. Organizations should continue to diversify their funding base. Researchers and organizations should consider collaborating to continue improving evaluation and performance measures. In addition, organizations would benefit from enhanced professional development efforts focused specifically on entrepreneurial programming efforts.

These researchers, and others, have stressed the importance of a revised system of performance metrics that can be used to evaluate entrepreneurship programming more effectively. As one researcher notes, short term job creation should not be the primary objective of entrepreneurial policy efforts (Pages, 2006). Moreover, simply ensuring the appropriate business climate is also not enough. Revising performance measures must be comprehensive by incorporating measures related to innovation, human capital, investment capital, and quality of life variables. Lessons can be learned from the European Union and the OECD, who have each undertaken a comprehensive analysis of best practice tools and measurement for regional innovation and entrepreneurship. Researchers continue to caution that each region is unique and performance metrics should be developed in close collaboration with regional or local professionals. Moreover, measurements should be useful to a range of stakeholders; the entrepreneurs, community leaders, as well as local community members.

The diverse assortment of policy measure aimed at entrepreneurship reveals the fragmented nature of the field and the diversity of opinion concerning the most effective policy measures in promoting regional entrepreneurship. Some professionals argue that regional development policy should first focus on providing the necessary public infrastructure (energy, water, telecommunications, etc.) and social services (education, health, etc) for businesses to be successful (Audretsch, 2002; Glaeser, 1998). Along these same lines, Bates (1993) argues the most effective policy measures are those that focus on capital gains tax incentives, encouraging immigration of educated individuals, and preferential public procurement.

Klein and Hadjmichael (2003) argue that "lasting subsidies are undesirable and that business development service should be market oriented and privately provided (p. 82)." The implication of this research is that public policy can and should consider focusing on basic and market infrastructure but public institutions should not intervene if they cannot perform their function better than the private market (Acs 2005; Bates, 1993). More generally, public policy in support of local and regional entrepreneurship should emphasize competitiveness, a level playing field for all firms, and active promotion of entrepreneurial activity (Parker, 2002; Mody, 1999).

OECD (1997) confirms the most important role of public policy in entrepreneurial development is in creating a supportive business environment for small business and entrepreneurial growth. Moreover, this research argues that entrepreneurship policy should consider the unique regional context of each effort and should be implemented by local professionals who have the knowledge of local conditions and needs. For example, workforce development efforts may be more effective in dense urban areas with greater population density, while firm creation policies maybe more effective in rural regions as there are fewer displacement effects when compared against urban locations (OECD, 1997). Overall, the OECD proposes five conditions for entrepreneurial policy best practices. They include: access to financing, market access, a supportive business environment, the existence of skilled business managers, and the availability of necessary technology.

It is tempting for communities to target their policy efforts towards sectors they believe have the greatest probability of success. Even given this temptation, a “picking winners” approach in economic development policy can be risky and is not recommended as a basis for public policy (Autio and Hancock, 2005; Edmiston, 2007). For example, it could be a policy mistake to narrow the definition of entrepreneurship to specific kinds of high-growth, high-tech firms. While all communities naturally want high growth, serial (repetitive) entrepreneurs in their communities, they should not discount the value-added of aspiring, survival and/or lifestyle entrepreneurs. Dabson (2007) argues that the policy goal should be to encourage a diverse range of individuals who want to create and grow new businesses from which a stream of local and regional entrepreneurs will continue to enhance local and regional economic growth, now and in the future.

In sum, while there continues to be debate over the correct policy approach to encourage and support entrepreneurship, there is considerable evidence that communities must start with creating an attractive and supportive business environment. From a macro level, federal and state government can do much to support an entrepreneurial friendly environment. However, as the Economist magazine (2008) notes, “Siliconitis” is the disease that many policy makers have and one that is a mistake for many communities. It is a mistake for most communities to think that they can recreate a “Silicon Valley.” Communities should, however, consider a broad range of policy efforts that enhance workforce development and general education levels, maintains and supports high-quality physical infrastructure, provides evidence of good governance and civic infrastructure, and supports local and regional natural amenities and assets (Edmiston, 2007). While no two communities are the same, all of the above policy measures could work in any community to improve the creation and support of local entrepreneurs.

State Entrepreneurial Policy

There is little question that state and local government can play a role in the success of regional entrepreneurship. What remains unclear is what the policy landscape for entrepreneurship looks like across states and regions. Entrepreneurial development efforts are an increasingly important part of state policy, but the scope and breadth of these efforts remain quite mixed (Kayne, 1999). State policy and programs generally fall into 2 categories. In one category are states with well defined objectives for the development and success of state entrepreneurs, while in the second category states encourage entrepreneurship under a general umbrella of economic development programming. As an example, 13 of the 37 state survey respondents do not differentiate between entrepreneurs and small businesses[16] in state development programs. The Kauffman Foundation's research indicates that states that have a better understanding of the unique contribution of entrepreneurs to state economic growth are more likely to have policy measures in place that support the specific needs of entrepreneurs.

The National Association of State Development Agencies (NASDA) 1998 survey of state economic development agencies reports that only $19 million of the $26.7 billion spent on economic development was targeted towards entrepreneurial development. NASDA defines entrepreneurial development as "state activities that support start up businesses or provide seed capital to emerging companies (Kayne, 1999, p. 11)." Moreover, 25 states reported no state funding towards entrepreneurial development. This is not to say that entrepreneurs do not creatively take advantage of other state economic development programs that are available to all businesses operating in the state.

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[16] The Small Business Administration (1978, p.121.1) indicates a "small business concern shall be deemed to be one which is independently owned and operated and which is not dominant in its field of operation." Entrepreneurs are generally characterized as taking on greater risk, incorporating more innovation in their endeavors, and potentially having higher growth potential than the average small business owner. Entrepreneurs may be small business owners but they may also be a part of much larger organizations and many small business owners are not entrepreneurs.

However, the Kauffman Foundation observes that state programs falling into this category, such as labor force development, infrastructure investment, competitive tax policies, and regulatory changes, are often used within a traditional business retention and industrial recruitment framework and may do little to impact entrepreneurship.

Research by the National Commission on Entrepreneurship (Kauffman Center for Entrepreneurial Leadership, 1998) holds that state policy can have a substantial impact on where entrepreneurs choose to locate new businesses and whether these ventures will succeed. The National Governors' Association (NGA) reports that state policy can create an entrepreneurial-friendly environment by nurturing the following policy efforts:

- Integrate entrepreneurship into state economic development efforts.
- Use education to nurture and encourage future entrepreneurs.
- Incubate entrepreneurial companies
- Invest in diverse sources of risk capital.
- Streamline the regulatory environment that impacts entrepreneurial firms.

One method of benchmarking and comparing state performance on economic development strategies is through the use of state rankings and comparative indices. The use of these rankings has become quite commonplace as states classify themselves across a range of indicators meant to capture innovative and entrepreneurial economies. While these indices have methodological drawbacks, they can provide insight into possible performance trends within a state.

A review of the range of entrepreneurial programming offered in South Carolina, reveals that the state fits the model of states and regions that support entrepreneurship under a mantle of general economic development programs. This would indicate that South Carolina does not acknowledge the unique characteristics of entrepreneurs and is more likely to implement general economic development policies and programs to benefit entrepreneurs along with all businesses in the state.

The following review of South Carolina indices of development and entrepreneurial activity provide insight into the scope and breadth of entrepreneurial policy across the state. Table 3.5 illustrates the 2008 rankings of the State Technology and Science Index from the Milken Foundation. This table includes South Carolina and its two closest neighbors, Georgia and North Carolina. This index provides an overall score and five other component indices, three of which are described here. The Research and Development Inputs Index is meant to embody the ability of a region to capture a range of federal, industry and academic research and development inputs. The Human Capital Investment Index is meant to measure the stock of human capital, with particular emphasis on the science and engineering fields. Finally, the Risk Capital and Entrepreneurial Infrastructure Index addresses the stock of entrepreneurs and risk capital within a state. South Carolina is lower in all indices than its neighbors and in some instances substantially lower. The state's overall ranking improved from 2004 to 2008, rising from 44^{th} to 42^{nd}. According to this set of indices, South Carolina appears to be weakest in the area of human capital investment and has experienced the most improvement in the area of risk capital and entrepreneurial infrastructure.

Table 3.5: 2008 State Technology and Science Index: Georgia, North Carolina, and South Carolina

	State Technology and Science Index: Overall Rankings	**Research and Development Inputs**	**Human Capital Investment**	**Risk Capital and Entrepreneurial Infrastructure**
Georgia				
2002	15	25	41	7
2004	18	26	43	10
2008	25	34	38	8
North Carolina				
2002	17	17	25	13
2004	20	22	33	7
2008	18	18	26	8
South Carolina				
2002	41	43	47	28
2004	44	42	48	39
2008	42	43	48	32

Source: Milken Institute: State Technology and Science Index, http://www.milkeninstitute.org

In comparison, the 2007 Development Report Card by the Corporation for Enterprise Development grades South Carolina in three primary categories; performance, business vitality, and development capacity. In these three composite categories, South Carolina respectively earned a C, B, and D, which shows some improvement over the 2006 report card.

Table 3.6 illustrates a more detailed analysis of the scores from this report card. While each of the three primary categories are composed of detailed indicators that impact entrepreneurial development, there are three specific measurements under business vitality and development capacity that are the most informative concerning entrepreneurship in South Carolina. These categories, entrepreneurial energy, human resource development, and innovative asset development respectively earned grades of C, D, and F. Each of these measurements is also composed of a variety of indices where each state is ranked and compared against other states. For example, within entrepreneurial energy there are five different components, including new companies, change in new companies, job creation in start up businesses, technology industry employment, and initial public offerings. South Carolina is ranked from a high of 8 in job creation by start-up businesses to a low of 43rd in technology industry employment.

Within the categories of human resources and innovation assets, South Carolina fares considerably worse. The highest ranking in these categories is 29th for teacher salaries, while the lowest ranking, 49th, for graduate students in science and engineering. According to the Development Report Card, South Carolina has seen overall improvements in the competitiveness of existing business and entrepreneurial energy, but has considerable room for improvement in access to financial and human resources and innovation assets.

The Corporation for Enterprise Development discontinued the Development Report Card for the States in 2007. In its place it now publishes an annual publication, the Assets and Opportunities Scorecard, for each state. According to their website, this new report card is “a comprehensive look at wealth, poverty, and the financial security of families.” To capture this there are six key issue areas in which composite indices are calculated: financial assets and income, businesses and jobs, housing and homeownership, health care, education, and community investment and

Table 3.6: 2007 Development Report Card: South Carolina

	Grade		Grade		Grade
Overall Performance Ranking	**C**	**Overall Business Vitality Ranking**	**B**	**Overall Development Capacity Ranking**	**D**
Employment	C	Competitiveness of Existing Businesses	B	Human Resources	D
Earnings and Job Quality	D	Entrepreneurial Energy	C	Financial Resources	D
Equity	D			Infrastructure Resources	C
Quality of Life	B			Amenity Resources and Natural Capital	B
Resource Efficiency	C			Innovation Assets	F

Source: Corporation for Enterprise Development, 2007 Development Report Card for the States, http://www.cfed.org

accountability policies. While all of these have relevance for economic development, the issue areas of businesses and jobs and education have the most direct impact on economic development and entrepreneurship. South Carolina received a grade of F on its overall 2009-2010 Assets and Opportunities Scorecard and an F on each of the aforementioned issue areas. According to this report, South Carolina must develop policies that facilitate asset building for all income earners, make education across all grade levels a priority, and curb predatory lending practices.

The 2008 State New Economy Index published by the Kauffman Foundation provides additional insight into a state's entrepreneurial capacity. This index uses twenty-nine indicators to represent the capacity of a state to be firmly grounded in the new economy. These indicators consist of variables that represent one or some combination of characteristics of a new economy region. Variables representing knowledge, or new economy, characteristics focus on the global economy, information technology sectors, and an emphasis on classic representations of entrepreneurship and innovative economies. These indicators are meant to represent either directly or indirectly an entrepreneurial, innovative, and dynamic economic environment.

This analysis gives South Carolina an overall ranking of 34. Table 3.7 provides a sample of these indicators for South Carolina. The rankings range from a high of 28th in industry investment in research and development and venture capital to a low of 45th in entrepreneurial activity and inventor patents. Based on The Kaufman Foundation's prior rankings, South Carolina has seen modest improvement in some of these indicators. However, all of these indicators[17] indicate that South Carolina continues to be ranked in the bottom half of states across a wide range of new economy oriented variables. In some instances South Carolina is in the lowest twenty percent of states. In sum these three indices highlight the possibility of significant gaps in South Carolina's ability to effectively compete in the new economy. To obtain a more complete picture of the entrepreneurial landscape in South Carolina, the next section uses publicly available firm and establishment data to further characterize the small business and entrepreneurial environment across the state.

[17] These indicators are not directly comparable. They are simply instructive.

Table 3.7: 2008 State New Economy Index: South Carolina

	Rank
"Gazelle Jobs"	39
Entrepreneurial Activity	45
Inventor Patents	45
High-Tech Jobs	39
Scientists and Engineers	35
Patents	42
Industry Investment in R & D	28
Venture Capital	28

Source: The Information Technology & Innovation Foundation,
Ewing Marion Kauffman Foundation, The 2007 State New Economy Index.

South Carolina Entrepreneurial Profile

One of the first places to begin measuring state level entrepreneurship is by carefully profiling firm and establishment data by employee size. It is true that medium and large firms can have entrepreneurial characteristics, but for the purpose of this analysis the focus will be on entrepreneurial firms defined as those with twenty of fewer employees. Table 3.8 reveals the percentage change in firms, establishments, employees and annual payroll by employee size from 1990-2000 and 1990-2007. The Bureau of Labor Statistics defines firms as “a legal business, either corporate or otherwise, and may consist of one establishment, a few establishments, or even a very large number of establishments (www.bls.gov).” Further, establishments are defined as “an economic unit that produces goods or services, usually at a single physical location, and engaged in one or predominately one activity (www.bls.gov).” For periods, 1990-2000 and 1990-2007, medium and large employers had larger percentage changes in every category except annual payroll.

Table 3.8: Percentage Change of Firms, Establishments, Employment and Payroll by South Carolina Firm Size

	Firms (%)	Establishments (%)	Employment (%)	Annual Payroll (000 %)
0-4 Employees				
1990-2000	15.67	15.61	13.02	75.48
1990-2007	26.15	25.90	26.14	126.89
20 or less Employees				
1990-2000	16.99	16.63	18.63	73.02
1990-2007	24.49	23.89	24.36	109.61
20 -99 Employees				
1990-2000	26.79	25.08	27.59	88.36
1990-2007	38.47	43.46	38.87	156.87
100 or more Employees				
1990-2000	33.94	41.36	28.49	85.73
1990-2007	43.37	66.60	28.16	122.91
500 or more Employees				
1990-2000	37.85	41.82	30.00	86.77
1990-2007	43.69	70.85	27.25	116.75

Source: United States Small Business Administration, Employer Firms, Establishments, Employment, and Annual Payroll by Firm Size, (Annual payroll in thousands of dollars), http://www.sba.gov/sites/default/files/st_totals.pdf.

Another measure of entrepreneurial activity can be captured by firm births and firm deaths in a state or region. This indicator is often called business churning. According to Table 3.9, twenty-three of South Carolina's forty six counties have birth to death ratios of over 1 (indicating that for every firm death, more than one additional firm is born). This data confirms much of the research on entrepreneurship and business churning. There is considerably more business churning in the metropolitan or near metropolitan regions of the state. From this list of twenty-three counties, fourteen are

Table 3.9: South Carolina's Top Business Churning Counties

	Ratio of Births to Deaths	**Metro Status**
Orangeburg	1.01	Micropolitan
Anderson	1.04	Metropolitan
Sumter	1.04	Metropolitan
Florence	1.06	Metropolitan
Williamsburg	1.07	Rural
Barnwell	1.14	Rural
Hampton	1.16	Rural
Cherokee	1.18	Micropolitan
Lancaster	1.19	Metropolitan
Spartanburg	1.19	Metropolitan
Dorchester	1.22	Metropolitan
Greenville	1.22	Metropolitan
Oconee	1.22	Micropolitan
Lexington	1.27	Metropolitan
Kershaw	1.29	Metropolitan
Richland	1.30	Metropolitan
Charleston	1.31	Metropolitan
Beaufort	1.32	Micropolitan
Georgetown	1.34	Micropolitan
Horry	1.35	Metropolitan
York	1.46	Metropolitan
Newberry	1.50	Micropolitan
Berkeley	1.63	Metropolitan

Source: U.S. Bureau of Labor Statistics, Business Employment Dynamics, http://www.bls.gov/bdm/bdmstate.

metropolitan counties, six are micropolitan counties and three are rural counties. Of the ten counties with the highest ratio of churning, seven are metropolitan areas and three are micropolitan areas.

Overall, these data reveal that small firms across South Carolina are not growing as quickly as medium and large firm and that business churning is positive in half of South Carolina counties. Firm growth is based on a variety of factors but one contributor is certainly the public policy environment. The literature and background presented provides evidence that South Carolina remains a state heavily invested in industrial recruitment and encourages entrepreneurship under a broad mantel of general business support programs. The next section begins to explore how local and regional policymakers across the state view industrial recruitment and entrepreneurial development as policy priorities.

Methodology and Survey Summary

Evidence presented in the literature review reveals that many states continue to practice incentive-based economic development policy. A number of reasons have been put forth to explain this seeming policy paradox (Burnier, 1992). One view is that policymakers feel pressure to make this type of development policy top priority (Wilson, 1989). This pressure may originate from voters, existing businesses, or other states. When these policies are successful, development officials can potentially tout job gains, enhanced infrastructure investment, and improvements to local revenue among other benefits. The benefits from these policies are questionable and there is ongoing concern that potential costs or losses to the community are omitted or downplayed in the discussion. Chi (1989) argues that states are not about to reverse their course of action in offering tax and financial incentive programs. There is a path-dependent element to this investment; states are reluctant to disavow programs in which they have invested substantial time and financial resources.

This analysis uses a statewide survey of local and regional economic developers to gain a more comprehensive understanding of the local and regional commitment to entrepreneurship policy efforts. The objective of this research is to sample a wide range of community and economic development practitioners who could provide insights regarding entrepreneurship and other economic development policy priorities across the state. Economic development is carried out in most states by a variety of organizations and professionals, and South Carolina is no exception. As a result, the survey sample included as many different types of organizations that we understood to have an active role in economic development policy and practice across the state. In addition, because of the expanding economic development role of Community Development Corporations, these organizations are also included in this analysis.

The South Carolina Economic Developers Association database and the South Carolina Community Developers Association directory were used to define an appropriate sample of economic development professionals. The survey was not meant to be a random sample but to capture a range of input from different development professionals and organizations across the state that have an active role in economic development policy. The hypothesis was that any organization with a functional role in economic development may also be involved in entrepreneurial policy efforts and, if not, they may still have relevant knowledge and feedback for a survey of this nature. As such, survey results should represent a broad measure of the awareness of respondents regarding economic development in their area. In consultation with Clemson University economic development and extension professionals, a sample of 160 organizations were chosen representing the following different types of organizations; Community Development Corporations, Chambers of Commerce, Council of Governments, Community Colleges/Workforce Development; and Economic Development Agencies.

An online survey platform was chosen to disseminate and manage survey responses. In March 2008 test surveys were sent to twenty-nine economic and community development professionals. The week of October 22 emails were sent to 160 potential respondents. Follow up emails were sent two weeks later, with a final reminder sent in the first week of January. It was evident early in the survey process that some CDC's did not all have the capacity18 to respond by email. As a result, a number of CDC surveys were conducted over the phone. A total of 99 surveys were completed, a response rate of almost 62 percent. Table 3.10 describes summary statistics of survey respondents. The largest number of respondents were CDCs (36), Local/Regional or Planning Organizations (i.e. Council of Governments) (22), and Chamber of Commerce or Local Business Development Organizations (14).

While the breadth of organizations appears to be well represented, it was also

[18] Reasons varied but some examples were that individuals did not have adequate access to a computer with internet, the CDC had no paid staff and relied on volunteer support, and individuals travelled a lot and as such conducting the survey over the phone was easier.

important to have representation from organizations that have a long tradition of being directly involved with local and regional economic development. Both Chamber of Commerce/ Local Business Development Organizations and Local/Regional or Planning Organizations (i.e. Council of Governments) are generally the organizations that many individuals consider the "local economic development" practitioner in their area. In total, these groups had 36 respondents. The average budget and number of employees varied significantly among these groups.

Table 3.10: Survey Sample Organization Types, Average Budgets and Numbers of Employees.

Sample Organizations	**Respondents**	**Average Budget***	**Average Number of Employees****
Community Development Corporation or Local Non Profit Organization	36	589,875	4.16
Chamber of Commerce or Local Business Development Organization	14	510,692	6.27
Educational Institution	8	145,000	145.43
Local Elected Official	2	1,450,000	6.50
Local/Regional or Planning Organization (i.e. Council of Governments)	22	399,000	15.85
Municipal or County Staff	9	352,707	2.38
Other	8	866,250	5.00

* CDC's had three outliers (2 @ $0 and 1 @ $25,000,000) that were not used to determine the average budget; Educational Institutions also had one outlier ($1,700,000) that was not used to determine the average budget.
** CDC's had one outlier (350) that was not used to determine the average number of employees; Educational Institutions also had two outliers (600 and 1500) that was not used to determine the average number of employees

In addition, survey respondents represented a range of service areas and represented a majority of South Carolina counties. Figure 3.4 indicates that the majority of respondents served either a county (56%) or a regional area (30%), with a much smaller portion of respondents serving a city, downtown, neighborhood, or other service area. Survey respondents represented thirty-five out of forty-six South Carolina counties. Table 3.11 lists the six counties that had the highest number of organizational respondents. Greenville, Richland, and Charleston are the 3 counties with the largest populations in the state, while Anderson, Florence, and Sumter counties are in the top fifteen most populated counties in the state. Survey results represent a diverse range of professionals, service areas, and regions throughout the state.

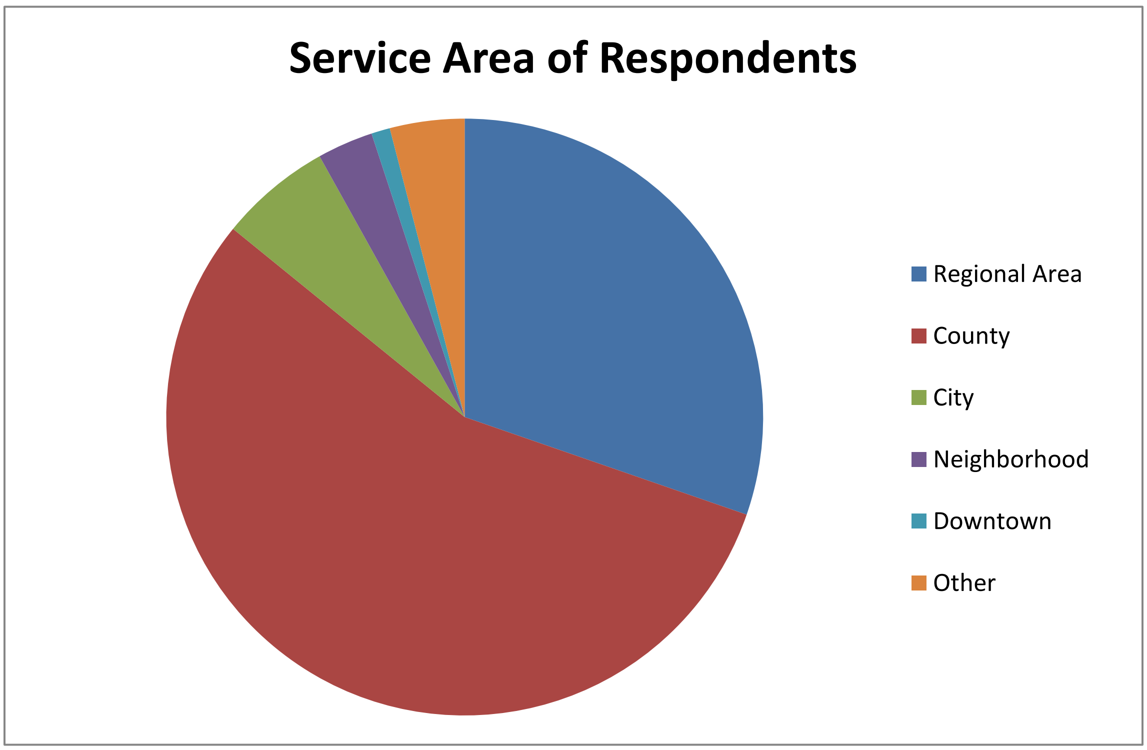

Figure 3.4: Respondents Service Areas

Table 3.11: Largest County Survey Respondents

Counties	Number of Respondents	Percent of Respondents
Richland	9	25.71%
Greenville	7	20.00%
Sumter	6	17.14%
Anderson	5	14.29%
Charleston	5	14.29%
Florence	5	14.29%

Over 80% of respondents have had specific training in economic development. Further, the majority of respondents both live and work in the same community. The average length of time living in the local community was over twenty years. This time span indicates a level of both knowledge of and commitment to the local community. While this longevity can serve a community well in determining policies that best-serve local strengths and weaknesses, it can also represent entrenched interests or a negative group think orientation.

There are a number of similarities across responses concerning the issues that are most important for communities in the near future. The following responses were ranked by at least one respondent as one of the five most important issues facing their community.

- Adequate housing
- Business Attraction
- Business Retention
- Education/skill development

- Entrepreneurial development
- Environmental Quality and Awareness
- Job Creation and development
- Providing Community Recreation and Culture
- Public Safety
- Telecommunications Infrastructure
- Transportation/Roads.

Almost 40% of respondents mentioned job creation as the number one issue facing their communities. Every respondent included this issue in their ranking of the five most important future issues. The issues ranked as most important, followed by the number of respondents indicating as such, are outlined in Table 3.12. Only one respondent mentioned entrepreneurial development as the most critical issue facing their community in the near future. However, entrepreneurial development was mentioned by 39 respondents as one of the five most important issues facing their community in the future.

Table 3.12: Future Community Issues Ranked as Most Important

Most Important Community Issues	**Number of Respondents**
Job Creation and Development	39
Education/Skill Development	18
Business Attraction	16
Adequate Housing	10
Business Retention	8
Entrepreneurial Development	1
Public Safety	1
Telecommunications Infrastructure	1

Over 80% of respondents indicate their community has an economic development plan, but only 52% of respondents affirmed that any type of entrepreneurship development and/or support policy was included in this economic development plan. In terms of specific development efforts, only 27% of responding agencies operate any type of entrepreneurial development program. Twelve of 36 CDCs surveyed stated that they had some type of entrepreneurial development program, while 15 out of 63 economic development organizations stated that they operate some type of entrepreneurial development program. Over half of respondents agreed or strongly agreed that their communities recognize the importance of entrepreneurs to the overall economic development of the region. When asked whether their community has well-developed programs in place that support and encourage entrepreneurial activity, the responses were mixed. There were not any respondents who strongly agreed, 22% agreed, and over 50% either disagreed or strongly disagreed that their community had well developed entrepreneurial programs in place. However, over 90% of respondents indicate they have local or regional access to a Small Business Development Center (SBDC). This response reveals that access to SBDC programs and services does not provide enough entrepreneurial infrastructure to characterize the community as having well developed programs in support of entrepreneurship.

If local developers understand the value of entrepreneurial development efforts, this research attempts to clarify the reasons that development officials would consider pursuing these efforts. The survey asked respondents to specify their top four reasons (from a list of eight) for advancing entrepreneurship efforts. The following reasons were mentioned by at least one respondent.

- Building community and family wealth
- Community downtown revitalization
- Diversification of the local economic base
- Enhancing workforce development
- Improving local business retention
- Improving new business recruitment
- Increasing competitiveness
- Increasing employment opportunities.

However, increasing employment opportunities, building community and family wealth and the diversification of the local economic base were mentioned respectively by 27, 24, and 22 respondents.

One critical component in understanding the implementation of local entrepreneurship development efforts is clarifying the perceptions of local and regional developers with regard to state policy priorities and incentives. When asked which type of economic development approach they believed was the highest priority for state and local policymakers, at least one respondent indicated one of the following:

- Business clusters
- Business incubators
- Downtown revitalization
- Entrepreneurship development
- Local business expansion

- Local tourism initiative
- New business recruitment.

However, almost 70%of respondents believe industrial and business recruitment efforts have the highest economic development priority for state policymakers and over 50% of respondents perceive this as the highest priority of local policymakers.

In addition to priority constraints, it is also recognized that many communities face additional barriers to developing and implementing entrepreneurial focused economic development policy. At least one respondent mentioned the following constraints to the successful implementation of entrepreneurial development policy.

- Availability of skilled, local professionals
- Alternative local or regional projects take greater priority
- Inadequate support from state/federal agencies
- Lack of funding
- Locational factors (e.g. market access)
- Not considered a local or regional responsibility
- Weak base of local entrepreneurs.

The majority of respondents rated a lack of funding as their biggest barrier in implementing entrepreneurship policy. The next two most substantive barriers are the priority of alternative local or regional projects and inadequate support from state and/or federal agencies.

Finally, Table 3.13 provides the results of respondents ratings of local access to a range of entrepreneurial services and programs. The results are not surprising but they are discouraging. None of these examples of entrepreneurial programming resulted in a majority of responses being above average or excellent. Four of these areas, local hiring initiatives, local infrastructure assistance (e.g. buildings, Broadband), networking and mentoring opportunities for community businesses, and small business and entrepreneurial training courses received a score of average by more respondents than any other ranking in that category. Access to six of these entrepreneurial service areas were ranked as poor by most respondents in those categories. These results paint a bleak picture of entrepreneurial service access and support in communities across South Carolina. As a result, communities appear to face substantial obstacles to implementing and encouraging successful local entrepreneurial development programs.

With this background, it is not surprising that over 65% of respondents either agree or strongly agree that industrial recruitment policy is more important for their community than entrepreneurial development policy. This response is undoubtedly influenced by several variables that this survey highlights. The majority of respondents indicate that industrial recruitment is the most important development policy priority of state and local policymakers. Additionally, every respondent mentioned job creation as a critical issue for their community in the future. Industrial recruitment strategies are often perceived as a more effective job creation tool than entrepreneurship, coupled with the aforementioned policy perceptions, industrial recruitment strategies would naturally be the preferred choice of policymakers. Survey results further highlight that most of these communities face substantial barriers in their access to a range of entrepreneurial support programs. Combined with the fact that the majority of respondents indicate weaknesses in local programming to support entrepreneurship, it is not surprising that only 27% of respondents indicate their community has any type of entrepreneurial development programming. Overall, these results begin to clarify the scope and breadth of

Table 3.13: Local and/or Regional Access to Entrepreneurial Programs

	Extremely Poor (%)	**Poor(%)**	**Average (%)**	**Above Average (%)**	**Excellent (%)**
A local business incubator	16.83	40.59	25.74	8.91	7.92
Access to venture capital or angel investors	27.00	56.00	14.00	3.00	0.00
Access to start up or seed capital	25.00	52.00	21.00	2.00	0.00
Advertising/marketi ng assistance	11.22	44.90	38.78	5.10	0.00
An organized buy local' program	8.16	40.82	32.65	14.29	4.08
Local hiring initiatives	6.06	35.35	43.43	14.14	1.01
Local infrastructure assistance (e.g. buildings, Broadband)	10.10	27.27	41.41	16.16	5.05
Micro-lending programs	17.35	46.94	30.61	5.10	0.00
Networking and mentoring opportunities for community businesses	5.10	23.47	50.00	20.41	1.02
Small business and entrepreneurial training	5.05	18.18	51.52	20.20	5.05

entrepreneurial development programming across South Carolina. However, a quantitative examination of the survey may provide additional understanding of variables that influence the likelihood of communities engaging in entrepreneurial development programming. The next section describes the logit model and results from a detailed examination of the relationship between entrepreneurial development programming and related survey questions.

Model Estimation and Results

Logit models are binary outcome models in which a dependent variable is modeled as one of two mutually exclusive outcomes. Logistic regression models are used to predict the probability of an occurrence by fitting the data to a logistic function. The probability of one outcome is *p*; while the probability of the other outcome must be *(1-p)*. As a function of regressors, the probability *p* will differ greatly across individuals being sampled. (Cameron and Trivedi, 2005).

Standard OLS regression is not appropriate to model binary outcome models because dependent variables are not continuous and would thus, result in heteroscedastic error terms. In standard OLS regression, $x'\beta$ cannot be constrained to the 0-1 interval (Greene, 2000). These models would produce nonsensical probabilities and variances. Thus, another model is needed. A continuous probability distribution should work to meet the expectations of

$$\lim_{x'\beta \to \infty} Prob\ (Y = 1 |\ x) = 1 \ (1)$$

$$\lim_{x'\beta \to -\infty} Prob\ (Y = 1 |\ x) = 0. \ (2)$$

The normal distribution is used with the probit model:

$$Prob\ (Y = 1|\ x) = \int_{-\infty}^{x'\beta} \Phi(t)dt = \phi(x'\beta). \text{(3)}$$

The logistic distribution is given by

$$Prob\ (Y = 1|\ x) = \frac{e^{x'\beta}}{1+e^{x'\beta}} = \wedge\ (x'\beta). \text{(4)}$$

The logit model and probit models both have symmetric distributions. For intermediate values of $x'\beta$, the distributions give probabilities that are comparable (Greene, 2000). It is argued that these models result in widely different predictions in studies with small samples. In samples with less than approximately 500 responses logistic regression may systematically overestimate the β -coefficients or the predicted odds ration. However, statistical theory indicates that overestimation in a single study may have little to no impact on interpretation as overestimation is much lower than the standard error of the estimate. When several small samples are pooled together, however, estimation of the result may be compromised by systematic overestimation (Nemes et al., 2009). A minimum of ten events per independent variable has been suggested as the optimum (Peduzzi et al., 1996; Agresti, 2007).

This logit model is defined by the Bernoulli model and thus is estimated by maximum likelihood. The model with success probability $\boldsymbol{F}\ (\ x'\beta)$ and independent observations leads to the likelihood function:

$$Prob\ \left(Y_1 = y_{1,}\ Y_2 = y_{2,} \ldots., Y_n = y_n\ \middle|\mathrm{X}\right) = \prod_{y_i=0} [1 - \boldsymbol{F}\ (\ x_i{}'\beta)\ ] \prod_{y_i=1} \boldsymbol{F}\ (\ x_i{}'\beta).$$

The likelihood function for n observations can be written as

$$L(\beta\ |data) = \prod_{i=1}^{n} [\boldsymbol{F}\ (\ x_i{}'\beta)]^{y_i}\ \ [1 - \boldsymbol{F}\ (\ x_i{}'\beta)]^{1-y_i}$$

After taking logs,

$$\ln L = \sum_{i=1}^{n} \{y_i\ \ln \boldsymbol{F}\ (\ x_i{}'\beta) +\ (1 - y_i\ ) \ln [1 - \boldsymbol{F}\ (\ x_i{}'\beta)]\}.$$

The likelihood equations are

$$\frac{dln\ L}{d\beta} = \sum_{i=1}^{n} [\frac{y_i f_i}{F_i} + (1 - y_i\ ) \frac{-f_i}{(1 - F_i)}]\ x_i\ = 0.$$

The density is f_i.

For the logit model, the first order conditions are

$$\frac{dln\ L}{d\beta} = \sum_{i=1}^{n} (\ y_i\ - \wedge) x_i\ = 0.$$

For the normal distribution, the probit model log-likelihood equation is

$$\ln L = \sum_{y_i\ =0} \ln[1 - \Phi\ (\ x_i{}'\beta)] + \sum_{y_i\ =0} \ln \Phi(\ x_i{}'\beta).$$

The first order conditions are

$$\frac{dln\ L}{d\beta} = \sum_{y_i\ =0} \lambda_{0_i}\ x_i\ + \sum_{y_i\ =1} \lambda_{1_i}\ x_i.$$

This reduces to

$$\frac{dln\ L}{d\beta} = \sum_{y_i\ =0} \lambda_i\ x_i\ = 0.$$

The second derivatives for the logit model are:

$$\mathrm{H} = -\sum\nolimits_{\mathrm{i}} \wedge_{\mathrm{i}}\ (1 - \wedge_{\mathrm{i}}) \mathrm{x_i} \mathrm{x_i}{}'.$$

Newton’s method of scoring can be used since the random variable y_i is not included in the second derivatives for the logit model. The log-likelihood is globally concave and this method will normally converge to the log-likelihood maximum in minimal iterations (Greene, 2000).

This model is intended to estimate the marginal effect of a change in the regressor on the conditional probability that y is equal to zero, which represents the existence of any type of entrepreneurial development program. Typical binary outcome models are single-index, which allow the ratio of coefficients for two regressors to equal the ratio of the marginal effects. The sign of the marginal effect is given by the sign of the coefficient (Cameron and Trivedi, 2005). The marginal effects of the logit model can be obtained from the coefficients, with

$$\frac{dp_i}{dx_{ij}} = B_{ij} p_i (1 - p_i), where\ p_i = \Lambda_i = \Lambda(\mathbf{x}'\boldsymbol{\beta}).$$

Interpreting the coefficients is frequently done in terms of the marginal effects on the odds ratio. For the logit model:

$$p = \exp(\boldsymbol{x}'\beta)/(1 + \exp(\boldsymbol{x}'\beta)$$

Which implies:

$$\ln \frac{p}{1 - p} = \boldsymbol{x}'\beta.$$

The odds ratio, or relative risk measures the probability of y being equal to one in relation to the probability of y being equal to zero, this is *p/ (1-p).* The log-odds ratio is linear for the logit model (Cameron and Trivedi, 2005).

The dependent variable tested in this research is whether a community has any type of entrepreneurial development program. In order to capture the broadest measure of respondent’s knowledge of local entrepreneurial development programming, the definition of entrepreneurial development was left as wide as possible. One of the potential challenges with this research is in clarifying the causality of entrepreneurship and entrepreneurial development programming. Communities with an existing base of dynamic entrepreneurship are more likely to have entrepreneurial development programming in support of these efforts. This virtuous cycle of policy and related entrepreneurial outcomes makes it difficult for researchers to clarify which came first; development policy or entrepreneurs themselves. However, this research is an important attempt to understand how entrepreneurial development fits within the priorities of local and regional policymakers.

Table 3.14 illustrates summary statistics for the dependent variable and all independent variables tested in this analysis. Appendix One provides the complete survey used in this research and Appendix Two includes a correlation matrix of all examined variables. The correlation results provide initial evidence that many of the variables tested have little correlation with the odds of a community having an entrepreneurial development program. All of the independent variables were individually tested against the probability of having a local entrepreneurial development program. The variables that were significant either individually or in models with multiple independent variables are included in Table 3.15.

Individual logit models were performed testing the relationships between each independent variable and the likelihood of having a local entrepreneurial development program. Early examination of a model incorporating the full sample population suggested that the model may be missing important interactions or variables related to these organizations specific characteristics. It is hypothesized that this model may suffer

Table 3.14: Entrepreneurial Summary Statistics

Questions	N	Mean	Std. Dev.
Training in economic development	99	3.47	2.11
Live and work in same community	98	0.13	0.34
How many miles to work?	99	0.20	0.40
How long have you lived in the community?	26	20.00	14.38
Children that attend local schools?	91	24.40	16.49
Georgraphic focus of organization	98	0.59	0.49
How many employees?	99	2.01	1.11
What is your organizations budget?	93	43.75	176.09
Do you have any entrepreneurial development programs?	86	0.72	0.45
Percent of budget from county	98	0.39	0.49
Percent of budget from city	98	0.73	0.44
Percent of budget from the state	98	0.69	0.46
Percent of budget from federal sources	98	0.72	0.45
Percent of budget from foundations	98	0.89	0.32
Percent of budget from private sources	98	0.73	0.44
Percent of budget from membership dues	98	0.80	0.41
Percent of budget devoted to entrepreneurial development	82	5.12	13.89
Future community population growth	99	1.98	0.89
Most important community issues: Housing	98	0.87	1.46
Most important community issues: Business attraction	98	2.05	1.59
Most important community issues: Business retention	98	2.00	1.91
Most important community issues: Education	98	2.66	1.61
Most important community issues: Entrepreneurship	98	1.51	1.99
Most important community issues: Environment	98	0.90	2.07
Most important community issues: Job Creation	98	2.06	1.50
Most important community issues: Culture	98	0.71	1.83
Most important community issues: Safety	98	0.44	1.55
Most important community issues: Telecommunications	98	0.78	2.00
Most important community issues: Roads	98	1.61	2.34
K-12 education support for entrepreneurhsip education	98	2.27	0.93
Community college support for entrepreneurship education	98	3.15	0.92
University support for entrepreneurship education	98	3.36	0.86
Access to Small Business Development Centers	99	0.11	0.40
Is there a community economic development plan?	98	0.19	0.51
Is entrepreneruship apart of an economic development plan	95	0.74	0.83
My community recognizes the importance of entrepreneurs	98	3.47	1.02

Questions	N	Mean	Std. Dev.
My community has well-developed programs to support entrepreneurship	98	2.56	1.00
Reasons for entrepreneurship: Community wealth	99	3.02	1.59
Reasons for entrepreneurship: Downtown revitalization	99	4.45	1.14
Reasons for entrepreneurship: Diversify	99	3.14	1.57
Reasons for entrepreneurship: Workforce development	99	3.96	1.35
Reasons for entrepreneurship: Business retention	99	4.32	1.19
Reasons for entrepreneurship: Business recruitment	99	4.11	1.14
Reasons for entrepreneurship: Competitiveness	99	4.32	1.05
Reasons for entrepreneurship: Employment opportunities	99	2.82	1.49
Which economic development approach is the priority of local policymakers?	99	5.30	2.14
Which economic development approach is the priority of state policymakers?	92	6.11	1.83
Industrial recruitment is more important than entrepreneurship efforts.	98	3.68	1.05
Access to a local business incubator	98	2.49	1.11
Access to venture capital	98	1.93	0.74
Access to seed capital	98	1.77	0.43
Access to advertising and marketing	97	2.37	0.75
Access to a buy local program	97	2.66	0.97
Access to local hiring programs	98	2.68	0.83
Access to local infrastructure assistance	98	2.79	1.01
Access to micro-lending	97	2.23	0.80
Access to networking and mentoring	97	2.90	0.82
Access to small business training courses	98	3.02	0.90
Constraints to entrepreneurship: Availability of skilled local professionals	99	3.84	1.52
Constraints to entrepreneurship: Alternative local and regional projects	99	3.35	1.48
Constraints to entrepreneurship: Inadequate support from state/federal agencies	99	3.80	1.33
Constraints to entrepreneurship: Lack of funding	99	2.08	1.34
Constraints to entrepreneurship: Locational factors	99	4.31	1.04
Constraints to entrepreneurship: Local/state taxation	99	4.67	0.86
Constraints to entrepreneurship: Not a local responsibility	99	4.33	1.11
Constraints to entrepreneurship: Weak base of entrepreneurs	99	3.86	1.38
Financial support from federal, state or local agencies for entrepreneurship	98	0.80	0.82

from Simpson's paradox, whereby a relationship that exists in different sub-populations may be reversed or not be found when the groups are combined. Simpson's paradox can be corrected when a confounding or interaction variable is identified and included in the model (Simpson, 1951).

Table 3.15: Entrepreneurial Development: Significant Independent Variables

Dependent Variable Survey Question
Does your agency operate an entrepreneurship development program?
Independent Variables Survey Question
Which of the following best describes your organization and responsibilities?
How many employees does your organization/office employ?
Percent of budget from the state
Most important community issues: Business retention
Most important community issues: Entrepreneurship
Reasons for entrepreneurship: Diversify
Reasons for entrepreneurship: Workforce development
For my community, industrial and new business recruitment efforts are more important economic development tools than entrepreneurship efforts.
Access to seed capital
Constraints to entrepreneurship: Inadequate support from state/federal agencies
Financial support from federal, state or local agencies for entrepreneurship

One of the ongoing challenges with data that suffers from Simpson's paradox is clarifying the most appropriate manner of partitioning the data. As probability relations will vary widely given different groupings of data, appropriately partitioning the data is critical for accurately determining causation. In data sets that exhibit Simpson's paradox, analysis of the entire data set or inaccurate partitioning of the data may support the

Table 3.16: Model Tests: Sub-Sample Economic Developers excluding CDC's

Model	**-LogLikelihood**	**ChiSquare**
Difference	13.405259	26.81052
Full	20.619789	**Prob>ChiSq**
Reduced	34.025048	<.0001
Measure		
RSquare (U)	0.394	
AICc	52.3305	
BIC	61.7939	
Observations	61	

Table 3.17: Likelihood Ratio Tests and Parameter Estimates: Sub-Sample Economic Developers excluding CDC's

Term	**Estimate**	**Std Error**	**ChiSquare**	**Prob>ChiSq.**
Intercept	4.7615361	2.5924798	3.37	0.0663
Percent of budget from the state	1.6349244	0.5981136	7.47	0.0063
Most important community issues: Business retention	0.6259304	0.2965396	4.46	0.0348
Industrial recruitment is more important than entrepreneurship efforts	-0.915824	0.3821059	5.74	0.0165
Access to seed capital	-2.58161	0.991933	6.77	0.0093
For log odds of 0/1				
Effect Likelihood Ratio Tests				
Source		**L-R ChiSquare**	**Prob> ChiSq**	
Percent of budget from the state		10.2086024	0.0014	
Most important community issues: Business retention		5.57986998	0.0182	
Industrial recruitment is more important than entrepreneurship efforts		6.84499366	0.0089	
Access to seed capital		11.5157006	0.0007	

Table 3.18: Model Tests: Sub-Sample CDC's

Model	-LogLikelihood	ChiSquare
Difference	7.752037	15.50407
Full	15.162473	**Prob>ChiSq**
Reduced	22.91451	0.0014
Measure		
RSquare (U)	0.3383	
AICc	39.6153	
BIC	44.659	
Observations	36	

Table 3.19: Likelihood Ratio Tests and Parameter Estimates: Sub-Sample CDC's

Term	Estimate	Std Error	ChiSquare	Prob>ChiSq
Intercept	-1.6408524	1.8255805	0.81	0.3688
Most important community issues: Entrepreneurship	-1.3652996	0.5804278	5.53	0.0187
Reasons for entrepreneurship: Diversify	-0.6944201	0.3441571	4.07	0.0436
Financial support from federal, state or local agencies for entrepreneurship	0.83488682	0.3902418	4.58	0.0324
For log odds of 0/1				

Effect Likelihood Ratio Tests

Source	L-R ChiSquare	Prob>ChiSq
Most important community issues: Entrepreneurship	7.6523793	0.0057
Reasons for entrepreneurship: Diversify	5.00076482	0.0253
Financial support from federal, state or local agencies for entrepreneurship	6.18877633	0.0129

absence or prevent the determination of significant effects.

There was concern early in this analysis that CDC's and other economic development organizations were different populations and may therefore require different models to estimate the relationship between the dependent and independent variables. Historically, CDCs have engaged in different objectives than traditional economic development organizations, and their organizational structures have often been considerably different as well. For example, CDCs often rely on volunteers and have few paid professional staff to operate and manage the organization. As well, CDCs have historically focused heavily on adequate and affordable housing as critical organizational objectives. The larger sample of economic development organizations is also composed of a mix of organizational structures with differing functions. However, these organizations all have some professional staff and are focused on a broader set of community and economic development goals beyond housing.[19] As a result, this mix of organizations arguably has more in common than the larger group has with CDCs. As a result, separate models were estimated for both sub-populations. Tables 3.16 – 3.19 illustrate the results for two sub-populations of the data; CDC's and the rest of the population.

The goodness of fit measures indicate that the models are significant and adequate. The AIC, BIC, and -2LogLikelihood values are an indication that the selected covariates are better than the model with the intercept only. The R-squared reported for logistic regression can be interpreted in a similar fashion as a traditional OLS R-squared. In both sub-samples over 30% of the variation in the likelihood of having a local or

[19] Many of these organizations may not be involved with local housing issues at all.

regional entrepreneurial development program can be explained by these models.

Table 3.24: Odds/Ratios: Sub-Sample Economic Developers excluding CDC's

Unit Odds Ratios **Per unit change in regressor**			
Term	**Odds Ratio**	**Lower 95%**	**Upper 95%**
Most important community issues: Business retention	1.869985	1.104714	3.667237
Industrial recruitment is more important than entrepreneurship efforts.	0.400187	0.17099	0.801658
Access to seed capital	0.075652	0.007014	0.390961

Range Odds Ratios **Per change in regressor over entire range**			
Term	**Odds Ratio**	**Lower 95%**	**Upper 95%**
Most important community issues: Business retention	22.86602	1.645313	663.2769
Industrial recruitment is more important than entrepreneurship efforts.	0.025648	0.000855	0.413007
Access to seed capital	0.000433	3.45E-07	0.059759

Odds Ratios for percent of budget from the state					
Level1	**/Level2**	**Odds Ratio**	**Prob>ChiSq**	**Lower 95%**	**Upper 95%**
1	0	0.0380122	0.0014	0.0026106	0.3112996

Overall, these logistic regression models were highly significant at the 5% level as indicated by the Likelihood ratio testing the global null hypothesis that the model parameters are significant.

The interpretation of the coefficients for logistic regression can be awkward. Thus, the odds ratio from these models is used for additional interpretation. The odds

Table 3.21: Odds/Ratios: Sub-Sample CDC's

Unit Odds Ratios Per unit change in regressor			
Term	**Odds Ratio**	**Lower 95%**	**Upper 95%**
Financial support from federal, state or local agencies for entrepreneurship	2.304553	1.174726	5.743178
Reasons for entrepreneurship: Diversify	0.499364	0.226545	0.922346

Range Odds Ratios Per change in regressor over entire range			
Term	**Odds Ratio**	**Lower 95%**	**Upper 95%**
Financial support from federal, state or local agencies for entrepreneurship	28.20635	1.90435	1087.95
Reasons for entrepreneurship: Diversify	0.062183	0.002634	0.723729

Odds Ratios for most important community issues: Entrepreneurship					
Level1	**/Level2**	**Odds Ratio**	**Prob>ChiSq**	**Lower 95%**	**Upper 95%**
1	0	15.342078	.0057	2.0575535	219.63091

ratios are given in Tables 3.20 and 3.21 for the respective subpopulations. An odds ratio larger than one indicates growth in the odds of having an entrepreneurial development program, while less than one indicates a reduced likelihood of having an entrepreneurial development program. In the sub-sample excluding CDCs, the following variables tested significant at the five percent level or higher ; the importance of business retention, whether industrial or business recruitment is more important than entrepreneurial development, and access to seed capital for local or regional entrepreneurship. For a 1 unit increase in the importance of business retention, the probability of having an entrepreneurial development program changes by a factor of 1.86. As well, for a 1 unit change in how a community values business recruitment in comparison to entrepreneurship efforts, the odds of having an entrepreneurial development program changes by a factor of .400. As a community's access to seed capital changes the odds of having an entrepreneurial development program changes by a factor of .076. Finally, as organizational funding shifts towards additional state funding, the odds of having an entrepreneurial development program changes by a factor of .038

In the CDC sub-sample the following variables tested significant at the five percent level or higher; the stated importance of entrepreneurship to the future of the local community, whether a community believes entrepreneurship is a valuable method of diversifying the local economic base, and whether a lack of government support is ranked as one of the primary reasons for the inability to support local entrepreneurship efforts. A 1 unit change in how a community values entrepreneurship as a valuable method of diversifying the local economic base results in the odds of having an entrepreneurial development program changing by a factor of .499. The odds of having an entrepreneurial development program will change by a factor of 2.3 when a lack of government support is ranked as one of the primary reasons for the inability to support local entrepreneurship efforts. Finally, if communities rank entrepreneurship as a variable that is important to their future the odds of having an entrepreneurial development program will change by a factor of 15.34.

One way to manage data with different sub-population's suffering from Simpson's paradox is to "normalize" the data across the sub-populations and then to pool

Table 3.22: Model Tests: Full Model

Model	**-LogLikelihood**	**ChiSquare**
Difference	19.517893	39.0358
Full	37.518589	**Prob>ChiSq**
Reduced	57.036482	<.0001
Measures		
RSquare (U)	0.3422	
AICc	90.3099	
BIC	106.988	

the normalized data. Normalizing the data reduces the skewness effects. However, as discussed earlier, it is important to seriously consider the method of portioning and normalizing the data set. One standard method is to determine variables of significance in individual sub-populations and then test these variables in the full population model with the addition of a dummy variable representing the conditioned or indicator variable. Interacting all significant variables with the indicator dummy variable in the pooled data set may correct for Simpson's paradox.

The goodness of fit measures indicates that the model is significant and adequate. The AIC, BIC, and -2LogLikelihood values are an indication that the selected covariates are better than the model with the intercept only. The R-squared reported for the full model logistic regression indicates over 30% of the variation in the likelihood of having a local or regional entrepreneurial development program can be explained by the full model. Overall the full model logistic regression was highly significant at the 5% level as indicated by the Likelihood ratio testing the global null hypothesis that the model parameters are significant.

Table 3.23: Likelihood Ratio Tests and Parameter Estimates: Full Model

Parameter Estimates				
Term	**Estimate**	**Std Error**	**ChiSquare**	**Prob>ChiSq**
Intercept	-.6765089	1.3849874	.24	.6252
Percent of budget from the state	1.00856971	.3666404	7.57	.0059*
Most important community issues: Business retention	.56350951	.2069923	7.41	.0065*
Industrial recruitment is more important than entrepreneurship efforts.	1.09968583	.3600222	9.33	.0023*
Access to seed capital	-1.7735581	.7198392	6.07	.0137*
Organizational dummy	-4.6298454	2.3068806	4.03	.0448*
Access to seed capital *Organizational dummy	2.5873346	1.1604417	4.97	.0258*
For log odds of 0/1: Effect Likelihood Ratio Tests				
Source	**L-R ChiSquare**	**Prob>ChiSq**		
Percent of budget from the state	8.9790776	0.0027*		
Most important community issues: Business retention	8.73870389	0.0031*		
Industrial recruitment is more important than entrepreneurship efforts	10.4439445	0.0012*		
Access to seed capital	8.29831592	0.0040*		
Organizational dummy	4.69127041	0.0303*		
Access to seed capital *Organizational dummy	5.95237678	0.0147*		

The odds ratios for the full model are illustrated in Tables 3.24. In the full sample the following variables tested significant; whether an organization receives any funding from the state, the importance of business retention, whether industrial or business recruitment is more important than entrepreneurial development, access to seed capital for local or regional entrepreneurship, the dummy variable for organization, and the interaction of access to seed capital and the organizational dummy. For a 1 unit increase in the importance of business retention, the odds of having an entrepreneurial development program changes by a factor of 1.76. For a 1 unit change in how a community values business recruitment in comparison to entrepreneurship efforts, the odds of having an entrepreneurial development program changes by a factor of 3.003. For organizations that acquire any state level funding, the probability of having an entrepreneurship development program changes by .133.

The odds ratios reported for the organization dummy and the seed capital variable do not account for the interaction term of these variables in the model. As a result, interpretation of the unit changes should be considered with caution. The main effect of having an entrepreneurial development program changes by a factor of .170 as communities' access to seed capital for entrepreneurship changes by one unit. The organizational dummy only results in a minor shift, .0098, in the odds of having an entrepreneurial development program.

However, odds ratios, inclusive of interaction terms, can be interpreted using Equation One:

$$e^{B_i + B_{ij}\ X_i}$$

Where $B_{\ i}$ = The individual coefficients for the organizational dummy or the seed capital variable

B_{ij} = The coefficient of the interaction term; organizational dummy and seed capital

X_i= The observed values of the organizational dummy or seed capital

Table 3.24: Odds/Ratios: Full Sample

Unit Odds Ratios Per unit change in regressor			
Term	**Odds Ratio**	**Lower 95%**	**Upper 95%**
Most important community issues: Business retention	1.756827	1.199495	2.731192
Industrial recruitment is more important than entrepreneurship efforts	3.003222	1.526508	6.370153
* Access to seed capital	.169728	.033624	.596692
* Organizational dummy	.009756	6.736E-5	0.659361

Range Odds Ratios Per change in regressor over entire range			
Term	**Odds Ratio**	**Lower 95%**	**Upper 95%**
Most important community issues: Business retention	16.73576	2.483089	151.9712
Industrial recruitment is more important than entrepreneurship efforts	9.019345	2.330227	40.57885
* Access to seed capital	.004889	.000038	.212447
* Organizational dummy	0.009756	6.736E-5	.659361

Odds Ratios for percent of budget from the state			
Level1	**/Level2**	**Odds Ratio**	**Prob>ChiSq**
1	0	0.1330355	0.0027*
Ratios marked with '*' are not interpretable due to interaction effects.			

Table 3.25 provides an estimate of the odds of a community having an entrepreneurial development program given different levels of seed capital where $X_{i,}$= Organizational Dummy. This table and Figure 3.5 illustrate that, as organizations

perceive there is greater availability of seed capital in their local community, the odds of having an entrepreneurial development program increase substantially. In fact, those communities that indicate an above average level of entrepreneurship are 22 times more likely to have a program, while those that perceive a low level of local seed capital are unlikely to have any local entrepreneurial development programming. This provides further evidence that access to seed capital may not only be a barrier to individual entrepreneurship but also to local entrepreneurial development programs.

Table 3.25: Equation One Estimates with $\boldsymbol{X_{i,}}$= Organizational Dummy

Seed Capital Value	Odds/Ratio of Entrepreneurial Development Program
1	0.1297026
2	1.72430453
3	22.9234

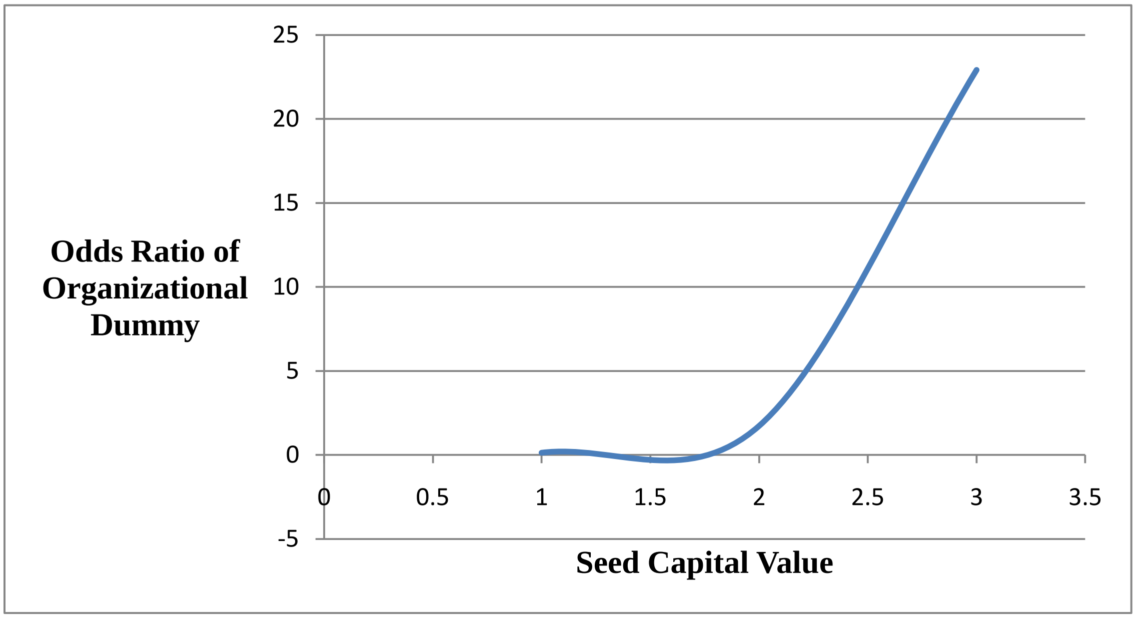

Figure 3.5: Odds/Ratio of Organizational Dummy vs. Seed Capital Value

Overall, these results suggest that the relationship between the probability of local or regional entrepreneurial development programming and a variety of organizational and community characteristics is complex and dependent on the type of organization involved in economic development. While these results are instructive, this research highlights several opportunities for additional research. This research underscores questions related to the nexus of entrepreneurship and local entrepreneurial development programming. For instance, communities that have an existing base of entrepreneurship with a culture that supports these efforts will likely have more entrepreneurial development programming compared to other communities. This underscores a which came first, chicken/egg question. As a result, those communities that do not have a solid base of local/regional entrepreneurs may not have entrepreneurial development programming.

However, communities may remain weak in this area as local developers do not facilitate this programming because of a perceived local weakness in the area. If this is the case, communities without an existing base and culture of entrepreneurship will undoubtedly remain weak in this area without programming efforts that begin to redirect the community's development focus. Disentangling this relationship is not easy; however, future research utilizing information on levels and types of local entrepreneurs may improve our understanding.

Selection bias is an area of ongoing concern with surveys and samples of this nature. By including a wide range of local and regional development professionals, sampling bias in this analysis is minimized. Self-selection bias in the survey sample is an additional area of concern. This research minimizes self-selection bias by surveying a broad sample of representative organizations and localities. Similar research may have broader applicability and generalizable conclusions by sampling across states or even nations.

Additionally, a larger and broader sample may detect statistical significance of additional variables and relationships. A number of independent variables in this analysis tested significant individually but not in the full model. The importance of business attraction and entrepreneurship development to your community in the nearby future, and the policy priorities of both local and state policymakers were all variables that tested significant individually. Future research and a larger sample of communities could further test these relationships as well as allow for exploration of potential interaction of these and other variables. A considerable body of research describes the importance of community characteristics on local entrepreneurship. None of the community variables tested in this analysis was significant. A larger sample size with a more diverse set of communities may allow for additional clarification of the relationship between community characteristics and the probability of having an entrepreneurial development program.

One of the primary relationships this research sought to highlight was the relationship between policy priorities and the probability of a community having a local economic development program. The policy priorities of local economic developers do appear to play a significant role in the probability of having local entrepreneurship policy and programs. While this is not surprising, the policy priorities of local developers are influenced by the policy signals from state and federal authorities, as well as other community and business leaders in the region. If a state wants to prioritize entrepreneurship efforts it must send clear signals to local and regional leaders so that they will also consider shifting economic development priorities. Additionally, the value placed on local and regional business retention efforts is significantly related to an enhanced entrepreneurial development approach. For many communities there may be the perception that focused business retention efforts have the potential to benefit local entrepreneurial efforts across all sizes of firms. Business retention may thus be viewed as directly related or almost synonymous to entrepreneurial efforts. Business retention efforts in many communities may be used to encourage and support local entrepreneurship, however, future research would benefit from a better understanding of the nature of these policies across different types of communities. Finally, barriers to entrepreneurship, access to seed capital specifically, significantly influence local and regional support of entrepreneurship. This confirms earlier research on barriers to financing but provides further documentation on the importance of this barrier to preventing entrepreneurship efforts at the local and regional level.

Conclusion

South Carolina has long relied on a development model that emphasizes free trade, minimal regulation, low taxes, and a competitive environment as the best prescription for economic growth. This model has resulted in ongoing efforts to recruit new business based on the business-friendly environment that South Carolina provides. However, in the face of globalization and the loss of many of South Carolina’s traditional textile and manufacturing jobs, communities across the state find themselves struggling to compete.

In an effort to assess South Carolina’s potential for supporting new economy models of development, this research has begun to examine the state’s development policy landscape. These results illustrate several key issues that constrain local communities from implementing entrepreneurial oriented policy efforts. One key finding is that South Carolina policymakers do not appear to have clearly articulated entrepreneurial development as a primary policy priority for the state. If policymakers have made statements regarding the importance of entrepreneurship in the state, local and regional officials continue to see other economic development initiatives (e.g. industrial recruitment, business retention) ,as more of a priority than entrepreneurship development efforts. Surveyed communities remain highly focused on issues related to job creation and policy initiatives like industrial recruitment that are perceived to most effectively meet this objective. This research also indicates that South Carolina communities have poor access to entrepreneurial resources and support. Overall, these results indicate that South Carolina communities continue to favor traditional economic development policy efforts. Additionally, communities perceive a number of substantive barriers and constraint to moving forward with entrepreneurial policy efforts.

There is much work to be done to move communities away from traditional development models towards models that emphasize innovative and entrepreneurial policy approaches. Research reveals these efforts need to begin with a focused and concerted entrepreneurial policy effort from the state. They also must be about more than words on a website and more about substantive change resulting in robustly funded programs. If local and regional community leaders witness a concerted policy effort from the state, accompanied with resources and support to facilitate this effort, local communities might begin to embrace entrepreneurial development policy within their own local and regional economies.

CHAPTER FOUR

PARALYZED STATE TECHNOLOGY INVESTMENTS AND THE IMPACT ON STATE SMALL BUSINESS AND ENTREPRENEURIAL ACTIVITY: A FIRST LOOK

Introduction

A substantial body of research documents a shift in regional economic development research and policy from one focused on traditional resource variables, like land and labor, to an approach that creates an appealing environment to facilitate local business retention and the creation and expansion of existing local business. The so-called third wave of economic development policies are often referred to as "high-road" or knowledge- based policies. These encompass a broad range of policy efforts aimed at entrepreneurship and technology-based economic development efforts, projects such as Information and Communications Technology[20] (ICT) infrastructure investment, business incubators, developing and nurturing industry clusters, and education and technology training programs.

For these economic development strategies to be successful, states and regions are recognizing that core infrastructure must be in place to support innovation and entrepreneurial activity. In today's technology-driven marketplace, it can be assumed that advanced ICT infrastructure is a prerequisite to developing a tech-savvy workforce, developing local competitive advantage, and, generally, ensuring economic development

20 For the purposes of this research we define ICT as all forms of technology used to create, store, exchange, and use information. It can include any communication device or application, including telephones, cellular phones, computer and network hardware and software, and regular and advanced bandwidth infrastructure. Additionally, we assume that advanced ICT incorporates Broadband technology and can thus be viewed synonymously throughout this research.

success (European Commission, 2002b; Department of Trade and Industry (DTI), 2001). High-speed Internet access, in particular, has received much recent attention since most computing applications with promise to deliver competitive advantage to firms and regions, require this access (Eberts, et al, 2005). This vision is described as one that:

> consists of strong non-inflationary growth arising out of the increasing influence of information and communications technology and the associated restructuring of economic activity…{embracing features such as}…the growth of small high-tech (businesses), the increasing importance of mobile and highly skilled talent, the rise of entrepreneurship and the centrality of venture capital. (Thirft, 2001, p.414)

While firms and regions may require this technology, it is not ubiquitous. In the United States there continues to be an ongoing digital divide across geographies, regions, racial groups, age groups, and income classifications. Further, uptake and use of advanced ICT infrastructure and applications vary considerably across type and size of firm, with smaller firms more often lagging (Buckley and Montes, 2002; Dun and Bradstreet, 2001; Varian, 2001). If one of the foundations of the knowledge economy is entrepreneurial activity and advanced technology infrastructure, understanding differences in ICT uptake and use patterns across different sizes and types of firms is important. If both the spatial concentration of entrepreneurs and advanced ICT infrastructure and applications are factors important to economic development, we need to better understand the relationship between these factors.

In acknowledging the importance of advanced ICT investments to economic and social development, many communities and regions are beginning to consciously take steps towards enhancing their access to Broadband[21] infrastructure. In most communities, incumbent local exchange carriers (ILECs) and/or competitive local exchange carriers (CLECs) --- created after the breakup of the regional Bell incumbents and largely the result of the Federal Communication Commission's (FCC's) attempts to deregulate and create competition in the industry --- are thought to be the only viable options for providing the necessary bandwidth at reasonable prices. However, nearly all ILECs and many CLECs are publicly-traded business concerns whose operations are driven by maximizing profit and increasing shareholder value. Deploying advanced networks to sparsely-populated rural regions or disadvantaged urban areas often does not allow these firms to meet articulated revenue and profit objectives. As the expectations of many economic development professionals are that even greater bandwidth will be required for economic success in the future, communities feel increasing pressure to take this issue into their own hands by creating municipal-owned and/or operated ICT facilities (Eberts et al., 2005).

In response to increasing municipal interest and involvement in deployment of ICTs, traditional private sector providers of these services have responded with their own legislative efforts, mainly at the state policy level, to restrict municipal involvement in

[21] There is not a single, standard definition of Broadband as the concept deals with several different technologies, platforms, and service speeds. For the purposes of this research we rely on a basic understanding of Broadband technology as the ability to transmit data at high-speeds over a single cable or fiber network. The most common platforms for this technology are cable, DSL, fiber optic, wireless, and satellite. The FCC defines Broadband as follows: Broadband or high-speed Internet access allows users to access the Internet and Internet-related services at significantly higher speeds than those available through "dial-up" Internet access services. Broadband speeds vary significantly depending on the particular type and level of service ordered and may range from as low as 200 kilobits per second (kbps), or 200,000 bits per second, to six megabits per second (Mbps), or 6,000,000 bits per second. Some recent offerings even include 50 to 100 Mbps. (http://www.fcc.gov/cgb/consumerfacts/highspeedinternet.html).

the industry. These efforts have often been undertaken even when existing providers do not have any near-term plans to provide this service. Barriers range from legislative constraints that prevent all municipal investment in advanced ICT infrastructure, provision, and/ or service to a variety of administrative, financial, and/or procedural barriers. There are a variety of stated reasons for these policy measures, mostly focused on defining the provision of advanced networks as the exclusive domain of the private sector. However, many policy makers, researchers, and local leaders are increasingly concerned that these restrictions place underserved communities and regions at risk of falling further behind other communities in relation to technology infrastructure investment, making them less attractive places to start or expand a business. There is also concern that the unhindered ability of communities to develop or operate their own infrastructure represents a “viable threat” to existing providers, encouraging them to deploy networks, enhance service, and/or reduce prices in heretofore relatively un-served regions. In fact, there is much anecdotal evidence indicating that communities need only begin to make serious plans about deployment of Broadband services in order to induce existing providers to take the needs of these communities seriously.

This paper will begin by exploring the current literature on the economic benefits of Broadband, including the potential benefits from local municipal investment in advanced ICT infrastructure. This will be followed with an overview of current national Broadband trends and legal barriers that states have enacted in an effort to hamper local and regional investments in advanced ICT infrastructure. Next is a discussion of the research on small business access and adoption of advanced ICT and e-business technology. This is followed with a presentation of the unique legal and policy environment in South Carolina as one example. The second section of the paper presents results from interviews of South Carolina municipal leaders and surveys from 10 of South Carolina's municipal electric cities. The last section of the paper describes a model and results from a state level regression analysis estimating the impact of ICT policy restrictions on state-level small business growth. In conclusion, this research hopes to clarify the impact of the state policy environment on a state's ability to realize success with new economy indicators like small business growth. If our nation and each state are to fully embrace a "knowledge-economy," understanding the full scope of opportunities and constraints to this development is critical to the ongoing research agenda.

Evidence of the Benefits of Broadband Investment

Katz and Rice (2002) argue that one of the reasons that Broadband is perceived to have the potential to generate substantial economic benefits is the analogous association with the growth potential of historical investments in other technologies that had done so. The transformative benefits that Broadband can provide are elaborated by Commissioner Copps (2002) of the Federal Communications Commission (FCC).

> In this new century we will work differently, play differently, and probably each govern ourselves differently, all because of the transformative power of telecommunications. Broadband is already becoming key to our nation's system of education and commerce and jobs and therefore, key to America's future. Broadband is going to be front and center in America's 21st century transformation. Those who do have access to advanced communications like Broadband will win; those who don't will lose.

Generally, Broadband has the potential to improve the access and quality of education and health services, government communication, jobs, and overall economic well-being (Firth and Mellor, 2005). For consumers Broadband enhances educational opportunities, access to peers and networks, access to entertainment options, and generally improves consumer information and networking choices (Wales et al., 2003). For businesses and organizations, Broadband potentially offers efficiency and productivity enhancing benefits through specific applications that allow for the adoption of new business models (Precursor Group, 2001). The OECD (2001) has argued that ICT infrastructure has the potential to influence firm location decisions just as transportation networks did in the 20th century. Additionally, as technology marches onward, there is evidence that consumers and businesses will require more bandwidth, not less, in order to effectively leverage the most up to date technologies. Overall, the estimated benefits have generated ongoing interest and the belief that Broadband technology should be actively promoted in the public arena (Xavier, 2003).

Theoretically, the specific benefits that arise from Broadband related activities can be measured in relation to the increase in private and/or social surplus (Katz & Shapiro, 1986; DiMaggio, Harigittai, Neumann, and Robinson, 2001). Katz et al. (2010) discuss four primary economic effects generated by an increase in Broadband availability and/or penetration. The first effect is generated by the construction of Broadband infrastructure. This creates direct, indirect and induced effects from employment and industrial relationships impacted by economic multipliers. The second effect occurs from positive spillovers or externalities created from the use of a Broadband network. For firms, effective leveraging of this technology can enhance resource productivity, while consumers may experience positive income effects from economic multipliers. Both of these impacts may be important contributors to enhanced GDP growth. Additionally, consumers may realize an increase in their consumer surplus, calculated as the difference between what consumers would be willing to pay and the actual Broadband price. Taken together, all of these benefits are hypothesized to make a positive impact on GDP growth now and in the near future.

Many researchers have hypothesized about the potential net private and social benefits to be gained from an increase in nationwide and/or regional Broadband availability and deployment. However, only one study has attempted to estimate the national consumer and producer surplus generated by Broadband access over narrowband access (dial-up). Greenstein and McDevitt (2009) estimate a $28 billion total surplus from Broadband availability in the US in 2006. Consumer surplus was 27% of the total, or $7.5 billion, and producer surplus was estimated to be $20.5 billion. A 2010 study (Greenstein and McDevitt) estimating Broadband surplus in Canada, the United Kingdom, Spain, Mexico, Brazil and China finds that a nation's total Broadband surplus is directly related to Broadband penetration. Crandall et al. (2003) estimate a $300 billion annual increase in US consumers' surplus generated from new services that Broadband deployment enables[22]. While this research stream continues to evolve, Foster and Neuberger (1999) argue that estimating consumer and producer surplus in complex and imperfectly competitive markets, such as telecommunications markets, remains difficult.

[22] This assumes universal adoption of current Broadband technologies such as DSL and cable modem service. Benefits are based on residential usage.

Challenges notwithstanding, the first available studies on the nationwide impact of Broadband adoption began appearing by 2001. A Verizon-commissioned study by Criterion Economics (Crandall and Jackson, 2001) estimated that Broadband would contribute an extra $500 billion in GDP by 2006. The New Millenium Research Council (Pociask, 2002) estimated that 1.2 million jobs would be created from the construction and use of a nationwide Broadband network. Similarly, Ferguson (2002) argued that without improving Broadband networks and performance the U.S. could see substantial productivity losses. These early studies provided important forecasts of the nationwide potential of Broadband technology, however, additional work clarifying the full scope of benefits to the national economy has only occurred more recently.

Since the early 2000s a number of national studies have further evaluated the economic impact of a national Broadband network. All of these (Crandall et al., 2003; Katz et al., 2008; Atkinson et al., 2009; Liebenau et al., 2009; Katz et al., 2009; and Katz et al., 2010) used input-output analysis to estimate the impact of a nationwide network on job creation. Given specific assumptions about the value of this national investment, each study found significant employment impacts from the creation of a nationwide Broadband network. These studies assume that the buildout of a nationwide network would generate direct employment impacts from the actual building and deployment of the physical infrastructure, along with indirect and induced effects. Indirect effects are created from the additional employment created by firms selling to those involved in network construction while induced effects are generated from the additional employment created from household spending generated by the income earned and spent from direct and indirect effects. Three studies (Crandall et al., 2003; Atkinson et al., 2009; and Katz et al., 2009) estimate total U.S. employment impacts of respectively 140,000, 180,000, and 127,800 annual jobs. Additionally, the U.S. studies estimate Type II[23] multipliers of 2.17, 3.60, and 3.42 respectively. The estimated multipliers provide additional confirmation of the potential strength of national Broadband investments.

Regression analyses and top-down multipliers[24] have also been used to estimate the employment impact of Broadband externalities. Using a sample of 48 states from 2003-2005, Crandall et al. (2007) estimate a 1% point increase in state Broadband penetration will generate employment growth of 0.2 to 0.3 % per year, assuming the state is not already at full employment. Thompson and Garbacz (2008) use a sample of 48 states over the period 2001-2005 to confirm a statistically significant positive relationship between Broadband penetration and employment. Their research further confirms that the strength of this relationship varies by industrial sector. Similarly, Gillett, et al. (2006) estimates the economic impact of Broadband deployment at the zip code level. They conclude that an increase in nationwide Broadband deployment would result in an increase in employment of 1.5%. In conclusion, all of these studies provide additional evidence that a nationwide Broadband deployment will provide positive employment effects across the nation. These studies highlight the importance of differential impacts

[23] Type II multipliers estimate the impact of direct, indirect and induced effects divided by the direct effect.

[24] Top-down multipliers are distinguished from those that are used in a bottoms-up approach. A top-down approach uses macroeconomic models, state or U.S. models, to estimate aggregate impacts generated by a specific policy shock. These models use state or national multiplier estimates to determine employment and income impacts.

across industries and also potential methodological issues in estimating local and regional impacts.

Recent research has also focused on the impact of Broadband on gross domestic product (GDP) growth. The majority of these studies find a statistically significant relationship between Broadband penetration and GDP growth but the results vary widely. Two U.S. studies (Crandall et al., 2007; Thompson and Garbacz, 2008) estimate this relationship using the majority of U.S. states, covering the periods 2003-2005 and 2001-2005 respectively. Crandall et al. (2007) do not find a statistically significant relationship between Broadband and GDP growth, while Thompson and Garbacz (2009) estimate a 10% increase in Broadband penetration increases efficiency by 3.6%25. In an international analysis of low, middle, and high income countries, Qiang and Rossotto (2009) find a 10% increase in Broadband increases GDP growth respectively by 1.38% in low and middle income countries and 1.21% in high income countries. Two studies (Czernich et al., 2009; Koutroumpis, 2009) on OECD nations also yield mixed results. Koutroumpis (2009) estimates an increase in GDP growth of .25% for a 10% increase in Broadband penetration, while Czernich et al. (2009) estimate an increase of 1.9 -2.5 %. These studies provide further confirmation of the potential significance of Broadband on economic activity but the variation in these estimates highlights underlying methodology problems with highly aggregated data and potential weaknesses in the model specifications or the data itself.

Several studies have specifically addressed the potential benefits of rural

[25] Katz et al (2010) indicate that the standard assumption is a 1% increase in productivity or efficiency results in a 1% increase in GDP.

Broadband deployment. Katz et al. (2010) estimate that rural wireless Broadband will result in the creation or retention of 117,000 jobs in the nineteen states with the lowest Broadband access and adoption rates in the United States. Approximately 38,500 would be new jobs concentrated in trade, health, and financial service sectors. This study uses this same methodology to estimate the economic impacts of rural wireless Broadband in three relatively underserved states; Kentucky, Ohio, and West Virginia. If Broadband availability were to increase to 100 % through deployment of 700 MHz wireless technology in these states, between 2011 and 2014, 10,235 jobs are estimated to be saved or created in Kentucky, 5,744 in Ohio, and 4,793 in West Virginia. In Kentucky the majority of jobs would be concentrated in rural areas adjacent to metropolitan areas, while in Ohio and West Virginia the majority of jobs saved or created would be concentrated in isolated, rural communities. The authors speculate that these different impacts are largely due to differences in regional Broadband supply gaps. Thus, states with larger rural supply gaps will experience a greater benefit proportionately in rural areas than other regions in the state. Enhancing Broadband availability is also estimated to increase the growth of median income in states counties by 2.1 % in Kentucky, 0.8% in Ohio, and 3.43% in West Virginia. Overall, with 100% Broadband deployment these three states are estimated to create or save 116, 863 jobs from 2011-2014 and to increase the median per capita income by $1201.

Individual state or regional studies have not been as common as national level research. However, several studies point to the significance of increased Broadband access for regions, as well as the potential of municipal deployments to generate positive economic benefits. Shideler et al. (2007) estimates the impact of increasing Broadband penetration across counties in Kentucky. Their analysis reveals that for every 1% increase in Broadband penetration, total employment growth increases from 0.14% to 5.32%, depending on the industry. One early, small regional study (Strategic Networks Group, 2001) found significant predicted positive impacts from the local deployment of a Broadband network in South Dundas, Ontario. Following this, two studies (Kelley 2004; Ford and Koutsky, 2005) began to further clarify the benefits of local public investment in technology infrastructure. Kelley (2004) compared the economic effects of a municipal Broadband deployment in Cedar Falls, Iowa with nearby Waterloo, Iowa. Ford and Koutsky's (2005) study compared Lake County, Florida with similar counties where advanced telecommunications networks were not deployed. All of these studies indicated that investments in advanced ICT systems have a positive influence on economic growth and development.

With the possibility of substantial private and social benefits at stake, there is pressure on local, state and national governments to participate in these investments. As a result, research has also explored various alternatives for public involvement in ICT infrastructure investment. Gillett et al. (2004) describe four possible roles of government involvement in Broadband infrastructure; 1) stimulator of demand, 2) rule-maker, 3) source of funds, and/or 4) developer of infrastructure. This research also begins to clarify the role of municipally based electric utilities (MEUs) in the provision of this infrastructure. Gillett et al. (2006) follow up this research with a more in-depth analysis of the role of local municipal electric utilities in providing ICT infrastructure. Their results reveal that MEUs are more likely to invest in ICT infrastructure if they can exploit scope economies in supporting their own electric utility operations and if they perceive themselves to be underserved by private competitors. This research also indicates that MEU's closer to metropolitan areas and less constrained by state regulatory barriers are also more inclined to make these investments.

In 2004 there were 2,007 municipalities that provided municipal electric service to their local communities (Gillett et al., 2004). Of these, 616 utilities provided some type of communication service for their region, a 37% increase since 2001[26]. There is evidence that larger cities and even those municipalities without MEU's have begun considering wireless Broadband networks as important investments for the long-term success of their communities. However, there is ongoing criticism of the government's involvement in supplying these types of communications services. The "crowding out effect" is one of the primary criticisms used to argue against these types of public investments (Ford, 2005). The simple version of the argument is that within any region the market is only capable of supporting so many suppliers and government entry into any given the market causes some private firms to be crowded out of these markets.

However, critics uphold there are several problems with this argument. Contradictions to the crowding out theory include the following:

- ICT investments require large, upfront investments in fixed assets that have the potential to result in scale economy benefits.

[26] Also see Electric Power Statistics at www.appanet.org.

- In some regions the start-up costs and projected revenues of these investments are such that private firms may be precluded from entering the market.
- In some regions a government provider may be the only provider willing to enter the market or may be an additional competitor to an existing local monopoly firm.
- Cities and regions already have examples of infrastructure investments with these characteristics within their own communities; fire, police, water, sewer, and other public services.

Moreover, Ford's (2005) analysis of the state of Florida provides no evidence that the crowding out effect is at work in communities with MEUs. Rather, Ford's model supports the possibility that MEUs may actually increase the competitive environment and stimulate private telecommunications provision and investment. Specifically, in Florida communities without a municipal Broadband provider there were 13% fewer competitors (ibid,). One Verizon representative acknowledged that community networks make "people more aware of the benefits of Broadband" (Williams, 2005). Sutton (1995) and Beard and Ford (2003) argue that municipal service provision could be the catalyst for additional private firms in the market if municipal provision creates an environment for the market to expand. Overall, this research supports the ability of MEU's to make these investments in order to ensure that the supply and demand conditions of a nationwide telecommunications market are met.

The idea of government involvement in ICT infrastructure investment continues to generate strong debate over the potential benefits and costs of this infrastructure. Papacharissi and Zaks (2006) note that, in the U.S., a number of groups view the discussion of any government regulation or involvement as a threat to the foundations of capitalism. Patek (1992) argues that this type of regulation will not only bring cumbersome bureaucracy but also will discourage technological innovation. However, Papacharissi and Zaks note that the government has and continues to be an important investor in nationwide research and development efforts across a wide range of infrastructure and technology related areas. Ironically, it is because of government investment from the Department of Defense, National Science Foundation, and several institutions of higher education that the United States (and the world) has the nationwide technology backbone (Internet) that allows for the current development of local and regional technology networks. Moreover, the government has a long history of making investments in infrastructure that have the potential to serve the public at large and result in community wide positive externalities.

The ongoing question continues to be what is the public role for ICT infrastructure development? If, as a number of researchers have argued, market incentives are not likely to eliminate all of the gaps in access and service, some form of government intervention is necessary to ensure adequate deployment and uptake of Broadband infrastructure. Feser (2007) calls for a bottom-up approach to Broadband investment, whereby the government is a catalyst for these investments and possibly a partner in developing local initiatives. Feser (2007) argues the locally-driven nature of a bottom-up approach increases the likelihood that the unique needs of diverse geographies can be met with unique and creative solutions, rather than top-down standardized solutions.

This issue has been further complicated by the regulatory and reporting requirements of the 1996 Federal Telecommunications Act. As a part of this Act, the 1999 First Broadband Development Report defined “Broadband” as 200 kilobytes per second in either or both upstream or downstream data transmission. As Broadband penetration has increased and the types of applications requiring enhanced bandwidth has grown, this definition has been increasingly criticized as severely inadequate for competitive communities of the Twenty First century. However, until 2010, any supplier meeting this service requirement, no matter how inadequate, was technically providing Broadband service by FCC standards. It could be argued that the failure of the FCC to update this definition as the technology rapidly changed has contributed to a slower growth of competitive, high speed service options across the country.

The 2010 National Broadband Plan and ongoing criticism from industry experts led to a revised FCC definition of “Broadband.” The National Broadband Plan sets a benchmark for every household to have affordable Broadband service of at least 4 Megabytes per second (Mbps) download speed and upload speeds of at least 1Mbps. These service benchmarks represent the minimum requirement to stream high-quality video while continuing to support basic email and web browsing. While updating minimum specifications, the sixth Broadband deployment report (FCC, July 2010) also acknowledges that 14 to 24 million Americans remain without adequate access to Broadband. Despite the forgoing, the FCC further reports that ensuring adequate access and penetration of Broadband, based on the National Broadband Plan, is proceeding in a “reasonable and timely fashion (FCC, July 2010, p.5).”

An additional challenge to ensuring adequate access and adoption of this technology, that is arguably a result of the 1996 Telecommunications Act, concerns the FCC reporting requirements of national Broadband coverage. The FCC considers an area as served by Broadband if the telecommunications industry reports that at least one FCC-defined subscriber resides there. Historically, the FCC did not require any additional information beyond the location of providers; information such as the type of service, speed, or pricing options, all of which are important in confirming the breadth and scope of national Broadband coverage. As a result, incumbent telecommunications providers have been able to legally claim much higher penetration rates than more detailed data would likely reveal. Partly in response to ongoing criticism of the weakness of FCC reporting data, the 2009 American Recover and Reinvestment Act (ARRA) provided \$350 million for the creation of a nationwide Broadband map. The map[27] was released in February, 2011. It is a searchable database of over 25 million records that provide information on service, service providers, speed of service, and type of service technology. The 2009 stimulus bill and the resulting National Broadband Plan have improved the landscape for nationwide Broadband deployment and penetration, but there remain ongoing concerns about the regional and national impact from the business and consumer Broadband gaps that remain.

[27] The map can be accessed at Broadbandmap.gov

Table 4.1: States Lagging in Broadband Accessibility

State	Percent of Un-served or Underserved	Number of Broadband Lines	Households	Household Penetration[28] (percent)	Population	Population Penetration[29] (percent)
W. Virginia	26.0	442,000	748,517	59	1,819,777	24
Arkansas	25.2	516,000	1,124,947	46	2,889,450	18
Mississippi	23.0	447,000	1,095,026	41	2,951,996	15
Alaska	20.7	162,000	236,597	68	698,473	23
S. Dakota	18.7	179,000	316,638	57	812,383	22
Montana	17.3	212,000	375,287	56	974,989	22
N. Dakota	16.5	155,000	279,014	56	646,844	24
Kentucky	15.7	876,000	1,694,197	52	4,314,113	20
N. Mexico	15.1	389,000	742,104	52	2,009,671	19
Missouri	13.6	1,269,000	2,339,684	54	5,987,580	21
Wyoming	13.5	122,000	213,571	57	544,270	22
Oklahoma	13.1	731,000	1,430,019	51	3,687,050	20
Louisiana	12.8	888,000	1,688,027	53	4,492,076	20
N. Carolina	12.3	2,172,000	3,646,095	60	9,380,884	23
Alabama	12.0	901,000	1,848,051	49	4,708,708	19
Kansas	11.6	659,000	1,104,976	60	2,818,747	23
Virginia	11.2	1,904,000	2,971,489	64	7,882,590	24
Tennessee	10.1	1,248,000	2,447,066	51	6,296,254	20
Maine	10.0	330,000	544,855	61	1,318,301	25
Total	14.1	13,602,000	24,846,160	55	64,234,156	21

Source: US Census Bureau; National Broadband Plan; FCC; analysis by Katz, R.L., Avila, J, and Meille, G. (2010). Economic Impact of Wireless Broadband in Rural America. Telecom Advisory Services, LLC.

Over the past decade there is little question that Broadband deployment, adoption and use has continued to increase across all communities and socio-economic

[28] Household penetration is the percentage of households in a state with access to Broadband lines.
[29] Population penetration is the percentage of a state's population with access to Broadband lines.

characteristics. The FCC National Broadband Plan estimates there are 7,035,613 United States housing units identified as un-served or underserved. As stated earlier, the FCC defines a region as un-served or under-served if housing units do not have access to service of 4 Mbps download speed. The largest portions of these households are in rural areas and remain un-served or under-served because of lower population densities and/or economically distressed populations. Katz et al. (2010) identified US states where less than 90% of the population are served by the 4Mbps service requirement. Table 4.1 illustrates their estimation of those states that have the most substantial gaps in Broadband deployment. Katz et al. (2010) and Atkinson and Shultz (2009) argue that these areas are likely to remain under-served because current incumbent providers lack the incentives to invest in rural fixed or mobile capital investment.

Even with the growth of Broadband deployment and use, there also continue to be persistent gaps in both the adoption and use of Broadband across demographic and socioeconomic categories. There is anecdotal evidence that widespread, lower-cost bandwidth is available in wealthier urban and suburban areas but spotty availability remains in rural and poorer urban markets. The Pew Internet and American Life Poll regularly reports on home Broadband adoption and use trends. Table 4.2 summarizes data from the 2009 Pew Internet and the American Life project. In 2009 there remains a rural-urban gap of 21 %, a 31 % gap from the lowest educational attainment to the highest, a 19% and 22% gap respectively between black Americans and White and Hispanic Americans, and a gap ranging from 6-53% among different income groups.

Table 4.2: Home Broadband Adoption Trends

	2006 (%)	**2007 (%)**	**2008 (%)**	**2009 (%)**
Yearly Adoption				
All Adults	42	47	55	63
Income				
Under $20K	18	28	25	35
$20K-$30K	27	34	42	53
$30K-$40K	40	40	49	54
$40K-$50K	47	52	60	71
$50K-$75K	48	58	67	80
$75-$100K	67	70	82	82
Over $100K	68	82	85	88
Educational Attainment				
High School Grad	31	34	40	52
Some college	47	58	66	71
College +	62	70	79	83
Age				
18-29	55	63	70	77
30-49	50	59	69	72
50-64	38	40	50	61
65+	13	15	19	30
Race/Ethnicity				
White (not Hispanic)	42	48	57	65
Black (not Hispanic)	31	40	43	46
Hispanic (English Speaking)	41	47	56	68
Community Type				
Non-rural	45	50	59	67
Rural	25	31	38	46

Sources: 2006 data from the Pew Internet Projects survey February 15-April 6 survey;
2007 from the March survey, 2008 from the April-May survey and 2009 from the April survey.

Though progress is being made, there continues to be evidence of a digital divide across the nation.

With the ongoing lag in Broadband deployment, persistent digital divide disparities and efforts by the telecommunication industry to protect their monopoly power, many communities have investigated the possibility of making these advanced ICT investments on their own behalf. One early advocate of community Broadband efforts, Baller-Herbst Law, has been actively involved in a number of state and federal legislative battles over government restrictions on public investment in advanced networks. Tracking these policy battles over time documents that municipally-led investments are diverse in terms of the scope of their ownership, funding and service expectations (http://www.baller.com/comm_Broadband.html). However, many are of a public/private nature and may reflect an understanding and appreciation of the perceived economic and social development potential of such investments.

Municipalities with locally-owned municipal electric utilities are, probably, more likely than other municipalities to take local initiative and serve as early adopters of advanced cyber-infrastructure projects. Such municipalities can often justify investments in network infrastructure (fiber optic routes, routers, and switches) simply to reduce the cost of providing cost-saving internal-to-the-utility administrative services (e.g. automated meter reading, internal communications, and system controls). Ford (2005) argues that for most Florida communities these investments have often been undertaken only after a direct request for high quality service provision was denied by incumbent providers. Although, once these investments are made, a case can often be made for leveraging these public investments to exploit scale and scope economies associated with converting the closed internal network to a public open network.

Even though an argument can be made for some municipalities to make such investments, there are several factors that seem to affect the probability of municipalities taking local initiative on such telecommunications infrastructure projects. Gillett, et al. (2006) describes these factors as geo-demographics, the regulatory framework, competition, and internal infrastructure. Geo-demographic factors center on the demographics that shape demand (e.g. income and education levels) as well as those that influence the cost of providing services (e.g. population density, proximity to metropolitan areas). The regulatory framework centers on the existence of or lack of state-level policies that might hamper or encourage municipal provision of telecommunications services. Among other things, traditional private sector providers have lobbied for the promulgation of policies that create supposed "level playing fields" between private and public providers. Notwithstanding attempts at the federal level to negate state level policies restricting the entry of municipalities into the telecommunications service market, a host of state-level policies exist across the country. [30] These state laws have often been created at the request of the telecommunications industry to erect barriers to entry against municipalities as well as other providers.

Figure 4.1 illustrates that in 2010 eighteen states had some type of policy restriction concerning municipal involvement in advanced ICT infrastructure projects. This map documents the range of these restriction; from explicit bans on any direct or

[30] Baller-Herbst Law group at www.baller.com keeps an up to date list of restrictive state policies and links to the specific legislation within the state.

indirect municipal provision of telecommunications services to procedural and accounting mandate; many of which are substantive barriers to entry. Moreover, this policy environment is not static and continues to change each year. In 2005, 14 state legislatures across the U.S. sought to impose new barriers to municipal investments in ICT initiatives (Swirbul, 2006). Incumbent cable and telephone companies often fought to ensure the passage of this legislation, but in 2005 only one state,

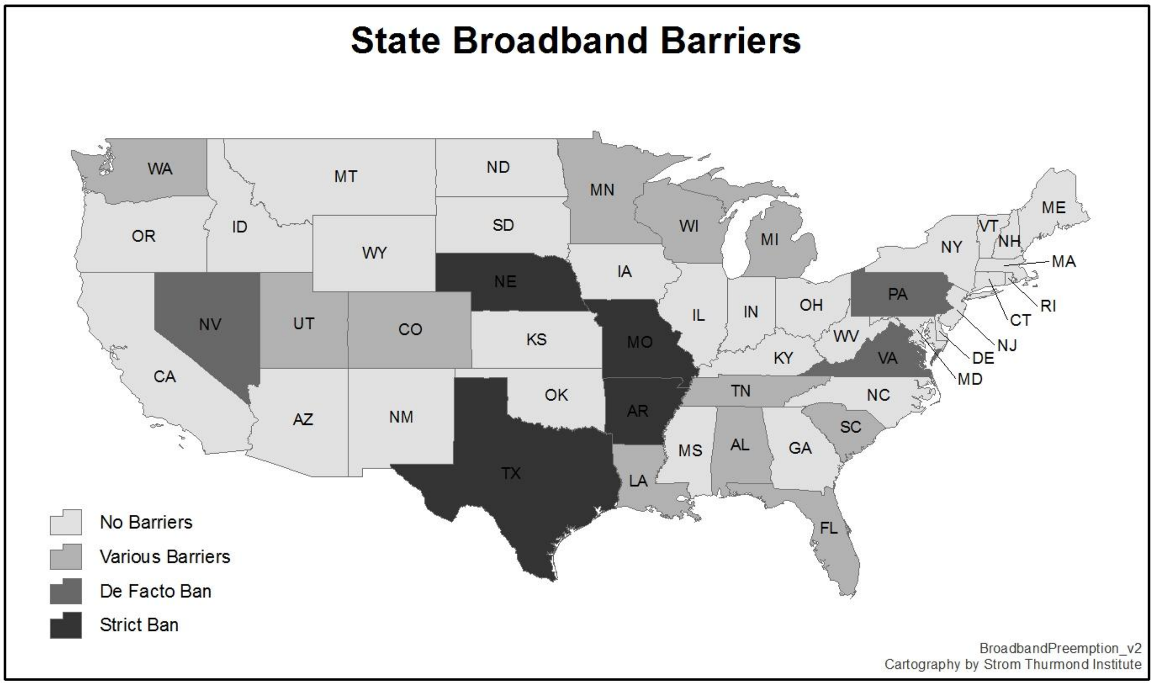

Figure 4.1: State Policy Restrictions to Local Involvement in Advanced ICT Infrastructure.

Source: Mitchell, M. (2010). *Breaking the Broadband Monopoly.* Minneapolis, MN: The New Rules Project.

Nebraska, saw the passage of new barriers to municipal ICT investment. The 2010 legislative cycle saw newly proposed restrictive legislation in North Carolina and in 2011 South Carolina saw proposed amendments to already existing restrictive legislation. While neither piece of legislation passed, both of these legislative efforts would have put additional constraints on local involvement in advanced ICT projects. A brief summary of the restrictive policies in each of the eighteen states are provided in Appendix three. Overall, the unique policy environment of each state, along with Federal telecommunications policy and regulation, appear to constrain the ability of communities to create locally driven solutions for their advanced ICT infrastructure and service needs.

Advanced ICT and Utilization by Small and Medium Sized Enterprises (SMEs)

There is an implicit assumption in the idea that advanced ICT investment is a critical factor to the entrepreneurial, innovative economy and that SMEs will adopt and use this technology in productivity-enhancing ways. Within the last few decades, technology in general has dramatically transformed the way businesses are created, managed and operated (Keen and McDonald, 2002). Advanced ICT service and applications are critical variables in relation to the transformative potential of technology. Rayport and Sviokla (1996) argue that today firms almost inhabit two worlds; a virtual, "Internet" world and the physical, tangible world of "days gone by." Broadband technology has the potential to generate a wide range of benefits for all sizes and types of firms. For SMEs in particular this technology can provide access to customers and markets never before accessible (Ritchie and Brindley, 2000; Quayle, 2002; Raymond, 2001; and Vescovi, 2000). This may allow firms to increase the scope of their marketing efforts and improve existing marketing techniques (Sparkes and Thomas, 2001). The networking potential of this technology can provide SMEs with greater access to supplier networks and potential business partners. Poon and Swatman (1999) document this technology's ability to improve business relations of business partners in SME firms.

With the potential to generate substantial benefits there is increasing pressure on SME firms to fully adopt and utilize this technology (Spurge and Roberts, 2005). The European Commission (2002c) upholds that SME's use of e-business applications is "critical" to the EU nations being full participants in the entrepreneurial, knowledge economy. Taylor and Murphy (2004) see SMEs as the crux of the new economy because they can be substantial innovators, buyers of technology, and ultimately the creator of new jobs. As national and state governments proclaim the importance of this investment for SMEs and the economy at large, Standford (2005) indicates that the majority of SME's have not made Broadband central to their operations. As well, there are ongoing questions regarding the most effective methods for SME's to leverage this technology (Southern and Tilley, 2000). Different sizes and types of firms will also use this technology differently (Buckley and Montes, 2002; Taylor and Murphy, 2004). Moreover, some of the hardware and software applications necessary for the effective leveraging of this technology may be out of reach financially for SME's or may require economies of scale in use that SME's do not have, unless they find appropriate mechanisms to work cooperatively.

Theoretically, advanced ITC resources can be used to enhance the competitive and strategic position of any size firm (King et al. 1988). Barkley et al. (2007) document over thirty e-commerce case studies briefly summarizing the uses of and barriers to E-commerce activities in SMEs. Markley et al. (2007) further describe twenty-five short case studies of rural E-commerce utilization, barriers, and possible best practices. Barker (1994) has identified the following categories as best uses of Broadband technology for small businesses.

- Enlarging a firm's customer base and general geographic reach
- Improved access to information for marketing and advertising
- Improved and reduced cost of firm communications
- More productive communications and improved access to suppliers and customers
- Opportunity to improve supplier and customer support networks
- Developing new sources for markets and business ideas
- Expanding opportunities for networking

Fuller and Jenkins (1995) confirm similar categories from their research of small firms in the UK. Time and resources are often the major constraints for SME's. This technology allows SMEs to use less time and fewer resources to gather and disseminate a larger selection of information. Poon and Swatman (1995) argue that advanced ICT provides opportunities for SMEs to interact with a much broader range of suppliers and customers. Several studies document the importance of E-commerce activities as a marketing method and tool for enhancing market access (Adirondack North Country Association, 2005; Cordeiro, 2003). Moreover, in a globalized marketplace research confirms the importance of this technology in extending the global reach of small businesses (Dent, 1990; Welsh and Cummings, 1991).

Several case studies have documented that many small firms, especially those in rural settings, do not experience a significant increase in revenues due to increasing online sales (Cordeiro, 2003; Papandrea and Wade, 2000). Cordeiro's (2003) case study of a small retail firm notes that on-line sales are generally not high-profit margin sales. Thus, on-line sales do not yield the same profit margins as in-store sales. This could be a dilemma experienced to a greater degree by retail firms as customers may need to see, touch and/or try on an item before they purchase it. However, Papandrea and Wade (2000) reveal that firms may experience costs savings in document and information delivery and may experience lower transaction costs in establishing contact with potential customers.

A considerable body of research has documented the importance of small business networks or cooperative alliances as it relates to firm success and growth (Curran et al., 1993; Furukawa et al., 1990; Golden et al., 1993; Johannisson, 1987; Stephenson and Duncan, 1993; and Yarnell and Peterson, 1993). The internet expands the geographic reach of these networks with the creation of "virtual alliances." These groups can trade and share information, develop cooperative research and/or advertising efforts, create supplier and/or customer networks across an industry, along with many other possibilities. Alliances that span international boundaries have the potential to enhance market and information access in ways that dramatically improve small firm competitive advantage at only a fraction of the cost. Several case studies also document the importance of the network characteristics of regional e-commerce networks on small firm success (Adirondack North Country Association, 2005; Henderson, 2001). The idea of forming regional e-commerce alliances borrows from research on network economics and the idea that networks, properly leveraged, can improve firm scale economies. Participation in these networks may theoretically assist firms in their adoption and use of this technology in such a way that they fully capture the benefits it can provide. While identifying potential best uses of Broadband technology for small firms is important, confirming the adoption and use of the technology is a critical pre-requisite to its use. If SMEs are not adopting and/or using advanced ICT applications and services then identifying best uses is an exercise in hypothesis building. Moreover, there continues to be ongoing questions as to how SMEs are engaged in the adoption and use of this technology.

A 2002 study by Buckley and Montes for the Economics and Statistics Administration documents how SMEs in the United States are using advanced ITC tools and applications. Overall, 70 percent of SMEs use computers in their businesses. They spend approximately one-quarter of their capital expenditure budgets on computers and communications technology. SMEs and large firms spend roughly the same percentage of their investment budgets on this technology, but SMEs spend less on a per employee basis. In 1998, firms with more than 500 employees spent 4 times as much as firms with 100 or fewer employees. Dun and Bradstreet (2001) report that over 80 percent of small firms with 25 or fewer employees have computers in the workplace and approximately 70 percent have Internet connectivity. Table 4.3 below reports Internet access among manufacturing plants by employment size categories in 2000. This data confirms the trend that small firms are less likely to have internet access in relation to larger firms but that overall Internet penetration across firms is high.

Table 4.3: Internet Access for Manufacturing Plants, 2000 (Percent)

Employment Size	**Percent With Internet Access**
1-4	47.1
5-9	52.1
10-19	64.7
20-49	76.2
50-99	84.9
100-249	91.5
250-499	94.1
500 +	94.9
Total	83.9

Notes: Data for the 38,985 manufacturing plants responding to the survey. This is a plant- level survey and is not comparable with firm or company level data; a give firm may own multiple plants. The Annual Survey of Manufactures (ASM) uses a probability-proportionate-to-size sample design that results in a sample primarily comprised of larger manufacturing plants. While a number of small plants are included in the ASM, the number is disproportionately small in comparison to the entire manufacturing population. Thus, these comparisons are suggestive, but not definitive. Detail may not add to total due to rounding.

Source U.S. Bureau of the Census, çE-Stats Manufacturing 1999 and Mid-2000é, Table 7, June 8, 2001 (http://www. census.gov/estats).

Research on how SMEs use advanced ICT reveals a wide spectrum of intensity and type of use. Moreover, technological use depends upon both the size and type of firm represented. For example, manufacturing firms of all sizes have a long history of using computer networks for sales and operations (Buckley and Montes, 2002). Varian et al. (2002) report that large firms have been faster to adopt more advanced business solutions like supply chain management and other integrated solutions. However, this research confirms that firms of all sizes use the Internet for a variety of business activities, including marketing, human resource management, finance and accounting, and customer service and support. Dun and Bradstreet (2001) find that 27 percent of small firms (1-25 employees) use the Internet for sales and 44 percent use the Internet to purchase business supplies and inputs. A study in the same year by the National Association of Purchasing Managers (NAPM)/Forrester Research finds that small firms were only in the very early stages of adopting and using Internet tools for sales and online purchasing.

The European Commission (2002c) provides evidence of similar advanced ICT adoption and use trends across Europe. Table 4.4 illustrates SME uptake of both technology and e-business applications. Similar to U.S. figures, the majority of EU SMEs are likely to use ICT and have Internet access. However, considerably fewer EU SMEs are likely to use e-business applications of this technology. Taylor and Murphy (2004) report that these numbers are considerably overstated for the UK. Foley and Ram (2002) report that for UK small and micro firms less than six percent of the value of firm orders and purchases are made online. Given the low application use rates of UK small firms, Taylor and Murphy question how widespread both technology uptake and e-business applications are across other nations.

Table 4.4: SME e-business adoption rates in 2001 – selected countries

SMEs (%)	**UK**	**Austria**	**Sweden**	**Italy**	**Nether-lands**	**Norway**
Using ICT	92	92	96	86	87	93
Web access	62	83	90	71	62	73
Own Website	49	53	67	9	31	47
Making e-commerce purchases	32	14	31	10	23	43
Making e-commerce sales	16	11	11	3	22	10

Source: European Commission, 2002c, p. 4

As this research has evolved it has become evident that there is not a simple linear relationship between the level and type of ICT adoption and firm size. Moreover, it is well documented that SMEs are very diverse. SME firms will also have very different needs for technology and related applications. With this said, research has documented a number of general barriers to SME adoption of advanced ICT (Dixon et al., 2002; The European Commission, 2002c; and Buckley and Montes, 2002).

- The initial costs to set up systems and the ongoing maintenance costs may be perceived as too high for these firms or may not be cost-effective for firms to manage in-house.
- SMEs do not have the ability to quickly change existing IT investments. Adopting new and more innovative business solutions requires that any technology changes work within an existing IT framework.
- Many SMEs do not have the staff to properly implement and/or manage advanced ICT resources.
- There are ongoing questions of security and privacy with Internet sales and purchases.
- Many SME firms are not fully aware of the potential costs savings and productivity benefits that this technology and its applications could provide.

Even those firms that have adequate technology in place often do not have the proper skills or level of engagement with the technology to fully leverage its use (Spurge and Roberts, 2005; Taylor and Murphy, 2004).

Survey research of SMEs in the UK identifies training and skill gaps as significant barriers to the widespread use of advanced ICT. Taylor and Murphy (2004) support the conclusion that current advanced ICT uptake is rudimentary when compared against larger firms. The National Federation of Small Business indicates that SMEs may not be at a competitive disadvantage if they have little or no business-to-business commerce activities (cited in Standford). The cost/benefit of making these investments may not be prudent for many SMEs.

In conclusion, research reveals that the majority of SMEs have not fully leveraged advanced ICT technology. If this is the case, it is questionable whether state level restrictions on investments in municipal ICT infrastructure and/or service will impact state level small business and entrepreneurial activity. The argument can also be made that if advanced networks are built and access to service is enhanced, residents and businesses will demand these services. This is a “build it and they will come” philosophy, not unlike Say’s Law, where supply creates its own demand. What is certain is that SMEs will not be able to leverage advanced ICT tools and applications if the networks are not in place. Moreover, the implementation of this infrastructure is influenced by local, state and federal policy measures.

Overall, given the diversity of state small business environments, entrepreneurial activity, economic and policy climates, and other demographic characteristics, clarifying these relationships between state telecommunications policy variables and state small business and entrepreneurial activity remains an important area of research and one that is pursued in the remainder of this publication. The following section reviews the mixed methods approach used in this research to clarify the impact of state telecommunications policy restrictions on local investments of advanced telecommunications infrastructure and ultimately on state small business and entrepreneurial activity.

Methodology

This research uses a mixed methods approach to document the potential impact of state level restrictions on municipal Broadband investments. To lay the groundwork for this analysis, we begin with a brief description of the legal and policy environment surrounding municipal ICT investments in South Carolina. This is followed by a summary of the results from a series of interviews with representatives from South Carolina state and regional organizations that are knowledgeable about these issues and their potential impact on municipalities. Next, a survey was employed to develop a case study of the potential impact of these restrictions and the perceived importance of this technology to South Carolina cities that have their own electric utilities (electric cities). Finally, a national, state-wide data base for the years 1997-2005 was created to test the hypothesis that state level ICT restrictions impact state level small business and entrepreneurial indicators. Overall, this mixed methods approach highlights important ICT related issues across organizations, local governments, and state governments more generally. The lessons learned are varied and will be discussed in the results to follow.

South Carolina Telecommunications Legal and Policy Environment

South Carolina is an interesting case study of the potential impacts of state policy restrictions on local and regional technology investments. South Carolina has many of the characteristics (rural, poor, high percentage of minorities, elderly) that make the digital divide a very real issue. In addition, South Carolina has a complicated legal and policy history surrounding municipal involvement in ICT investments. To date, only a small number of municipalities have attempted to make advanced telecommunications investments across the state, though many communities continue to express interest in making investments that would enhance their community's access to high-quality, high-bandwidth competitive telecommunications service[31].

The slow pace of ICT infrastructure investment and deployment in South Carolina originates, in part, with a South Carolina Supreme Court case that dates from the early 1990s. The City of Orangeburg, South Carolina chose to pursue building and offering its own public cable service after numerous consumer complaints over quality and service of the local franchised monopoly. As the city pursued its plans, the local cable company sued the city. The city claimed it had the right to build cable infrastructure and offer cable service under Articles eight and sixteen of the state constitution, claiming that local municipalities "may acquire or purchase and operate gas, water, sewer, electric, transportation, or ***other*** public utility systems and plants upon majority vote of the electors (South Eastern Reporter, 1994, p.602)."

The lower court decision held that a local, public referendum could be held to determine whether this local investment could be made. On January 28, 1992, a public referendum on the issue was held and a majority of citizens voted to *authorize* the City of Orangeburg to construct, purchase, and operate a cable television system. Even with overwhelming local support, the local cable company continued to pursue a legal case against the city. The case went to the South Carolina Supreme Court where a decision in

[31] Most recently Oconee and Orangeburg Counties received federal stimulus funds to improve service and access to rural communities in the region. However, incumbent providers have called on the state legislature to increase policy restrictions, which threatens the viability of these projects.

favor of the local, incumbent cable company resulted. The SC Supreme Court argued the enumerated utilities described in Article eight and sixteen are of the same general kind or class of utilities that provide essential services to the public.

> "We do not believe that the value and necessity of cable television is so self-evident that this court should declare that cable television system provides an essential service…moreover, we do not find that the supplying of cable television is necessary for the security, general welfare, and convenience of the municipality or for preserving health, peace, order, and good government as required by section 5-7-30 (South Eastern Reporter, 1994, p.602)."

The court effectively decided that providing cable services was not within the purview of municipal service provision. As a result, this ruling left many communities cautious of using Articles eight and/or sixteen to justify the provision of additional public services outside those explicitly outlined in South Carolina law and currently provided by municipalities.

In addition to the Orangeburg case, the South Carolina 2001-2002 legislative session saw the passage of what has come to be referred to as "level playing field legislation." Specifically, this legislation broadly regulates telecommunications provision by any South Carolina state or local agency, excluding the State Budget and Control Board. The definition of provision is broadly interpreted as:

> Any state or local political subdivision or person or entity providing telecommunications service to the public for hire over a facility, operation, or system that is directly or indirectly owned by, operated by, or a financial benefit obtained by or derived from, an agency or entity of the State or any local government. (South Carolina Legislature Online, Session 114 (2001-2002), S1151).

- Key features of this legislation indicate that a government-owned communications provider must:

- Be subject to the same local, state, and federal regulatory, statutory, and other legal requirements to which nongovernment-owned communications service providers are subject to

- Not receive a financial benefit for which a nongovernment-owned communications service provider is not a recipient

- Not be permitted to subsidize the cost of providing a communications service with funds from another communications service, operation, or other revenue source.

- Impute, in calculating the cost incurred and in the rates to be charged for the provision of a communications service, the following: cost of capital component that is equivalent to nongovernment-owned communications service providers in the same state or locality; and an amount equal to all taxes, licenses, fees, and other assessments to a nongovernment-owned communications provider. (South Carolina Legislature Online, S483, http://www.scstatehouse.gov)

Amendments to this legislation were proposed in the 2011-2012 legislative session. The amendments increase existing barriers to municipal provision of advanced telecommunications service and make the applicability of the legislation broader by replacing the word "telecommunications" with "communications" throughout the entire law. The kinds of financial benefits that municipal providers are precluded from receiving include tax exemptions or government subsidies of any kind. As well, if the state determines that a direct or indirect subsidy has been applied, the government telecommunications provider is required to change the pricing structure such that there is no effective subsidy. The original legislation and its current amendments also place substantial constraints on publicly-owned telecommunications providers in the collection and payment of taxes. As an example, government owned providers are mandated to pay all property taxes, including property that would otherwise be exempt, if it is utilized in any manner towards the provision of telecommunications services. This legislation has sparked widespread criticism that South Carolina's level playing field legislation effectively blocks municipal provision of telecommunications services. The argument can be made that similar burdens are not applied to local governments in the provision of public services like police, fire, or education; all services where private sector alternatives exist. As well, it begs the question of what benefits or advantages should be allowed for public goods and/or services that are argued to be important for the ongoing economic development of regions. Finally, similar restrictions on cross subsidization of private sector enterprises are not suggested or enforced, leading many to question just how level the field is between private and public sector enterprises with this legislation in place.

Between the Orangeburg Supreme Court case and more recently, the level playing field legislation, South Carolina's municipalities face considerable constraints in any effort to pursue public involvement in ICT infrastructure investments. Anecdotal reports from officials across the state seem to be in agreement that the Orangeburg case was a defining moment for municipalities in determining the types of services that cities could deliver (Dickes and Lamie, 2007). This court case appears to have instilled a sort of "chilling effect" on the willingness of municipalities to engage in projects that are not explicitly defined as within their legal purview.

Local Interviews

In the fall of 2007 several interviews were conducted with representatives from the Municipal Association of South Carolina (MASC) and the Piedmont Municipal

Power Association (PMPA). These agencies were chosen because of their extensive recent and historical contact with South Carolina municipalities on ICT issues. These representatives confirmed that many municipalities across the state remain concerned with the legal ramifications of any municipal involvement that is not already a well-defined municipal activity. In addition, representatives from MASC uphold that for the smallest communities across the state, ICT infrastructure investment is not a priority. Further, there are ongoing questions concerning how best to leverage and deploy this technology given the uniqueness of each community and region in the state. The variance among communities inhibits the direct replication of telecommunications solutions across communities.

Representatives of both the PMPA and MASC emphasized that a large part of the public policy problem is that there is not a “one size fits all” strategy for local Broadband access. With a diversity (size, economics, infrastructure, geography, etc.) of communities across the state, policy proposals that attempt to standardize technology policy are, according to the PMPA executive, doomed to failure. Thus, the state must have a better understanding of different policy options that can work across a range of communities. Further, the rapid pace of technological change makes it imperative that state and local leaders begin to clarify and resolve any barriers that currently exist for local and regional participation in ICT infrastructure investment.

A Survey of South Carolina Electric Cities (MEUs)

In South Carolina, very few cities state have engaged in any component of a municipal Broadband project. Those that have are one of the twenty-one [32] electric cities[33]. Electric cities (Gillett et al., 2006) can often make these types of investments more efficiently as they already have much of the physical infrastructure and staff expertise in place to do so. To date, the most comprehensive municipal project is a community that built out a network for its own municipal use and is not providing, nor planning on providing access to non-municipal customers (households, institutions, businesses). At the time of this survey, the researchers were aware of one small city that was able to deploy a local Wi-Fi network as part of a downtown revitalization program and another that began the planning phase for a community Broadband network but has not gone any further with this effort. A number of other cities have tried to get involved in municipally led Broadband, but to date no city has been successful in planning, building, and/or deploying a community network. More recently, after this survey was conducted, both Orangeburg and Oconee Counties received federal Broadband stimulus funding to deploy advanced networks. Orangeburg County received $18.65 million and Oconee County received $9.6 million to improve access and service to rural residents, emergency and law enforcement services, healthcare facilities, and other community institutions across these counties (Chandler, 2010; Sarata, 2010). However, the nature of the state telecommunications policy environment threatens the viability of these and other projects.

Given the purported nature of the South Carolina political climate for municipal

[32] The 21 electric cities are Abbeville, Bamberg, Bennesttsville, Camden, Clinton, Due West, Easley, Gaffney, Georgetown, Greenwood, Greer, Laurens, McCormick, Newberry, Orangeburg, Prosperity, Rock Hill, Seneca, Union, Westminster, and Winnsboro.

[33] Electric cities are municipally owned and operated, not-for-profit, electric suppliers.

investments in ICT projects, a survey instrument was developed to learn more about local municipal and utility leaders' experiences with ICT planning and investments. The survey had three primary objectives: first, to clarify which communities were participating in ICT projects and to what degree; second, to gain an understanding of the perceptions of local leadership with respect to the political climate surrounding ICT investments; and finally, to ascertain how local policymakers view the relationship between ICT investments and community and economic development.

The survey instrument was sent to South Carolina local municipal and utility leaders of the ten electric cities represented by the Piedmont Municipal Power Association (PMPA). An online survey platform, QuestionPro, was used in place of a traditional mail survey. An initial cover letter was e-mailed to a list of twenty-three municipal and utility leaders from the ten electric cities.[34] This was followed approximately a week later by a reminder email. [35] Out of the original twenty-three leaders surveyed, fourteen individuals (61%), from nine of the ten electric cities, responded to the online survey.

The nature of much survey work lends itself to questions of selection bias. With this topic, it could be argued that those with prior interests in ICT issues will be more likely to respond. However, the goal of this analysis is not to generate a random sample of responses but to build a case study of results from informed local representatives. Thus, the notion that individuals will self-select to complete the survey because of their

[34] This list was comprised of municipal utility directors and executive managers of the municipalities. The list was provided by PMPA.
[35] Several browser compatibility issues were brought to our attention by survey participants, which resulted in an additional follow-up email and reminder to all participants approximately two weeks later.

interest in ICT issues is potentially beneficial. This has the potential to allow for a more complete understanding of the issues that these communities face with regard to ICT investments and state level restrictions. It can also be argued that these individuals may have a much stronger bias and thus, their responses are potentially influenced by a specific policy bias. This is plausible but it is also true that if responses come from generally more knowledgeable individuals with regard to communication and technology issues, coupled with an effective survey instrument, a strong case study can be developed that enhances our understanding of the impact of state level ICT restrictions on cities and regions.

The first objective of the survey was to clarify which communities were participating in ITC projects and to what degree. Several interesting conclusions can be drawn from these questions. Over sixty percent of respondents revealed that their city does not have an ICT master plan. When asked if ICT development efforts were included in other areas of city planning, there was considerable uncertainty where, if at all, ICT planning and development would be included. Figure 4.2 illustrates where survey participants identified ICT planning and investment in community planning efforts. A few local leaders indicated they recognize the importance of ICT planning in relation to their communities' overall planning efforts, but specific local planning with respect to deployment or service provision of ICT investments is rare. From this sample, only two communities indicated that they were actively engaged in any aspect of locally-initiated ICT projects.

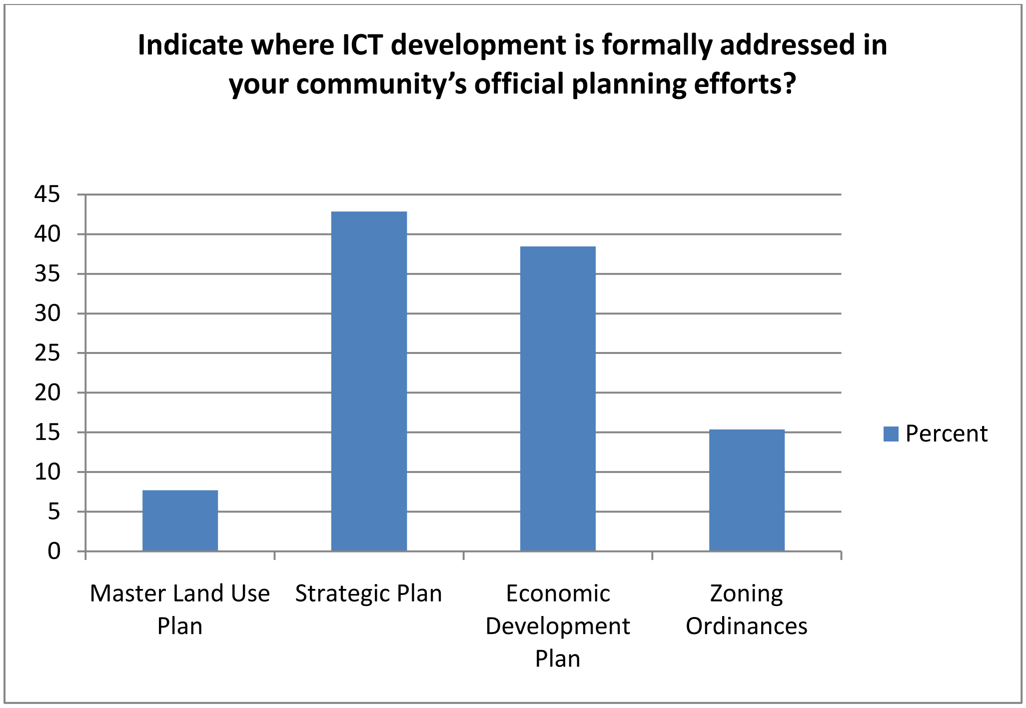

Figure 4.2: Community ICT Planning Efforts

Communities that have undertaken any type of ICT project, or that were seriously considering a community project, indicated that the primary motivation for these efforts was the effective provision of a public service. Other reasons given for community involvement in ICT infrastructure investment included local economic development initiatives, provision of a key government service, increase the regional/national competitiveness of the community, and the lack of adequate private sector provision. In a separate question, survey results also reveal that the majority of participants believed ICT investments are important for the future development of local community sectors. The vast majority of respondents indicated that ICT investments were either critical or very important to the future of their main street/small business environment, their industrial/large business environment; and for the government, health, and education sectors of their communities. In terms of specific economic development areas, approximately three-quarters of respondents indicated these investments as important or very important for improving new business recruitment efforts, increasing employment opportunities and enhancing workforce development skills and training. Appendix Four includes data tables for each of the above questions.

One of the hypotheses considered for this analysis is that the political climate in South Carolina is such that local policymakers have been conditioned to view issues related to ICT investments as beyond their local purview. However, the majority of respondents strongly support the idea that ICT planning and implementation is within the purview of local community responsibilities. If this is the case, and if communities remain underserved with advanced ICT as many say they are, what are the constraints to local ICT planning and investment opportunities?

Figure 4.3 highlights the barriers that respondents identified as the most significant obstacles to local community participation in ICT planning and investment. The fact that funding and alternative city projects were the most significant constraint confirmed earlier responses from PMPA and MASC representatives. These representatives noted that many small communities do not have the appropriate resources for locally driven ICT investments and most have other city projects that are considered a much greater priority. For example, many communities do not have ICT staff even for city functions and thus would be unable to accommodate the demands of a municipally driven ICT project. As well, many communities have water, sewer or road projects that always take priority over a variety of other projects, including technology projects. As local government resources are increasingly scarce, this does not bode well for un-served or underserved communities across the state.

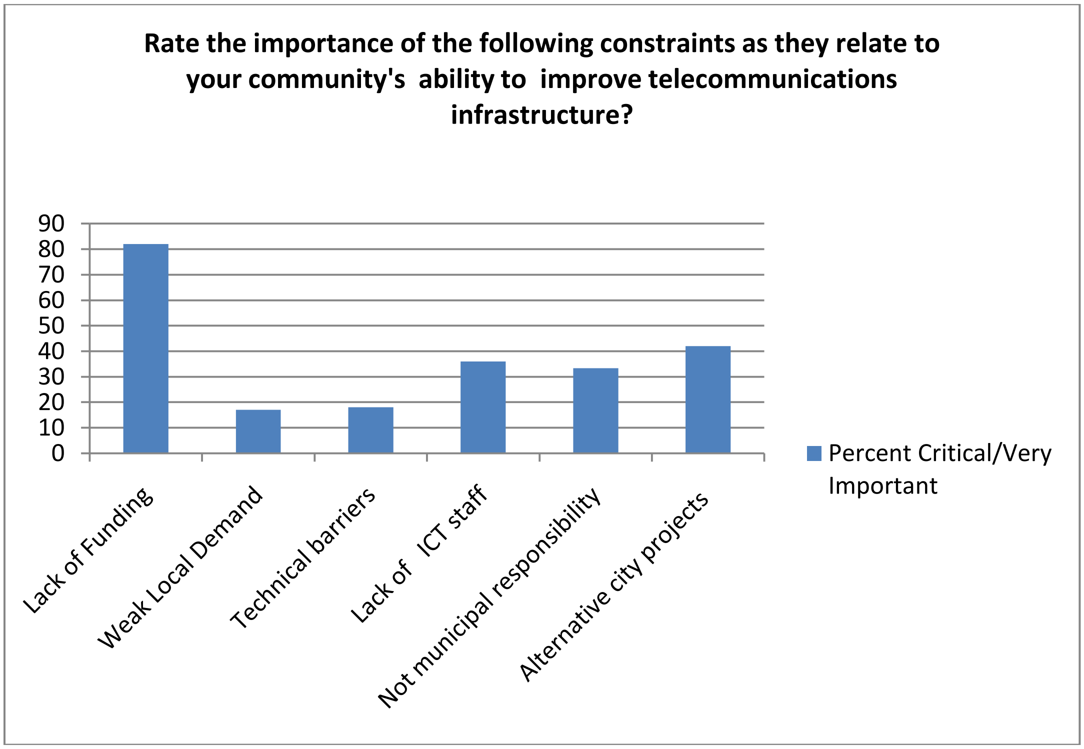

Figure 4.3: Critical or Very Important Barriers to Municipal Involvement in ICT Infrastructure Investments

One of the related hypotheses of this analysis is that local communities interested in these issues may face substantial pushback from incumbent local providers. Approximately one-third of respondents indicated that local opposition to local government involvement in a community ICT project was moderate or strong. This opposition originated from a local telephone company and a local cable company. This type of opposition is challenging for small communities, as these providers are often positioned as entrenched, exclusive gatekeepers in the provision of this key service.

These providers often have the advantage of political influence that allows them to discourage or even block municipalities from entering this market.

One respondent used the open-ended response section to comment on the political barriers of local ICT infrastructure investments. This respondent indicated that the political dynamic in dealing with local incumbent providers was a powerful barrier for local community involvement in these issues. Another respondent revealed that effective cooperation between government entities was a primary barrier to ICT investments, while another indicated that a lack of knowledge by state legislators was also a significant barrier. Finally, two participants mentioned that a lack of public knowledge and/or awareness of these issues were potential barriers.

While this survey provides only a limited sample from which to analyze the stated survey objectives, it does provide insight into these issues and further, provides a useful foundation from which to do additional research. Further, the survey begins to answer and clarify the three primary objectives laid out earlier in this section. This sample reveals that municipal leaders recognize the importance of ICT planning efforts and, in a few cases, have been involved in the implementation or deployment of this service to enhance local development and services. Additionally, the majority of respondents see value in ICT investments as they relate to community and economic development. The results also reveal that several communities feel constrained by ongoing questions concerning the purview of municipal responsibility with these issues. Overall it appears that funding constraints and the uncertainty surrounding the political and legal climate of municipal ICT investments creates a disincentive for communities that are interested in undertaking ICT investments.

In conclusion, while these survey results have only shed partial light on the ICT situation in South Carolina, it does begin to provide insight into the kinds of issues that cities may face if they involve themselves in advanced ICT projects. Furthermore, these results generate important questions for future research. Given the paucity of municipal ICT projects in the state, the development of municipal ICT case studies could provide a more complete understanding of the complexities and nuances specific to different communities across the state. Additional case studies could allow for generalizations that would be instructive for state and local policy, eventually leading to a better decision-making environment for other communities across the state. In addition, state-wide comparisons of the breadth and scope of municipally led ICT projects could allow for a more detailed quantitative analysis of community and state characteristics that drive locally driven ICT investments.

There is considerable room for additional quantitative analysis surrounding a broad range of issues within the telecommunications policy environment. One area of research that is important for further exploration is the nature of these investments as a pre-requisite to full participation in the knowledge economy. If advanced ICT infrastructure is a necessary, but not sufficient input for full participation in an entrepreneurial, innovation-focused economy, then it is plausible that a lack of these investments or barriers to these investments could hinder local and state economic activity. The next section of this research begins to explore this hypothesis with a series of state panel regressions testing the impact of state ICT policy restrictions on a variety of state small business and entrepreneurial variables.

Cross Sectional/Panel State Regression Model

The empirical structure of this research is a series of panel regressions of state business, economic and demographic parameters measured against state small business and entrepreneurial activity. The analysis uses publicly available data for all fifty states from 1999-2007 (excluding 2005[36]). Six dependent variables are examined to increase the robustness and reliability of the results; the number of new companies, the change in the number of new companies, new business job growth, technology industry employment, the proceeds of initial public offerings, per 1000 firms within a state, and the number of patents.

One of the ongoing dilemmas in entrepreneurship research is a lack of agreement concerning defining and measuring entrepreneurship. Researchers have used measurements like sole proprietorships, new businesses, patent activity, technology companies, and other measures of innovation. One of the ongoing questions concerns which variable best represents the entrepreneurial, innovative climate that research is often trying to capture. With this in mind, this analysis makes use of both traditional Small Business Administration measures like new business startups along with arguably more innovative measurements represented by patent activity, technology industry employment, and IPOs.

The new company variable is measured by the U.S. Small Business

[36] The majority of data came from the Center for Enterprise Development’s, Development Report Card for the States. There was no Development Report Card in 2005 and thus, too many variables would have been missing in an analysis of 2005.

Administration as the number of companies applying for new employment identification numbers, per 1,000 workers in a given year. Change in new companies is measured as the percentage change in the new company variable from one year to the next. Also measured by the U.S. Small Business Administration, new business job growth is calculated as the annual number of jobs per new establishment with fewer than 500 employees. These dependent variables capture elements of small business activity and job growth but may not capture elements of a high-growth, entrepreneurial, innovative activity.

Technology industry employment, proceeds of initial public offerings, and the number of patents each may provide insight into the nature of entrepreneurship and innovation within a given state. The Bureau of Labor Statistics calculates technology industry employment as a percent of the total wage and salary jobs in high technology industries in a given year. Technology industry jobs are those that fall within specific NAICS codes defined as high technology industries. Proceeds of initial public offerings per 1000 firms within a state, in a given year come from Thomson Financial Securities Data. Patents are measured by the U.S. Patent and Trademark Office as the number of patents issued per 1 million population in a given year. Summary statistics for all dependent variables are provided in Table 4.5.

The causal links of entrepreneurial activity have been explored in a wide body of research. Individuals become entrepreneurs and create new firms for different reasons and under many different circumstances. There is evidence that entrepreneurial decision making is influenced by the state and local policy environment, the local and regional

Table 4.5: Summary Statistics for Dependent Variables

Variables	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
Number of New Companies	6.3890825	1.936310443	3.149	13.77
Change in Number of New Companies	408.0	10.83700845	-28.9	87.37
New Business Job Growth	2.137175	48.46213398	-1	484.5
Technology Industry Employment	28.30025	3.063270364	0.02	11.72
IPO Proceeds	4.3168	3144.761751	0	23847.45
Number of Patents	954.62615	210.9962874	43.48	1399.56

Source: Corporation for Enterprise Development, Development Report Card for the States, 1999-2007 (excluding 2005), www.cfed.org.

business climate, formal and informal networks, and local and regional financial infrastructure among other things. As a result, a broad set of thirty-two continuous and seven discrete independent variables were chosen for inclusion in this analysis. These variables are divided into six primary categories; employment, wages and income, demographics and equity, education, measure of innovation, and business climate. The following section describes how each variable was measured and its source.

All of the employment variables come from the U.S. Bureau of Labor Statistics. Long-term employment growth is measured as the percent change in annual average employment, by place of residence, over the preceding ten years. Short-term employment growth is the percent change in annual average employment. The unemployment rate is the annual average, state unemployment rate.

Average annual pay and average annual pay growth both come from the U.S. Bureau of Labor Statistics. State average annual pay is measured in thousands of dollars for all workers covered by unemployment insurance, by location of establishment. Pay growth is measured as the percent change in annual pay for all workers covered by unemployment insurance, by location of establishment. Median income comes from the U.S. Bureau of the Census and is measured in thousands of dollars.

The percent of business closings comes from the U.S. Small Business Administration and is measured as the annual rate of firm terminations in a state. The variables, working poor, population density, net migration, poverty rate, homeownership rate, and the percentage of businesses offering health care benefits all come from the U.S. Census Bureau. Working poor is calculated as the percent of household with at least one person working whose combined income is not more than 150% of the poverty line. State population density is calculated as the number of people per square mile and net migration is net domestic migration, per 1,000 people. The poverty rate is measured as the percent of the state population living in households with incomes below the poverty level. The homeownership rate is the percent of families in a state that are homeowners and the percentage of businesses offering health care benefits is measured as the percent of a state's non-elderly population covered by employer health-plans is the measure. Income distribution and Income distribution change come from Jon Haveman's calculations based on the annual U.S. Current Population Survey. Income distribution is the ratio of mean income of families in the top quintile to mean income of families in the bottom quintile. The percent change in income distribution is the annual change in the ratio of mean income of families in the top quintile to mean income of families in the bottom quintile.

High school graduation is the high school completion rate of 18-24 years in a given year. This data is from the U.S. Census Bureau. Both high school and college attainment are from Jon Haveman's calculations based on the annual U.S. Current Population Survey. High school attainment is measured as the percent of head of households with at least 12 years of education. College attainment is the percent of households with at least four years of college.

Venture capital investments are measured as the annual value of venture capital measured in dollars per worker. This measurement comes from Dow Jones VentureOne, Venture Capital Industry Report. SBIC Financing is measured as total SBIC financing, per worker and comes from the U.S. Small Business Administration. Royalties and Licenses are measured as the annual gross license income per worker in a given state. This comes from the Association of University Technology Managers, Inc., AUTM Licensing Survey.

PhD Scientists and Engineers are measured as the annual number of employed doctoral scientists and engineers per 1,000 workers. Graduate students in sciences and engineering are measured as the annual number of scientists and engineering graduate students in doctorate granting institutions per 1,000,000 population. Both of these variables come from the National Science Foundation, Division of Science Resources Statistics. The National Telecommunications and Information Administration report the annual state percentage of households with computers.

University research and development is the annual amount of state expenditures at universities and colleges. Federal research and development dollars is the amount of annual, state federal obligations for research and development per capita. Private research and development is measured as the annual amount of private research and development dollars per worker, per year. All three of these measures come from the National Science Foundation, Division of Science Resources Statistics. The number of university spin-offs is reported as the number of spin-off firms per $1 billion University R&D spending. This measure comes from the Association of University Technology Managers Inc., AUTM Licensing Survey.

Finally, the business climate variables include the lowest and highest corporate tax rate and the state income tax rate. The variables come respectively from the Federation of Tax Administrators and the National Bureau of Economic Research. Overall, these variables represent a range of economic, business, and demographic preconditions and/or controls that are recognized in the entrepreneurial literature as potential considerations when evaluating small business and entrepreneurial activity. Table 4.6 provides the summary statistics for each of the continuous independent variables.

The primary objective of this research is to clarify the relationship between state policy restrictions on small business and entrepreneurial activity. To measure this policy effect, a dummy variable for state level ICT restrictions is used to address this component of the analysis. The variable is coded as 1= ICT restrictions and 0=no state level restrictions. To further test the sensitivity of policy restrictions an additional set of discrete policy variables were tested. These variables further specified that a state has one of three ICT policy states: a policy ban (ban), general policy restrictions but no ban

Table 4.6: Small Business/Entrepreneurial Independent Variables

Employment	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
Long-term Employment Growth	15.105184	9.756762699	-3.9	60.36
Short-term Employment Growth	1.4450875	1.724216331	-3.99	6.9
Unemployment Rate	4.7405	1.147956559	2.2	8.2
Wages and Income				
Average Pay	32277.913	5742.231623	20925	51007
Pay Growth	3.587575	1.571939998	-4.3	9.8
Median Income	51310.515	7766.331568	35004	72403
Demographic and Equity				
Percentage of Business Closings	11.763145	5.075568323	0.0714	22.8
Working Poor	13.870233	4.558078236	3.99	26.08
Population Density	180.378	250.7321604	1.1	1144.2
Net Migration	0.6745	4.154756884	-12.1	28.4
Poverty	11.7395	3.114504792	5.5	23.4
Income Distribution	10.12295	1.674369458	6.62	15.83
Income Distribution Change	5.037875	12.00237175	-30.72	46.02
Homeownership Rate	69.9005	5.197078392	52.8	81.3
Percentage of Businesses Offering Health Care Benefits	65.933	6.111213326	51.1	79.9
Education				
High School Graduation	78.93625	11.05366998	50.4	96.8
High School Attainment	85.6403	4.126197787	74.1	93.44
College Attainment	25.45335	4.834917564	14.6	40.81

Small Business/Entrepreneurial Independent Variables cont.

Measures of Innovation				
Venture Capital	135.13449	287.3550032	0	2448.32
SBIC Financing	361.78905	638.8332889	0	2735.45
Private Lending	1411.7618	2970.707801	1.13	35532.15
Scientists and Engineers	3.6892	1.983885295	0.1	13.9
Science and Engineering Graduate Students	3133.6131	5766.327192	469.72	53437
Percentage of Households with Computers	51.175429	11.48682174	20.6	74.1
University Research and Development	111.5422	51.93667118	26.54	408.27
Federal Research and Development	247.79145	285.8647616	20.36	1725.75
Private Research and Development	1028.0098	948.1814941	8.02	6572.12
Royalties	4.714275	9.785021913	0	99.51
University Spinoffs	5371.2968	8.173367669	0	96.45
Business Climate				
Corporate Taxes/Lowest Rate	5.535665	2.801043106	0	10.5
Corporate Taxes/Highest Rate	6.64829	2.827945967	0	12
State Income Tax Rate	5.181225	2.924856015	0	9.86

Sources: Corporation for Enterprise Development, Development Report Card for the States, 1999-2007 (excluding 2005), www.cfed.org; Federation of Tax Administrators, Corporate Income Tax Rates, http://www.taxadmin.org/fta/rate/corp_inc.pdf; National Bureau of Economic Research, http://www.nber.org/; and U.S. Census Bureau, www.census.gov.

(restriction), and no policy restrictions (none). Further classifying the policy variable may provide additional insight into the relationship between policy differences and state small business/entrepreneurial activity.

Additionally, the inclusion of dummy variables representing Dillon's rule, Home rule, and Mixed rule reflect the possibility of additional constraints on local/regional government's ability to leverage their own investments in advanced ICT. With regard to governance, a state has one of three policy states; Dillon's rule, Home rule, or Mixed rule. Dillon's rule for state governance of municipalities was formalized in 1872 when U.S. Supreme Court Judge John Dillon said:

> It is a general and undisputed proposition of law that a municipal corporation possess, and can exercise, the following powers, and no other: First, those granted in express words; second, those necessarily or fairly implied in, or incident to, the powers expressly granted; third, those essential to the declared objects and purposes of the corporation not simply convenient, but indispensible. Any fair, reasonable doubt concerning the existence of power is resolved by the courts against the corporation, and the power is denied (U.S. Advisory Commission on Intergovernmental Relations (ACIR), 1968)

In effect, Dillon's rule upholds that local and municipal governments derive all of their powers from the state and only those expressly given to them or implied by the powers granted are their powers to exercise. Dillon's rule arose in response to widespread local corruption and abuse of political power in the late 1800's. Local governments were known to issue bonds to finance large projects like railroads and would then fail to honor their bonding obligations when projects failed. With Dillon's rule, any government powers in question are resolved against the municipality and calls into question whether local government has inherent rights of local self-governance.

Dillon's rule states are contrasted against those that are considered Home rule states. Dillon's rule assumes a city does not have a particular power or authority unless it is explicitly granted by the state; home rule assumes the opposite. Pure home rule is a transfer of all powers not specifically prohibited in a state's constitution or statutory law from the state to local government units. States that have adopted home rule have often modified pure home rule by providing varying degrees of freedom for local/municipal governance as well as the scope of power granted to these units. Home rule has the potential to allow local authorities to respond more expediently and efficiently to local problems and needs. It is often argued that local authorities understand their community needs more clearly than state officials. As such, home rule potentially allows local authorities to respond with creative and innovative solutions to local problems without waiting for state approval.

With regard to advanced ICT solutions, it is hypothesized that states governed by home rule exhibit policy environments that allow for more effective local solutions in meeting local ICT service and infrastructure needs. Additionally, the interaction of the Dillon/Home rule designation and state level ICT restrictions may also impact state level small business growth. Research documents the importance of an entrepreneurial culture for creating and sustaining local and regional entrepreneurial activity. Thus, the policy environment surrounding the balance of local and state powers may be an additional component of a state's culture that may or may not support a more innovative small business and entrepreneurial environment.

Methods of analysis for a panel study of this nature include constant coefficients models, fixed effects models, and random effects models. A constant coefficient model, also called a pooled regression model, assumes that state and temporal effects are insignificant and do not have to be considered in the modeling framework. In these models, standard Ordinary Least Squares (OLS) analysis is used to test the significance of model parameters (Yaffee, 2003).

However, when there are cross sectional and/or temporal parameters of significance, additional specification issues are dependent on whether these effects are characterized as fixed or random. Helms (1985) argues that it is both logical and statistically necessary with research of this nature to treat state and time effects as fixed. A model with both state and time fixed effects controls for the average differences across states and years in any observable or unobservable variables. This approach controls for across state and time variation. This can be very instructive if the purpose of the analysis is to better understand within state and/or time differences. Moreover, this method substantially reduces omitted variable bias. However, Yaffee (2003) notes that fixed effects models may suffer from multi-collinearity which increases standard errors and reduces the statistical power of model parameters. An additional limitation of fixed effects is that each state parameter must have a reasonable amount of variation over each time period. Without this variation, fixed effects modeling should be reconsidered, as the resulting estimated parameters may be imprecise.

Greene (2003) refers to random effects as regression models with a random constant term. Random effects models with a cross sectional and time component are sometimes referred to as two-way random effects models (SAS, 1999). Random effects models assume unobserved variables are uncorrelated with observed parameters. These models use information from both within a state and time period as well as across states and years. These models are particularly informative when there is little variation of parameters within states over time.

In addition to questions of modeling, the nature of this research generates concern over causality. These concerns arise when there is a question over the extent of endogeneity and simultaneity of the independent variables. In this instance, regression coefficients may be biased and therefore provide inaccurate parameter estimates. In this case, an estimation strategy accounts for potential endogeneity of entrepreneurial activity and state and economic and business activity by lagging all dependent variables in the panel regression by one year (Bruce, 2009). Specifically, each state's annual measures of entrepreneurial activity are therefore a function of the previous year's economic, business, and demographic characteristics.[37]

In the end, a fixed time and random state effects model, or mixed model, was chosen as the best set of assumptions for this analysis. Tests for normality of the error terms and multicollinearity among the Xs were executed. Variance inflation factors were used to test for multicollineartiy. A random effects model was chosen because it allows for the estimation of stable covariates. As well, random effects models generally have less sample variation, as the variation both between and within states is estimated (Allison, 2005). As the primary policy variable of interest is unchanging within states over time, a fixed effects model may yield estimates that are unreliable.

The model is illustrated below:

$$y_{i(t+1)} = \mu_t + \beta x_{it} + \gamma z_i + s_i + \varepsilon_{it}$$

[37] This data set includes 7 years of data (1999-2007; without 2005) which limits the inclusion of longer lag times for this analysis. However, future research should explore the use of longer lag times in data sets with additional years of data.

Where y_{it} is one of the six, lagged dependent variables representing small business and/or entrepreneurial activity, x_{it} represents a vector of independent variables that vary over time and z_i represents a vector of variables that do not vary over time. The variable s_i represents random state effects with a specific probability distribution and an assumed normal distribution. This variable represents the total effect on the dependent variable of unobserved state characteristics. The error terms, ε_{it}, represents the random variation across time and geography. By using a model with both fixed and random effects parameter, estimates will be more robust and reliable than a standard OLS or purely fixed effects approach.

However, it is important to acknowledge that this model will not confirm causation of these parameters. Causation could be tested with the use of an instrumental variable approach and/or Granger causality tests. Granger causality occurs when a variable X "Granger causes" Y if Y can be better predicted using the histories of both X and Y than it can using the history of Y alone. This concept highlights three important characteristics of these models: 1) the temporal assumption that only past values of X can cause Y; 2) If X is exogenous of Y, X fails to Granger-cause Y (Sims, 1972); and 3) X and Y are independent only if both fail to Granger-cause the other. By regressing each variable on lagged values of itself and the other, F tests can be used to examine Granger causality. This was not within the scope of this research but future research would benefit from the exploration of causality of policy variables.

Regression Results

A first glance at the possible impacts of different levels of ICT policy restrictions on small business and entrepreneurial activity are illustrated in Figures 4.4 and 4.5 These graphs illustrate the relationship between two dependent variables, the number of new companies and the number of patents and the three general policy options; ban, general restrictions, and no restrictions. Graphs representing the relationship between the additional dependent variables are provided in the appendices. From a visual inspection the only relationships that stand out are those between the number of new companies and patent activity. Individual OLS regression estimates of ICT restrictions on each of the dependent variables confirm that new companies and patent activity are the only relationships that yield statistically significant results. Tables 4.7 and 4.8 illustrate the individual regression estimates of the impact of state level restrictions on new companies and patent activity Moreover, the relationship between new companies and ICT restrictions only yields significant results with the inclusion of the broader set of policy dummies. There is a statistically significant relationship between general policy restrictions and new companies. The positive regression coefficient indicates a possible counter intuitive relationship, that policy restrictions may positively influence new small businesses activity. However, fuller models should be explored in depth before this conclusion is made.

Additionally, two individual OLS models yielded statistically significant results between the number of patents and ICT restrictions. Model I illustrates that general policy restrictions have a negative, statistically significant relationship with new patent activity. Further policy variable refinement indicates that policy bans exhibit a strong, negative statistically significant relationship with patent activity. However, as with new companies, fuller models are necessary to confirm this result.

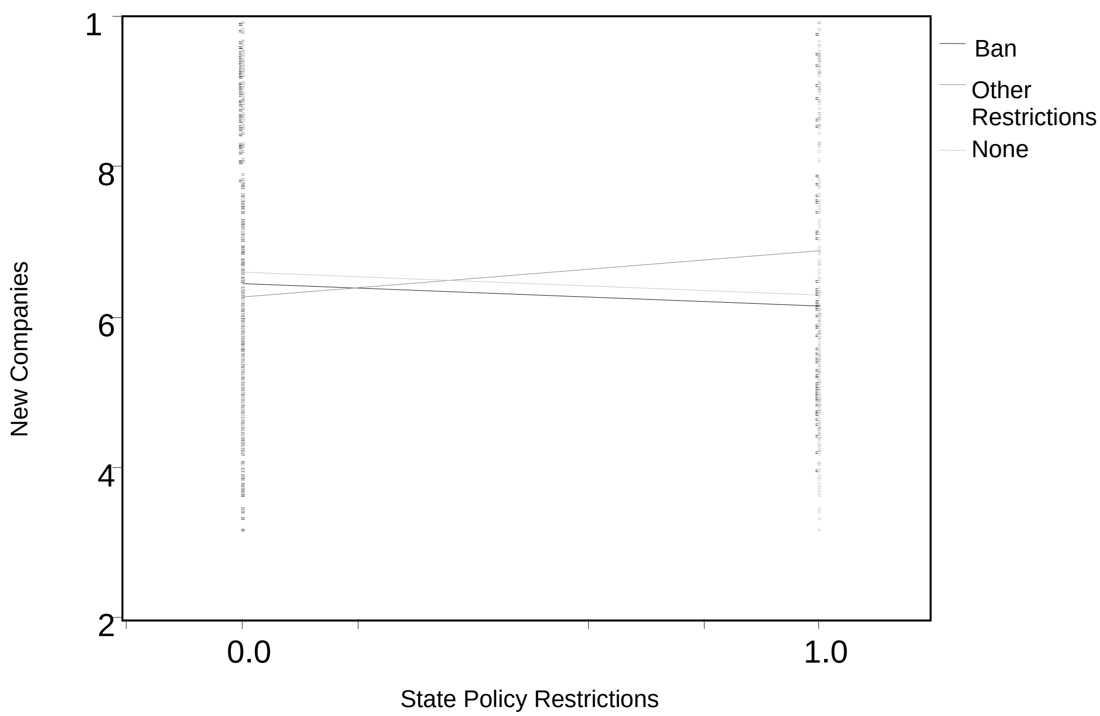

Figure 4.4: Bivariate Relationship between State Policy Restrictions and New Companies

Policy impacts may be magnified by related state policy measures and other state characteristics. As a result, several individual covariates were hypothesized to have a potential interaction with ICT restrictions. It was hypothesized that both the percentage of state households with computers and the Dillon/home rule variables may have significant interaction effects with the ICT policy restriction variables. Tables 4.9-4.12 illustrate the results of parameter tests that proved statistically significant. The ban, restriction, and restriction/Dillon rule interaction term are statistically significant. The interpretation of

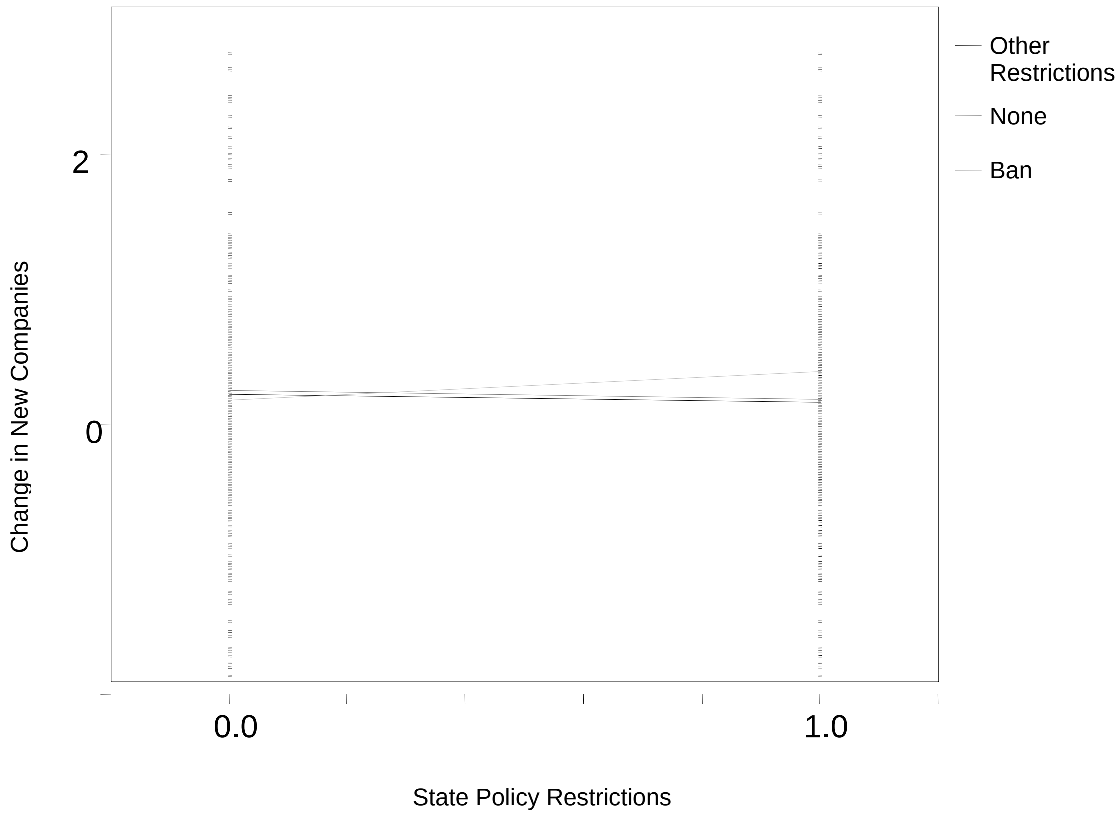

Figure 4.5: Bivariate Relationship between State Policy Restrictions and Change in New Companies

Table 4.7: Individual Regression Model of ICT Restrictions and the Number of New Companies

Number of New Companies			
Variable	**Coefficient**	**Std Error**	**Prob>|t|**
Ban	-0.125028	0.301004	0.6781
Restriction	0.6058198	0.252131	0.0168*
Observations	400		
Adjusted R2	0.013233		
Model F	3.3402*		

these parameters indicates a negative impact on patent activity in states with a policy ban and a positive impact on patent activity in Dillon rule states with a policy restriction.

Similarly, the Dillon rule/broad ICT restriction interaction term has a negative coefficient and is strongly statistically significant against the number of new companies. However, the interpretation of the marginal effects reveals a small, negative impact of these restrictions in Dillon rule states. The relationship between the number of new companies and the percentage of households with computers also reveals potentially important covariates and interaction terms. Tables 4.11 and 4.12 reveal that an ICT interaction term with the percentage of household computers is an additional variable for consideration when clarifying the relationship between ICT restrictions and the number of new companies in a state. Overall, these results highlight the potential importance of

Table 4.8: Individual Regression Model of ICT Restrictions and the Number of Patents

Model I: Number of Patents			
Variable	**Coefficient**	**Std Error**	**Prob>|t|**
ICT restrictions	-63.91994	24.08118	0.0083*
Observations	400		
Adjusted R2	0.017028		
Model F	0.0083*		
Model II: Number of Patents			
Variable	**Coefficient**	**Std Error**	**Prob>|t|**
Ban	-107.06	34.07525	0.0018*
Restriction	-16.8328	28.54261	0.5557
Observations	400		
Adjusted R2	0.022077		
Model F	0.0077*		

Table 4.9: Patent Covariate Tests: Dillon/Home Rule

Patents			
Term	**Estimate**	**Std Error**	**Prob>|t|**
Ban	-107.06	33.20308	0.0014*
Restriction	-108.5001	38.26581	0.0048*
Restriction*Dillon Rule	234.25379	53.37973	<.0001*
Restriction*Home Rule	35.662714	66.57622	0.5925
Observations	400		
Adjusted R2	0.071497		
Model F	7.7184*		

additional covariates and testing for hypothesized interaction relationships in these models. However, additional analysis of more complete models is necessary to confirm these relationships.

Table 4.10: New Company Covariate Tests: Dillon/Home Rule

New Companies			
Term	**Estimate**	**Std Error**	**Prob>|t|**
Dillon Rule	0.7989581	0.392223	0.0424*
Home Rule	0.8315357	0.438256	0.0586
ICT Restrictions	1.3714048	0.477113	0.0043*
Dillon Rule*ICT Restrictions	-1.70097	0.547715	0.0021*
Home Rule*ICT Restrictions	-0.295405	0.740102	0.69
Observations	400		
Adjusted R2	0.028795		
Model F	3.0695*		

Additionally, separate t-tests of each independent variable against the policy restriction variable were estimated. Table 4.13 illustrates each independent variable with

Table 4.11: New Company Covariate Tests: Household Computers and General ICT Restrictions

New Companies			
Term	**Estimate**	**Std Error**	**Prob>|t|**
ICT restrictions	-1.903106	0.940483	0.0438
Percent HHD computers	0.0199932	0.01102	0.0705
ICT Restrictions*Percent HHD computers	0.0416377	0.018024	0.0215
Observations	400		
Adjusted R2	0.0534		
Model F	7.5627*		

significant t-tests. These results indicate corporate income taxes, long-term employment growth, population density, the number of scientists and engineers, and state income tax rates are statistically different in states with a restrictive ICT policy environment compared to states without restrictive policy efforts.

Table 4.12: New Company Covariate Tests: Household Computers and Specific Policy Restrictions

New Companies			
Term	**Estimate**	**Std Error**	**Prob>|t|**
Percent HHD computers	0.0178341	0.010941	0.104
Ban	-0.60729	1.351167	0.6534
Restriction	-2.613495	1.08387	0.0164*
Percent HHD computers*Ban	0.0102154	0.026341	0.6984
Percent HHD computers*Restriction	0.0622817	0.020494	0.0026*
Observations	400		
Adjusted R2	0.073076		
Model F	6.5028*		

Table 4.13: Individual One-tailed T-tests of Significant Independent Variables by State and Rule Type

Corporate Income Tax	Prob < t	0.007
Long-term Employment Growth	Prob > t	0.0457
Population Density	Prob < t	0.0236
Phd Scientists and Engineers	Prob < t	0.0181
State Income Tax	Prob < t	0.0126

With these preliminary estimates, a variety of both random and fixed effects models were estimated to confirm the best fit and most reliable estimates. Tables 4.14 and 4.15 present the results of models where the ICT policy variable showed significance. The ICT policy variable has a significant impact in models of new business activity and new business job growth. The ICT Policy variable does not show up in relationships with change in new businesses, technology companies, patent activity, or IPOs. Results of additional models with these dependent variables, without the ICT policy variables are presented in the Appendix.

Table 4.14 presents the results for a random state/time fixed effects model with the number of new companies as the dependent variable. The adjusted R-squared is .904 which indicates a significant amount of the variation in the number of new firms across states is explained by this set of parameters. This model uses the general ICT restriction dummy and interaction terms for percentage of household computing, Dillon rule, and Home rule. Taking the partial derivative of the ICT restriction parameter results in the estimation of the marginal effects illustrated in Table 4.15. This reveals that a Dillon Rule state with general ICT restrictions, given some assumed percentage of state households with computers, will result in lower numbers of new businesses in a given year. For Home Rule states, there is a positive relationship with new businesses activity even though the Home rule/ICT restriction interaction parameter is not statistically significant. These results underscore the complexities of modeling and understanding the impact of policy variables on other demographic, economic, or social variables. The intended and unintended consequences that result from the implementation of any policy make hypothesizing and modeling these potential relationships challenging. Additional exploration of the kinds of economic impacts that may occur in this policy environment is an area for future research. Additionally, high school attainment, the percentage of households with computers, income distribution, patents, and venture capital all have a positive statistically significant relationship with the annual number of new companies in states. However, the percentage of firms that offer health care to their employees, and the percentage of residents in poverty exhibit a negative statistical relationship with new business activity.

Table 4.16 presents the results for a random state/time fixed effects model with the annual amount of new business employment as the dependent variable. The adjusted R-squared is .646, which indicates a significant amount of the variation in the number of new firms across states is explained by this set of parameters. This model uses the general ICT restriction dummy and interaction terms were not found to be significant. The ICT restriction coefficient is negative and statistically significant at the .10 confidence level

Table 4.14: Regression Estimates for New Business Activity

Number of New Companies			
Term	**Estimate**	**Std Error**	**Prob>|t|**
Intercept	-0.76777	2.758955	0.781
Corporate Taxes	-0.05359	0.04211	0.2041
Health Care	-0.06823	0.020351	0.0009*
High School Attainment	0.112697	0.026937	<.0001*
%Households With Computers	0.048212	0.01556	0.0021*
ICT Restrictions	0.334833	0.349749	0.3407
ICT Restrictions*Percent HHD computers	-0.00721	0.003865	0.0631
ICT Restrictions*Dillon Rule	-0.54526	0.261489	0.0423*
ICT Restrictions*Home Rule	-0.17466	0.320907	0.5886
Income Distribution	0.124934	0.059946	0.0379*
Number of Patents	0.001155	0.000594	0.0528*
Poverty	-0.12686	0.046321	0.0065*
2000	1.251353	0.236923	<.0001*
2001	1.005902	0.236405	<.0001*
2002	0.220408	0.095999	0.0224*
2003	-0.79718	0.124848	<.0001*
2004	-0.67012	0.121743	<.0001*
2006	-0.52307	0.13374	0.0001*
Venture Capital	0.000799	0.000205	0.0001*
UnivR&D	-0.00348	0.003089	0.2613
Observations	350		
RSquare	0.90938		
RSquare Adj	0.904163		
Root Mean Square Error	0.638135		

Table 4.15: Marginal Effects of ICT Restrictions in Dillon or Home Rule States
Percentage of State Household with computers

	50%	**60%**	**70%**	**80%**	**90%**
Dillon Rule	-0.21403	-0.21475	-0.21547	-0.21619	-0.21691
Home Rule	0.156567	0.155845	0.155124	0.154403	0.153682

These results indicate that ICT policy restrictions have a strong, negative relationship with new business job growth. Additionally, average pay, the state homeownership rate, science and engineering graduate students, and private research expenditures all have a positive, statistically significant relationship with the annual amount of new business job growth in states. The corporate tax rate and the number of technology companies both result in a negative, statistically significant relationship with new business job growth.

Overall, these preliminary estimates reveal that future research efforts should consider further clarification of the impact of these policy measures on a state’s economic and business environment. These initial models provide insight into the kinds of state variables that may be impacted by a restrictive ICT policy. Based on these results, restrictive ICT policy measures appear to have a negative relationship on general new business and employment activity but not on measures of entrepreneurship and innovation. However, these models also underscore the potential importance of the way these policies interact with other state level characteristics. Thus, it may be that these policies do not make a significant impact unless another set of state characteristics are in place.

Table 4.16: Regression Estimates for New Business Job Growth

New Business Job Growth			
Term	**Estimate**	**Std Error**	**Prob>|t|**
Intercept	-38.34931	22.84186	0.0984
Average Pay	0.0009182	0.000353	0.0114*
Corporate Taxes	-0.970333	0.430564	0.0281*
ICT Restrictions	-2.497875	1.32699	0.0665
Homeownership Rate	0.6061473	0.255786	0.0211*
Private Research and Development	0.0030163	0.001586	0.0602
Science and Engineering Graduate Students	0.0005204	0.000221	0.019*
Technology Industry Employment	-1.81808	0.649016	0.0055*
2000	3.5641845	2.392917	0.1376
2001	0.9893983	2.089193	0.6361
2002	-4.017065	2.233581	0.0731
2003	20.196946	2.170648	<.0001*
2004	13.702733	3.753773	0.0003*
2006	-16.05067	2.089671	<.0001*
Venture Capital	0.0070268	0.004775	0.1424
Observations	350		
RSquare	0.645977		
RSquare Adj	0.630391		
Root Mean Square Error	13.78714		

This research is a first look at the possible consequences of these policy measures. While the preliminary results provide evidence that ICT restrictions may have negative impacts on state business and innovation activity, there are several areas that should be considered for future research. First, this data set is limited to seven years. Additional years of data could provide further clarification of these relationships. Moreover, there is always concern with a complex issue like small business activity and/or innovation activity with causation and omitted variable bias. Considering and testing additional variables is also important for future research. As well, future research should explore the use of instrumental variables or incorporate a direct Granger test for causality. However, if states hope to leverage new economy resources to remain competitive in the twenty first century they should understand the potential impacts of these kinds of policy restrictions.

Conclusions

There is little question that any state policy measure has both intended and unintended consequences. It is also likely that states that pass ICT restrictions do not intend to limit new company activity or patent activity with these policy actions. While the reasons vary, it is highly unlikely that states intend to restrict economic activity with the passage of this type of legislation. However, in a more competitive, global business environment there may be a required set of technological infrastructure elements that must be in place for many new firms to be successful and existing ones to be innovative. As a result, efforts that limit the potential growth of this infrastructure may indeed have substantial short and long-term consequences.

In conclusion, if states hope to remain viable and competitive in the twenty-first century, understanding the pre-requisite infrastructure necessary for this is critical. The days are likely over when water, sewer, power, and access to a railroad are the primary infrastructure pre-requisites for new businesses to get started. Does a business have access to sufficient bandwidth to be competitive in a global context? Can individuals work from home with the most advanced ICT technology? These are infrastructure questions that may be equally as important today. Beginning to consider these questions and how we can ensure that local and regional communities have access to advanced ICT infrastructure and service is important for the future of all of our communities across the nation.

CHAPTER FIVE:

SUMMARY, CONCLUSIONS, AND FUTURE RESEARCH

As research confirms the importance of third wave economic development policies; entrepreneurship and innovation are promoted as the missing puzzle pieces to improving regional economic growth and community development. To promote these efforts, policymakers have created a diverse array of federal, state and local programs to spur entrepreneurship and innovative activity. However, there has been little research focused on reconciling and documenting the best practices of this diverse and fragmented policy environment. Moreover,

Hallberg questions whether “In reality the desire of governments to promote SMEs is often based on social and political consideration rather than on economic grounds (2000, p.5).” However, if the objective is to build local assets and create community wealth, entrepreneurship and local firm expansion may be the most effective manner in which to accomplish these goals (Lichtenstein and Lyons, 2001; Sherraden, 1991).

There are no simple answers and “canned” development strategies that will ensure development success for all communities. However, evidence continues to mount that states and localities must undertake policies to promote entrepreneurship and innovation in order to remain competitive and to encourage sustainable economic development in the twenty first century. Throughout the 1990’s, the majority of new jobs in the economy “were created by small and medium sized entrepreneurs operating high-growth businesses (Henderson, 2002, p.45).” There is a positive relationship between national GDP growth and entrepreneurial activity. Reynolds et al. (1999) report that one-third of the difference in economic growth among nations can be attributed to entrepreneurial activity. Moreover, while state and local governments have historically relied on recruiting medium and large industrially firms to create new jobs and economic activity, there is increasing evidence that this traditional approach will not yield the sustainable, healthy, wealth creating communities of the future.

Lichtenstein and Lyons (2001) call for a new paradigm in entrepreneurial development policy. They argue for a systems type approach to the development of regional entrepreneurship, one that focuses policy efforts towards a more comprehensive and holistic approach to developing local entrepreneurs. However, entrepreneurship policy continues to remain diverse and fragmented across states and regions. Some state’s[38] have a history of making investments in innovation and entrepreneurial policy efforts, but the majority of states continue to practice traditional development approaches focused largely on industrial recruiting. Many politicians and economic developers admit that ensuring regional success in the future requires entrepreneurial development policy as an essential component of every community’s development portfolio. However, the impetus for the research presented here is the ongoing concern of a divergence between policy practice and the public discourse on the importance of entrepreneurship and innovation policy.

This research has explored three critical research questions surrounding the issue

[38] Pennsylvania’s Ben Franklin Partnership is one example of a state-wide program that has been in place for over two decades.

of entrepreneurship and entrepreneurial development policy. However, as with any research there is always an opportunity for improvement of existing research methods as well as opportunities for future research. This chapter will review the conclusions of each of these papers and discuss opportunities for improvement within the existing research framework. Additionally, within the context of each paper, ideas for future research are explored.

Business Incubators

Business incubators have become an increasingly popular development tool across a wide range of communities around the world. Business incubators can be considered a type of entrepreneurial development policy as two of the primary objectives are to encourage local business creation and ongoing small business success. The majority of business incubators also advance job creation as a fundamental goal, however, as this development tool has evolved, a variety of additional goals have been promoted by specific types of incubators. Moreover, the idea of business incubation has been transformed into a variety of related development tools such as technology centers, science parks, innovation centers, virtual incubators and others. Many of these policy descendents share some of the characteristics of business incubators but often cannot be classified as traditional business incubators. What these variations highlight, however, is the ongoing desire of policymakers to encourage entrepreneurship, small business success, innovation, and high value-added research among other things.

The first paper attempted to lay the groundwork for a future research agenda on business incubation. Three theoretical frameworks were explored as potential tools for future research; network models; O-ring theory; and agglomeration economics and information spillovers. Both network models and O-ring theory frame incubators as quasi-firms, where the primary objective is to lower transactions costs to enhance firm survival and profitability. A network approach to business incubators focuses on client interaction through both formal and informal interaction, facilities design and workspace, and the spillover benefits from client co-location among other things. O-ring theory, however, highlights the importance of the skill and productivity of incubator management and support staff, along with the experience and specialization of incubator clients. This research stream hypothesizes that dynamic incubators are filled with highly effective incubator management, skilled and experienced service professionals, and innovative, young, entrepreneurial client firms.

Instead of viewing incubators as quasi-firms, an agglomeration economies paradigm frames business incubators as quasi-clusters. Using this theory as a framework for future research would emphasize the cost savings to client firms from the internal scale economies achieved through shared service provision and/or lower transaction costs due to enhanced access to a wide range of business services. Both the MAR's and Jacobs models of knowledge spillovers can also be used to model the process of business incubators. Thus, strong MAR's type localization economies may be experienced in incubators that specialize and support specific industrial or market niches. However, knowledge spillovers in Jacobs' model may be greater in incubators that encourage and support a wide variety of entrepreneurial firms. Ultimately, cluster theory, the MARs model, and the Jacobs model emphasize the potential of agglomeration economies that can result when co-located firms create an environment that generates internal scale economies and information spillover benefits.

These three theoretical approaches yield a series of specific research questions that are a useful basis for a research agenda. Much of this work would be focused on clarifying and quantifying the types of public benefits and costs that may occur as a result of public investment in creating a business incubator environment. Answering these questions is important as many business incubators, and similar organizations, require a range of public support; from start-up funds to ongoing operational funding. The research on business incubation has not yet quantified the costs and benefits sufficiently to confirm when and where public support may be warranted. In many cases, communities have made these investments because they are perceived as the development panacea of the day, while the benefits of incubation are not a certainty. In an environment of increasing fiscal constraint and where policy makers demand proof of outcomes, research that justifies the potential benefits of public investment is valuable.

An additional complication to answering the questions posed in this research is the expected time line in which benefits may be expected to accrue. Many policymakers expect relatively fast results from any development policy, and incubators are no exception. However, any entrepreneurial development policy is likely to be more of a long run investment that may take five or more years to begin to yield expected returns. The benefits, especially if the focus is on employment and income, that may accrue from successful entrepreneurial firms may be small compared to the short-term results that recruiting an industrial firm could provide. The longer term results, five or more years out, for communities that make these and similar investments may be substantial but require research on the longer-term impacts of business incubators. However, a considerable body of research questions both the short and long term benefits of these investments when communities carefully document the employment, income, infrastructure, and local finance costs and benefits. Although, if the successful communities of the future are those that are relatively more innovative and entrepreneurial then these types of strategic investments may be critical to the health and sustainability of regions. Thus, further analysis of experience with business incubators is critical to begin to understand the potential of these policy efforts for the short and long term growth and development of regions.

Policy Perceptions and Local Entrepreneurial Development In South Carolina

The second paper offers another approach to evaluating current local and regional entrepreneurial policy efforts. No policy will be successful without the support and commitment of those whose task it is to implement that policy. Despite lip service to entrepreneurship, it is clear that industrial recruitment still dominates most regions' economic development efforts. However, additional evidence indicates the emerging importance of entrepreneurial development policy across all types of geographies. While communities across the globe are beginning to realize the importance of local entrepreneurs for creating local wealth and long-term economic viability for their region, research regarding the impact of these policy efforts is limited. This paper explores the extent to which local and regional developers in South Carolina are engaged in this development policy area. As well, when communities are engaged in these efforts, what is the nature of involvement and what kinds of successes and/or failures have communities experienced?

A 2009 survey of over 100 economic and community development professionals in South Carolina confirms that many local communities do not have locally or regionally sponsored entrepreneurial development efforts. However, slightly more than half of the respondents report that fostering entrepreneurship is part of their community's economic development plan and that their region recognizes the value and importance of entrepreneurs. Additionally, entrepreneurship is recognized as a valuable development tool for increasing employment opportunities, building community and family wealth, and diversifing the local economic base, among other reasons.

One of the main objectives of this paper was to explore the impact of policy perceptions at different levels of government on the implementation of entrepreneurial programming. Thus, if local economic developers perceive a particular policy effort to be in/out of favor with state and federal policymakers, does this influence the probability of local implementation? Survey results confirm that almost three-quarters of respondents believe industrial and business recruitment efforts have the highest economic development priority for state policymakers and fifty percent believe this is also true for local officials. Nevertheless, respondents further indicated that there are substantive barriers to implementing entrepreneurial policy and a lack of local or regional access to a wide range of entrepreneurial services and programs.

To further test these conflicting results, logit modeling was used to clarify the probability of local entrepreneurial development programming. Creating sub-samples of economic developers and CDC respondents was one method used to begin to correct for the possibility of Simpson's paradox. Individual models were significant and further highlighted the importance of several hypothesized variables. Moreover, each sub-sample yielded unique sets of significant variables, providing some evidence of the differences among these populations. Testing the full model with the inclusion of an organizational dummy and appropriate interaction terms reveals the model is significant and better than the intercept only model.

Overall, these survey results highlight several important factors that influence the probability that a community has a local entrepreneurial development program. First, whether a community receives any state funding is an important predictor. This result is not surprising as financial barriers to development programming, in general, are likely to be ongoing concerns for many communities. For federal and state policymakers, these results highlight the importance of "putting your money where your mouth is." If policymakers want the development focus to shift towards entrepreneurial-oriented programming, funding sources may need to be redirected.

Another predictor of entrepreneurial development policy is how important a respondent rates business retention as an important community goal. This question highlights the potential policy overlap of business retention and entrepreneurial development efforts. In many communities, business retention can be as much about retaining regionally grown entrepreneurial firms as it is about retaining satellite branch plants. Policymakers may consider refocusing business retention efforts on younger, entrepreneurial firms so that this policy program becomes an additional tool of entrepreneurial development programming.

Finally, the influence of seed capital on the probability of local entrepreneurial development efforts is confirmation of other research findings about factors that influence levels of entrepreneurship in a state or region. These related studies indicate that entrepreneurship levels are likely to be higher in regions with higher levels of venture capital, seed capital, angel investors, and other sources of financing. This highlights ongoing questions of causality, as it is difficult to clarify which came first, the entrepreneurs or the policy? However, if seed capital is low or non-existent, local development officials may perceive that entrepreneurship policy is not feasabile. Exploring the impact of alternative sources of entrepreneurial financing and financing gaps on the success or failure of entrepreneurial development policies in different types of communities should provide some useful policy direction for ensuring that resources are used to best effect.

These results underscore the importance of several policy related issues. First, while local communities often see the value in entrepreneurial development, these communities often have more immediate needs and may lack key pre-requisite entrepreneurial infrastructure. If states want to emphasize local entrepreneurial development activities, policymakers may need to help these communities first address other local priorities. For example, a community with a high school dropout rate or a housing shortage may need to address these more immediate needs before they will consider entrepreneurial development policy as a viable option.

Additionally, this research confirms that the majority of local communities know when they have weak entrepreneurial support mechanisms. Entrepreneurial support mechanisms like access to a local business incubator, venture capital, seed capital, micro-lending, and networking and mentoring may all be important pre-requisites to the success of local entrepreneurial development programming. Local policymakers may understand the likelihood of successful entrepreneurial development programming is low without this kind of infrastructure already in place.

If state and local policymakers want to emphasize entrepreneurial development programming, as opposed to other development tools, they must consider the whole landscape of entrepreneurial infrastructure. For example, state and local policy may not be able to financially support venture or seed capital programs but the state could lead the way in facilitating private regional and state networks of venture or seed capital organizations and/or individuals. The same is true for networking and mentoring programs. While state or local government cannot create the networks, they can programmatically support and facilitate network creation. From a policy perspective, if states and regions want to support the creation of entrepreneurial communities, the policy environment must create an incentive structure for local communities to also invest in these approaches. As long as communities perceive the state and federal development policy focus is elsewhere, they will be less inclined to make investments in entrepreneurial development policy approaches.

One of the potential weaknesses of survey work, in general, is that much of this work may suffers from sample bias, in this case due to the small sample size and professional affiliation of the respondents. One additional area of weakness in this research concerns the lack of specificity in defining what is meant by entrepreneurial development programs. The objective of this approach was to capture the broadest sample of communities contending to have some type of entrepreneurial development program. On the positive side this sample potentially represents the fullest range of policy efforts occurring within these communities. However, this sample could also overstate regional entrepreneurial development efforts. As a result, future research should consider more specifically defining the types of programs that are considered entrepreneurial development efforts. Further research could additionally focus on reducing sample bias with multi-state or national surveys and enlarging the scope of development professionals included in the analysis. A multi-state or national inventory of policy efforts would be an important step in understanding how local and regional governments are specifically engaged in entrepreneurial development efforts. An inventory that included, among other things, the types of programs, their objectives, strengths and weaknesses would begin to provide a set of best practice policy measures for local communities.

Policy entrepreneurship and policy diffusion is an additional research extension related to this work. As policy programs become popular, policy entrepreneurs at different levels of government experiment with different policy measures. Policy measures that are perceived as innovative and successful are then adopted by other regions. This process of policy diffusion could provide important insights into the scope, breadth, and possible successes of different entrepreneurial development programming efforts. For example, are some programs more successful in rural or disadvantaged regions? Another research question could focus on whether policy efforts, generally, exhibit path dependent characteristics. Thus, regions with a historical legacy of entrepreneurship or innovation may create a policy environment where entrepreneurship is inherently more valued than other regions. For example, Pages and Poole's (2003) research indicates that the state of Pennsylvania has a long history of supporting innovation investments. This kind of policy environment may create a path-dependent process for some regions whereby entrepreneurial policy efforts are perceived as more important or beneficial, relative to other development policy efforts.

In conclusion, this paper highlights that South Carolina communities are not heavily invested in entrepreneurial development programming. Only a small percentage of communities have any programming efforts at all in this area. Moreover, it documents the importance of identifying barriers that may prevent the local implementation of these types of policies, including policy perceptions of those involved in local development policy. Additional research in this and related areas may provide evidence for policymakers that their words and actions contribute to how policies are perceived, and ultimately whether they are implemented at the local level. A research agenda which continues to clarify the scope and breadth of entrepreneurial development programming is important for ensuring that communities understand the range of policy choices, along with the potential costs and benefits of these programs

State Technology Investments

The third paper highlighted additional state variables that may impact state-wide entrepreneurship and small business activity. Further, this paper raises a critical research question for economic development practitioners in the twenty-first century: what are the infrastructure pre-requisites for communities to successfully implement third wave economic development policy? It is hypothesized that advanced ICT infrastructure, specifically Broadband networks, are necessary, but not sufficient, infrastructure in order for regions to take full advantage of an entrepreneurial, innovation-focused economic development environment. The foundation of this hypothesis is that advanced ICT technology and applications potentially offer productivity, efficiency, networking, and quality of life improvements for consumers and businesses. Thus, communities and regions that are fully engaged in providing the most up to date ICT infrastructure, service, and delivery options will be those that have more rapid economic growth and development compared to regions that do not.

While the research on the benefits of Broadband is still in its infancy, it has begun to yield important confirmation of the benefits of Broadband to nations, states and regions. However, even as Broadband infrastructure, service, and uptake have greatly expanded in the past decade there continues to be evidence of a digital divide across geographies, ethnicity, income, and age. Middle and higher income suburban and urban markets are more competitively served by existing telecommunications providers than rural and low-income markets, where there is evidence of both under-served and un-served communities. Moreover, across all geographies, many advanced telecommunications markets are characterized by duopoly[39] markets, with two competitors largely controlling the supply of services. As states and communities have begun to realize the potential benefits of this technology, many communities that have felt inadequately served by existing providers have taken provision into their own hands. These projects are characterized by different ownership structures, but communities with their own municipal electric utility (MEUs) were involved relatively early in providing this infrastructure for their communities. MEU's already have physical infrastructure in place from which they can leverage improved infrastructure for increased utility efficiency and cost savings. However, as communities recognize the value and importance of advanced telecommunications infrastructure, a wide range of community efforts have been undertaken to improve access to advanced ICT service and delivery.

As communities have begun to involve themselves in the planning, deployment, delivery, and /or service of advanced ICT, existing commercial providers of this service have felt threatened by public involvement in this market. Moreover, many states have restrictions on local public involvement in telecommunications, provisions often left over from the regulation of the telephone and cable industries. Unfortunately, as the trend toward community involvement has increased, a number of states have enhanced existing legislation and developed new legislation for the purpose of preventing or restricting local public involvement in the provision of advanced ITC infrastructure, service and/or delivery. Currently, eighteen states have bans or other barriers in place to prevent or discourage local involvement in the telecommunications industry. Additionally, survey

[39] There are also cases of pure local monopolies as there have been in the cable industry.

results from ten South Carolina electric cities confirms that some communities are concerned about undertaking community investments in advanced ICT for fear of legal repercussions. However, if this infrastructure is critical to twenty-first century community growth and development, what kind of impact do these restrictive policies have on economic activity across states and regions? If communities would benefit from these investments, what are the specific community and/or economic benefits that regions sacrifice when states have these policies?

Ultimately, the gaps in telecommunications service and access are market failure questions. Generally, communities remain un-served or underserved by adequate Broadband because these investments do not meet the profit and revenue expectations of private sector providers. This infrastructure requires substantive fixed-costs investments, which makes private sector provision unlikely in regions and communities where the return on investment is long term and/or low. In economic environments with these characteristics, underserved and un-served communities are likely to remain so without additional policy intervention and possibly subsidization.

The telephone and interstate highway system are historical examples of infrastructure with characteristics similar to the current Broadband environment. In these cases, it was argued that positive external benefits generated from this infrastructure were large enough to justify large federal and state investments. In the case of both of these investments, it is argued that substantive network benefits were created by the public subsidization of universal telephone service and investments in a national interstate highway system. Additionally, positive spillover benefits were created by reduced information and transportation costs just to name a few.

Many have called Broadband the interstate highway system of the twenty-first century. They speculate it has the potential to realize the kinds of benefits that other major historical public investments have made. This is certainly possible but the jury is still out. To leverage the positive externalities and network effects of Broadband infrastructure requires access, adoption, and effective use by a large number of both consumers and businesses. Given this, where do policymakers begin to assess the potential of this infrastructure in an environment of fiscal uncertainty and unclear benefits?

Today, there are numerous examples of small and medium scale public investments in Broadband infrastructure. National and state policymakers could benefit from large scale studies documenting the nature of these investments and their outcomes to date. Communities where these public investments have been made may provide a type of "incubator" environment for understanding the uptake and use patterns of businesses and consumers. As well, if policymakers see the potential of this technology, these communities may also be important "testing" grounds for business and consumer education programs that facilitate enhanced uptake and use of advanced technology services. While there have been considerable public monies invested in Broadband projects, before Broadband becomes the telephone or interstate of this century policymakers will likely need more substantive evidence of the network and spillover benefits to the larger community and region. However, if Broadband has the potential that many argue, policymakers may want to encourage and support these types of analyses.

This paper explores how these restrictive infrastructure investment policies may impact small business and entrepreneurial activity within states. It is understood that in order for restrictive telecommunications policies to impact small business and entrepreneurial activity, SMEs would have to use advanced ICT services. However, research presented in this paper indicates that SMEs use advanced ICT services differently depending on the size of firm and type of industry a firm represents. Rather than generalize, further research needs to explore the impact of these policy measures on specific industry types in order to understand differential impacts across industries, given different industry ICT uptake and service requirements.

The cross sectional/panel regression analysis presented here is an important first step to understanding the impact of restrictive telecommunications policy on state economic activity. These results provide initial evidence that restrictive policies negatively impact state small business activity but do not appear to impact indicators of innovative, entrepreneurial activity. However, these results should be treated with caution as these results do not confirm causation. Moreover, as with any analysis of this nature, there is always the concern of omitted variable bias. This is certainly true when trying to capture a wide range of the variables that influence small business activity and entrepreneurship. There are ongoing questions concerning the correct methodological approach to estimating panel models of this sort. Much of the statistical concern originates from the use of highly aggregated data. Thus, additional research focused on less aggregated units, for example, county variables might provide additional information concerning the relationship between these policy measures and county small business activity. This approach would allow for the inclusion of less aggregated population density variables and measures or urban/rurality that are highly correlated with levels of advanced ICT infrastructure, small business activity and entrepreneurship. Additionally, incorporating a broader range of business climate variables and the major business sectors represented in a state could also be instructive. An additional method of analysis could use a matched pair's type approach for counties or states to compare outcomes in communities with restrictive policies against similar communities or regions that do not have these policy measures.

It is important for states to understand the costs and benefits of these restrictive policy measures. If states understand both the intended and unintended consequences of these measures, a more accurate assessment of the costs and benefits of these policy efforts can be made. For example, it may be that the intended consequences of these restrictive policies for a state are perceived as positive and outweigh any potentially negative intended or unintended consequences. For example, lobbying efforts by private sector providers may allow legislators to bargain for additional infrastructure investments in underserved communities or technology education programs in schools or businesses. As well, rational choice models would argue that if private sector lobbying efforts result in additional campaign funds and reelection of state legislators, these policies may "rationally" be perceived as positive. Focusing on the rational choice elements of legislative interest in these policies is another area of future research. Overall, this and similar future research efforts, could begin to make a more accurate assessment, separate from the perceptions of benefits and costs, of the true impact of these policy measures.

Conclusions and Future Research

Each of these three papers highlights a different but related area of economic development policy. Moreover, one of the common threads that run across these difference development approaches is the likelihood that public dollars are invested in the project. Whenever public dollars are invested, it is imperative to understand both the rationale for the investment, as well as its costs and benefits.

Additionally, each of these development approaches all share the characteristic of being long-run investments that may take five or more years to yield positive expected benefits. New-firm development, whether it is in an incubator environment or through other entrepreneurial development programs is a long-term process. Moreover, large infrastructure investments, like Broadband, may also take years to yield projected positive benefits. Investments that have a longer or more uncertain return on investment are problematic for private sector providers. In the current economic and fiscal environment, policymakers must also be cautious about public investments without well documented benefits to a community or region.

These three papers begin to lay the groundwork for further research that may provide additional evidence on the costs and benefits of these development strategies. Future business incubation research, framed in the economic theories of agglomeration and network economies, has the potential to provide a more accurate picture of the benefits that an incubator environment may or may not provide. Further research documenting the scope and nature of local and regional entrepreneurial development programming can provide an opportunity to characterize best practices with this economic development approach. Documenting best practices across a variety of states and regions should provide insight into the kinds of programs that have the potential to generate the most return for local communities. Finally, there is much discussion about the potential of municipal and community Broadband investments. Carefully, documenting the current and projected benefits of a number of the existing public investments will begin to provide evidence of the potential of this infrastructure at a state and national level. This research could also provide supporting evidence as to whether restrictive state policies for these investments impact other state economic and community development indicators.

"The ultimate goal of economic development is to build assets and create wealth (Lichtenstein and Lyons, 2001, p.3)." As such, it is unlikely that communities can hang their hat on one economic development approach and be successful in meeting this goal. Thus individual communities, with supporting federal and state policymakers, must consider a wider range of development approaches, thereby taking a more holistic approach to individual community and economic development needs now and in the future. From an economic development perspective, this would include business recruitment, but would also acknowledge the potential of entrepreneurial and business retention efforts. Focusing on community development could incorporate a much wider set of indicators, including traditional economic variables along with areas like civic infrastructure, community leadership, social capital, job quality, human capital investment and others. However, understanding the full scope of economic and community benefits from the range of economic development strategies is important for the future success of communities and regions.

In order to accomplish this, a wide and diverse research agenda is necessary to fully capture the range of issues that economic development policy includes. While the appearance of simple answers has great appeal to politicians and policymakers, the reality is there are not simple answers or unique solutions to community and regional entrepreneurial development. Thus, it is hoped that research practitioners will continue to ask creative questions and add to the future theory and practice of regional community and economic development efforts.

APPENDICES

APPENDIX ONE:

Entrepreneurship and Community Based Economic Development

Introduction

We appreciate your participation in our survey. The major objective of this research is to learn more about the public policy environment surrounding entrepreneurship and local economic development. Throughout this survey you will see the terms entrepreneurship and economic development frequently. For the purposes of this survey please consider the following definitions for these terms. Entrepreneurship is the term frequently used to refer to the rapid growth of new and innovative businesses and is associated with individuals who create or seize business opportunities and pursue them without regard for resources under their control. (Kauffman Center for Entrepreneurial Leadership 1999). Economic development refers to policy efforts designed to enhance overall economic well-being and quality of life for a community. This can involve creating or retaining employment, policies to improve local income, improving education, enhancing environmental protection, and better health coverage among other things. This survey should take approximately 15-20 minutes and we, once again, are appreciative of your support!

Part I: Professional/Organizational

1. Which of the following best describes your organization and responsibilities?
    1.Chamber of Commerce or Local Business Development Organization
    2.Community Development Corporation or Local Non-profit Organization
    3.Local Elected Official
    4.Local/Regional or Planning Organization (e.g. COGs)
    5.Municipal or County Staff
    6.Workforce Development Agency
    7.Other

2. Have you had personal training in economic development?
    1.yes
    2.no

3. Do you live and work in the same community?
    1.yes
    2.no

3a. If you answered no above, approximately how many miles do you travel to work?

4. How long have you lived in the area?

5. Do you have children that attend local schools?
   1.yes
   2.no

6. What is the geographic focus for your organizations economic development activities?
   1.Downtown
   2.Specific Neighborhood
   3.City-wide
   4.Entire County
   5.Regional Area
   6.Other

7. How many employees does your organization employ?

8. What is your organizations approximate budget for all economic development efforts/projects?

9. Does your organization operate an entrepreneurship development program?
1.yes
2.no

10. If yes, what services do you provide?

11. What percent (should total to 100%) of your organizations operating budget comes from the following?

- Local government ___________
- County government ___________
- State government ___________
- Federal government ___________
- Foundations ___________
- Private business ___________
- Membership dues ___________
- Other ___________

12. Approximately what percent of your agencies budget is devoted to entrepreneurship development?

Part II: Community: For the following questions please use the term COMMUNITY to describe your organizations service area.

13. What is the zip code of your city/town?

14. What is your expectation for your community's population growth over the next 5 years?

1.Major decline
2.Slight decline
3.No change
4.Slight Increase
5.Rapid Growth

15. Please rank (1-5) the top five issues that you believe are most important for your community in the near future. (1=most important and 5=least important)

- Adequate housing ___________
- Business attraction ___________
- Business retention ___________
- Education/skill development ___________
- Entrepreneurship development ___________
- Environmental quality and awareness ___________
- Job creation and development ___________
- Providing community recreation, culture, and the arts ___________
- Public safety ___________
- Telecommunications infrastructure (e.g. high-speed Broadband) ___________
- Transportation/Roads ___________
- Other ___________

16. Please consider the following questions concerning educational issues and entrepreneurship development.

	Poor	Below Average	Average	Above Average	Excellent
How do you perceive the level of K-12 educational support for entrepreneurship education in your community?	❑	❑	❑	❑	❑
How do you perceive the level of community and technical college support for entrepreneurship education within the state?	❑	❑	❑	❑	❑
How do you perceive the level of college or university support for entrepreneurship education within the state?	❑	❑	❑	❑	❑

17. Does your community have access to small business training opportunities through organizations like Small Business Development Centers (SBDC) or County Extension Offices?

1.yes
2.no

18. Does your community have a specific economic development plan?

1.yes
2.no

19. If yes, is support for entrepreneurship a component of this economic development plan?

1.yes
2.no

Part III: Economic Development Priorities

20. Please consider the importance of entrepreneurship as it relates to overall community economic development priorities.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
My community recognizes the importance of entrepreneurs to the overall economic development of the region.	❑	❑	❑	❑	❑
My community has well-development programs in place to encourage and support entrepreneurial activity.	❑	❑	❑	❑	❑

21. Rank (1-4) the top four reasons for advancing entrepreneurship development as a tool to improve the following community business and economic development issues. (1=most important and 4=least important)

- Building community and family wealth ___________
- Community/downtown revitalization ___________
- Diversification of local economic base ___________
- Enhancing workforce development skills ___________
- Improving local business retention ___________
- Improving new business recruitment ___________
- Increasing competitiveness ___________
- Increasing employment opportunities ___________

22. Of the following economic development approaches, which ONE do you perceive is the highest priority for LOCAL policymakers?

1.Business clusters
2.Business incubators
3.Downtown revitalization
4.Entrepreneurship development
5.Local business expansion
6.Local tourism initiatives
7.New business recruitment
8.Other

23. Of the following economic development approaches, which ONE do you perceive is the highest priority for STATE policymakers?

1.Business clusters
2.Business incubators
3.Downtown revitalization
4.Entrepreneurship development
5.Local business expansion
6.Local tourism initiatives
7.New business recruitment
8.Other

24. For my community, industrial and new business recruitment efforts are more important economic development tools than entrepreneurship efforts.

1.Strongly disagree
2.Disagree
3.Neither agree nor disagree
4.Agree
5.Strongly agree

Part IV: Entrepreneurship Support

25. Rate your community's access to the following methods of entrepreneurial support.

	Extremely Poor	Poor	Average	Above Average	Excellent
A local business incubator	❑	❑	❑	❑	❑
Access to venture capital or angel investors	❑	❑	❑	❑	❑
Access to start up or seed capital	❑	❑	❑	❑	❑
Advertising/marketing assistance	❑	❑	❑	❑	❑
An organized buy local program	❑	❑	❑	❑	❑
Local hiring initiatives	❑	❑	❑	❑	❑
Local infrastructure assistance (e.g. buildings, Broadband)	❑	❑	❑	❑	❑
Micro-lending programs	❑	❑	❑	❑	❑
Networking and mentoring opportunities for community businesses	❑	❑	❑	❑	❑
Small business and entrepreneurial training courses	❑	❑	❑	❑	❑
Others	❑	❑	❑	❑	❑

26. Rank (1-4) the top four constraints that your community faces in its ability to support and enhance local entrepreneurship. (1=biggest constraint; 4=least constraint)

- Availability of skilled, local professionals ___________
- Alternative local or regional projects take greater priority ___________
- Inadequate support from state/federal agencies ___________
- Lack of funding ___________
- Locational factors (e.g. market access) ___________
- Local/state taxation ___________
- Not considered a local or regional responsibility ___________
- Weak base of local entrepreneurs ___________

27. Does your community receive financial support from local, state, or federal agencies in support of entrepreneurship efforts?

1.yes
2.no

27a. If yes, how much and specify the nature of this support?

28. Would you be interested in survey results?
1.yes
2.no

29. Name, address, email

Thank you for your time and your support of Clemson research!

APPENDIX TWO: CORRELLATION MATRIX

Questions	Training in economic development	Georgraphic focus of organization	How many employees
Training in economic development	1.000	0.047	0.202
Georgraphic focus of organization	0.047	1.000	-0.097
How many employees	0.202	-0.097	1.000
Do you have any entrepreneurial development programs?	-0.161	-0.009	-0.277
Percent of budget from county	0.127	0.181	-0.106
Percent of budget from city	0.101	-0.140	0.019
Percent of budget from the state	-0.272	0.225	-0.289
Percent of budget from federal sources	-0.093	0.170	-0.092
Percent of budget from foundations	-0.146	-0.113	-0.075
Percent of budget from private sources	-0.035	0.193	0.049
Percent of budget devoted to entrepreneurial development	0.039	0.014	-0.006
Future community population growth	0.043	-0.175	-0.029
Most important community issues: Housing	0.098	0.127	-0.089
Most important community issues: Business attraction	-0.127	-0.232	0.005
Most important community issues: Business retention	0.097	-0.193	0.014
Most important community issues: Education	-0.216	-0.101	0.001
Most important community issues: Entrepreneurship	0.079	0.002	0.003
Most important community issues: Entrepreneurship	0.120	-0.044	0.143
Most important community issues: Environment	0.157	0.055	-0.178
Most important community issues: Culture	0.192	0.223	-0.075
Most important community issues: Safety	0.161	-0.104	0.053
Most important community issues: Telecomm.	0.270	-0.031	-0.074
Most important community issues: Roads	-0.041	-0.018	0.085
K-12 education support for entrepreneurhsip edu.	-0.241	-0.023	-0.038
Community coll. support for entrepreneurship edu.	-0.161	0.048	0.030
University support for entrepreneurship education	-0.055	-0.036	0.058
Access to Small Business Development Centers	0.116	-0.140	0.041
Is there a community economic development plan?	0.027	0.138	-0.076
Is entrepreneruship apart of an economic dev. plan	0.136	0.154	-0.059
Community recognizes importance of entrepreneurs	0.029	-0.064	0.073
Community has progs. to support entrepreneurship	-0.068	-0.047	0.206
Reasons for entrepreneurship: Community wealth	-0.210	-0.133	0.058
Reasons for entrepreneurship: Downtown revitalization	0.018	-0.125	0.083
Reasons for entrepreneurship: Diversify	0.201	0.011	-0.100
Reasons for entrepreneurship: Workforce dev.	-0.242	-0.109	0.132
Reasons for entrepreneurship: Business retention	0.016	0.082	0.118
Reasons for entrepreneurship: Business recruitment	0.018	0.063	-0.088
Reasons for entrepreneurship: Competitiveness	-0.061	0.041	-0.316
Reasons for entrepreneurship: Employ. opportunities	0.092	0.168	0.036
Econ. dev. approach is priority of local policymakers?	-0.122	0.016	-0.207
Econ. dev. approach is priority of state policymakers?	0.050	0.042	0.116
Industrial recruit. more important than entre. dev.	0.033	-0.243	-0.129
Access to a local business incubator	-0.154	0.021	0.206
Access to venture capital	-0.003	-0.049	0.025
Access to seed capital	0.077	0.070	0.111
Access to advertising and marketing	-0.232	-0.041	0.019
Access to a buy local program	-0.206	-0.045	-0.112
Access to local hiring programs	-0.291	-0.030	-0.020
Access to local infrastructure assistance	-0.281	0.066	0.026
Access to micro-lending	-0.120	0.172	0.029
Access to networking and mentoring	-0.290	0.058	0.159
Access to small business training courses	-0.178	0.010	0.142
Constraints: Availability of skilled local professionals	-0.035	-0.047	0.109
Constraints: Alternative local and regional projects	0.115	0.078	-0.070
Constraints: Inadequate support from gov.	-0.188	0.043	0.134
Constraints: Lack of funding	0.018	-0.021	-0.125
Constraints: Locational factors	-0.190	-0.012	0.125
Constraints: Local/state taxation	-0.022	-0.093	-0.248
Constraints: Not a local responsibility	0.157	0.047	-0.091
Constraints: Weak base of entrepreneurs	0.081	-0.066	0.066
inancial support from gov. agencies for entre.	0.131	0.083	0.187

Entrepreneurial development programs?	Percent of budget from county	Percent of budget from city	Percent of budget from the state	Percent of budget from federal sources	Percent of budget from foundations
-0.161	0.127	0.101	-0.272	-0.093	-0.146
-0.009	0.181	-0.140	0.225	0.170	-0.113
-0.277	-0.106	0.019	-0.289	-0.092	-0.075
1.000	-0.175	-0.064	0.298	0.247	0.141
-0.175	1.000	-0.233	-0.062	-0.165	0.018
-0.064	-0.233	1.000	-0.148	-0.008	0.079
0.298	-0.062	-0.148	1.000	0.631	0.325
0.247	-0.165	-0.008	0.631	1.000	0.504
0.141	0.018	0.079	0.325	0.504	1.000
-0.116	0.099	0.267	-0.098	-0.060	0.079
-0.525	-0.018	0.151	-0.287	-0.395	-0.074
-0.193	-0.099	0.038	-0.015	-0.040	0.101
-0.021	0.217	-0.055	-0.061	-0.198	-0.144
-0.015	0.001	-0.024	-0.062	0.020	-0.029
0.104	-0.099	-0.073	0.058	0.120	-0.068
0.230	-0.225	-0.054	0.109	0.155	-0.034
-0.216	0.102	-0.090	-0.142	-0.072	-0.039
-0.006	-0.083	-0.176	0.042	-0.008	-0.175
-0.216	0.122	-0.177	-0.062	-0.143	-0.116
-0.132	0.079	-0.246	0.151	-0.034	-0.003
0.044	0.004	-0.084	0.017	-0.076	-0.046
-0.156	0.100	-0.056	0.059	-0.035	-0.024
0.028	-0.110	-0.179	0.070	-0.034	-0.129
0.180	-0.050	0.094	0.146	0.304	0.209
0.154	0.140	-0.080	0.233	0.254	0.130
0.119	0.105	0.055	0.125	0.100	0.036
0.116	-0.014	0.111	-0.035	-0.055	0.019
-0.077	0.064	-0.041	0.213	0.013	0.010
-0.040	0.159	0.169	-0.057	-0.027	-0.083
-0.113	0.062	-0.107	-0.116	-0.153	-0.057
-0.059	0.052	-0.170	-0.058	0.111	0.106
0.132	-0.119	0.000	0.140	0.116	0.102
-0.067	-0.186	0.156	-0.088	-0.058	0.055
-0.086	0.112	0.225	-0.090	-0.025	-0.138
0.181	-0.188	-0.109	0.304	0.249	0.251
0.049	0.052	-0.054	-0.195	-0.105	-0.068
-0.085	0.186	0.013	-0.135	-0.125	-0.053
-0.048	0.060	0.160	0.032	-0.054	-0.140
0.070	0.125	-0.162	0.028	0.039	0.061
0.146	-0.205	0.048	0.266	0.201	0.093
0.024	-0.104	-0.065	0.035	0.251	0.098
0.322	-0.145	0.104	0.009	0.074	0.170
-0.013	-0.012	-0.300	0.034	0.088	0.041
0.088	0.078	-0.185	0.056	0.127	0.142
-0.227	0.045	0.104	-0.054	-0.126	-0.197
0.057	0.082	-0.104	-0.085	0.154	0.220
0.096	0.086	-0.238	0.227	0.163	0.178
-0.010	-0.025	-0.034	0.174	0.123	0.176
0.232	-0.143	-0.128	0.278	0.301	0.150
0.173	-0.070	-0.150	0.135	0.207	0.184
0.005	0.024	-0.304	0.106	0.231	0.074
-0.011	-0.042	-0.245	0.090	0.065	0.008
0.159	-0.047	-0.114	0.099	0.125	0.023
0.061	-0.011	0.043	0.077	0.157	-0.072
-0.073	-0.108	0.060	-0.041	0.107	0.113
0.077	0.226	-0.012	-0.025	-0.098	0.088
-0.082	0.007	-0.135	0.025	0.006	-0.020
-0.056	-0.005	0.061	-0.003	-0.162	-0.102
-0.107	0.068	0.115	-0.164	-0.107	-0.070
0.052	-0.003	-0.067	-0.042	-0.102	0.125
-0.209	0.058	0.026	-0.101	-0.031	-0.006

Percent of budget from private sources	Percent of budget devoted to entre. dev.	Future community population growth	Most important community issues: Housing	Most important community issues: Business attraction	Most important community issues: Business retention
-0.035	0.039	0.043	0.098	-0.127	0.097
0.193	0.014	-0.175	0.127	-0.232	-0.193
0.049	-0.006	-0.029	-0.089	0.005	0.014
-0.116	-0.525	-0.193	-0.021	-0.015	0.104
0.099	-0.018	-0.099	0.217	0.001	-0.099
0.267	0.151	0.038	-0.055	-0.024	-0.073
-0.098	-0.287	-0.015	-0.061	-0.062	0.058
-0.060	-0.395	-0.040	-0.198	0.020	0.120
0.079	-0.074	0.101	-0.144	-0.029	-0.068
1.000	0.055	-0.040	0.120	0.034	-0.158
0.055	1.000	0.253	0.051	-0.089	-0.213
-0.040	0.253	1.000	0.258	-0.014	0.060
0.120	0.051	0.258	1.000	-0.218	-0.155
0.034	-0.089	-0.014	-0.218	1.000	0.240
-0.158	-0.213	0.060	-0.155	0.240	1.000
-0.097	-0.107	-0.069	-0.006	-0.057	0.050
-0.090	0.082	0.081	-0.033	0.047	-0.008
-0.041	-0.041	-0.073	0.149	-0.033	-0.021
-0.223	0.280	0.185	0.282	-0.148	-0.004
-0.183	0.044	0.047	0.128	-0.217	0.085
-0.144	-0.101	0.207	0.122	0.041	0.429
-0.196	0.021	0.228	0.142	-0.148	0.127
-0.160	0.043	0.080	-0.006	-0.188	0.254
-0.101	-0.237	-0.165	-0.128	-0.002	-0.097
0.051	-0.299	-0.220	-0.047	0.016	0.043
-0.017	-0.137	-0.039	0.125	-0.156	0.099
-0.235	-0.098	0.006	0.061	-0.041	0.067
0.041	-0.024	0.166	0.171	-0.129	0.063
0.003	-0.095	-0.102	0.089	0.035	0.091
0.008	0.190	-0.052	0.168	-0.008	-0.101
-0.053	-0.019	0.043	0.208	0.020	-0.110
-0.073	-0.200	-0.072	-0.133	0.061	0.082
-0.129	0.074	0.120	-0.131	0.055	0.009
0.018	0.192	0.104	-0.060	0.059	-0.045
0.029	-0.291	-0.137	-0.066	-0.099	0.032
0.140	0.022	-0.147	0.042	-0.025	-0.086
0.074	0.177	0.012	0.051	0.003	-0.113
0.138	-0.024	0.040	0.095	0.236	-0.026
0.042	0.008	-0.026	0.078	-0.275	-0.117
-0.071	-0.104	0.035	-0.001	0.135	0.068
0.114	-0.055	0.079	-0.238	-0.095	0.082
0.037	-0.148	0.019	-0.012	0.161	0.094
-0.090	-0.146	-0.063	-0.023	-0.003	0.015
-0.027	-0.157	-0.237	-0.047	-0.094	-0.051
-0.006	0.137	0.041	-0.051	0.170	0.114
-0.180	-0.135	-0.056	-0.043	0.096	-0.019
0.037	-0.195	-0.112	0.198	-0.217	-0.182
-0.034	-0.138	-0.092	-0.035	0.160	-0.071
-0.059	-0.297	-0.085	-0.138	0.020	0.064
0.079	-0.195	-0.099	0.051	-0.189	-0.142
-0.074	-0.200	-0.072	-0.028	0.059	0.105
-0.090	-0.042	-0.038	0.002	-0.044	-0.018
0.007	-0.292	-0.123	-0.043	-0.051	0.131
-0.067	-0.070	0.098	-0.122	-0.112	-0.047
0.234	-0.007	0.194	0.117	0.073	-0.040
-0.065	0.076	-0.033	0.009	0.033	-0.070
-0.023	-0.007	-0.236	-0.102	-0.034	-0.016
-0.047	0.068	0.165	0.103	0.020	0.025
0.220	0.154	0.090	0.014	-0.015	-0.131
-0.151	0.096	-0.052	-0.005	-0.001	0.047
-0.003	0.042	-0.075	-0.055	0.027	-0.004

Most important community issues: Education	Most important community issues: Entrepreneurship	Most important community issues: Entrepreneurship	Most important community issues: Environment	Most important community issues: Culture	Most important community issues: Safety
-0.216	0.079	0.120	0.157	0.192	0.161
-0.101	0.002	-0.044	0.055	0.223	-0.104
0.001	0.003	0.143	-0.178	-0.075	0.053
0.230	-0.216	-0.006	-0.216	-0.132	0.044
-0.225	0.102	-0.083	0.122	0.079	0.004
-0.054	-0.090	-0.176	-0.177	-0.246	-0.084
0.109	-0.142	0.042	-0.062	0.151	0.017
0.155	-0.072	-0.008	-0.143	-0.034	-0.076
-0.034	-0.039	-0.175	-0.116	-0.003	-0.046
-0.097	-0.090	-0.041	-0.223	-0.183	-0.144
-0.107	0.082	-0.041	0.280	0.044	-0.101
-0.069	0.081	-0.073	0.185	0.047	0.207
-0.006	-0.033	0.149	0.282	0.128	0.122
-0.057	0.047	-0.033	-0.148	-0.217	0.041
0.050	-0.008	-0.021	-0.004	0.085	0.429
1.000	-0.197	0.021	0.034	-0.040	0.056
-0.197	1.000	0.083	0.162	-0.010	0.010
0.021	0.083	1.000	0.128	0.221	0.320
0.034	0.162	0.128	1.000	0.329	0.193
-0.040	-0.010	0.221	0.329	1.000	0.354
0.056	0.010	0.320	0.193	0.354	1.000
-0.008	0.027	0.249	0.266	0.444	0.399
0.124	-0.154	0.239	0.142	0.257	0.341
0.016	-0.054	-0.084	-0.167	-0.260	-0.133
-0.071	-0.039	-0.182	-0.193	-0.231	-0.156
0.024	-0.020	-0.074	0.002	-0.086	-0.097
0.011	-0.149	-0.122	-0.080	-0.040	0.251
-0.015	0.020	0.320	0.207	0.554	0.308
0.008	-0.069	0.170	0.037	0.230	0.256
-0.090	0.009	0.080	0.018	0.043	-0.075
0.075	-0.025	0.151	0.115	-0.061	-0.050
0.061	-0.294	-0.028	-0.061	0.021	-0.092
-0.180	-0.020	0.063	-0.113	-0.175	-0.060
-0.151	0.089	-0.152	-0.021	-0.056	-0.052
0.248	-0.101	0.006	-0.218	-0.260	-0.172
0.077	0.109	0.080	-0.223	-0.005	-0.026
-0.155	0.167	0.004	-0.076	-0.035	-0.066
0.045	0.011	-0.246	0.151	-0.033	0.053
-0.033	-0.062	0.121	0.178	0.168	0.085
0.196	-0.076	0.051	-0.121	-0.063	-0.020
0.119	-0.030	-0.030	-0.175	-0.140	-0.155
0.027	-0.078	-0.014	0.080	0.072	0.081
0.076	0.054	0.202	-0.074	-0.001	-0.031
0.093	-0.158	0.029	0.032	0.191	-0.027
-0.011	0.155	-0.004	0.055	-0.060	0.064
0.074	-0.020	-0.157	-0.125	-0.180	-0.097
0.130	0.013	0.119	-0.040	-0.118	-0.100
0.020	0.036	-0.103	-0.067	-0.114	-0.027
0.101	0.004	-0.025	-0.148	-0.078	0.068
-0.091	-0.108	0.113	-0.197	0.129	0.145
0.067	0.014	0.104	-0.196	-0.212	-0.037
0.012	0.006	0.040	-0.254	-0.059	-0.125
0.135	-0.106	-0.006	-0.009	-0.128	-0.059
-0.056	-0.126	-0.151	-0.079	0.066	-0.056
0.072	0.003	0.014	-0.019	-0.139	0.106
-0.045	0.006	-0.025	0.004	0.053	-0.001
-0.055	0.058	0.029	-0.204	0.009	-0.110
0.021	0.041	-0.199	0.128	0.004	-0.004
-0.105	-0.016	-0.026	-0.130	-0.060	-0.030
-0.172	0.089	0.059	0.069	0.052	-0.031
-0.213	0.211	0.160	0.020	0.108	0.003

Most important community issues: Telecom.	Most important community issues: Roads	K-12 education support for entre. edu.	Community college support for entre. education	University support for entre. education	Access to Small Business Dev. Centers
0.270	-0.041	-0.241	-0.161	-0.055	0.116
-0.031	-0.018	-0.023	0.048	-0.036	-0.140
-0.074	0.085	-0.038	0.030	0.058	0.041
-0.156	0.028	0.180	0.154	0.119	0.116
0.100	-0.110	-0.050	0.140	0.105	-0.014
-0.056	-0.179	0.094	-0.080	0.055	0.111
0.059	0.070	0.146	0.233	0.125	-0.035
-0.035	-0.034	0.304	0.254	0.100	-0.055
-0.024	-0.129	0.209	0.130	0.036	0.019
-0.196	-0.160	-0.101	0.051	-0.017	-0.235
0.021	0.043	-0.237	-0.299	-0.137	-0.098
0.228	0.080	-0.165	-0.220	-0.039	0.006
0.142	-0.006	-0.128	-0.047	0.125	0.061
-0.148	-0.188	-0.002	0.016	-0.156	-0.041
0.127	0.254	-0.097	0.043	0.099	0.067
-0.008	0.124	0.016	-0.071	0.024	0.011
0.027	-0.154	-0.054	-0.039	-0.020	-0.149
0.249	0.239	-0.084	-0.182	-0.074	-0.122
0.266	0.142	-0.167	-0.193	0.002	-0.080
0.444	0.257	-0.260	-0.231	-0.086	-0.040
0.399	0.341	-0.133	-0.156	-0.097	0.251
1.000	0.314	-0.142	-0.150	-0.020	0.006
0.314	1.000	0.101	-0.090	-0.001	0.003
-0.142	0.101	1.000	0.531	0.267	0.030
-0.150	-0.090	0.531	1.000	0.551	0.036
-0.020	-0.001	0.267	0.551	1.000	0.032
0.006	0.003	0.030	0.036	0.032	1.000
0.386	0.265	-0.125	-0.195	-0.012	-0.057
0.189	0.148	-0.050	-0.128	-0.125	0.248
0.046	-0.031	0.193	0.137	0.255	-0.130
0.083	0.110	0.418	0.318	0.330	-0.082
-0.120	0.056	0.169	0.179	0.119	0.076
-0.014	-0.119	-0.114	-0.154	-0.185	0.000
-0.021	-0.192	-0.137	-0.025	0.025	0.104
-0.257	0.043	0.223	0.186	0.109	-0.124
-0.211	-0.026	-0.058	-0.259	-0.220	-0.140
0.073	-0.039	0.096	0.070	-0.045	-0.027
-0.049	-0.201	-0.151	-0.072	-0.023	-0.038
0.250	0.039	-0.022	0.029	0.070	0.000
-0.033	-0.111	-0.127	-0.171	-0.137	0.008
0.019	0.045	0.051	0.159	0.022	-0.090
-0.072	-0.051	0.007	-0.006	0.055	-0.013
-0.048	0.042	0.163	0.238	0.191	-0.078
0.108	0.056	0.193	0.137	0.150	0.097
0.034	-0.123	-0.205	-0.169	-0.076	-0.145
-0.077	-0.088	0.398	0.268	0.275	0.064
-0.108	-0.083	0.225	0.101	0.158	-0.089
-0.087	-0.101	0.202	0.144	0.080	-0.077
-0.101	0.047	0.217	0.202	0.137	0.060
-0.093	0.092	0.265	0.167	0.060	0.035
-0.115	0.097	0.305	0.340	0.280	-0.180
-0.026	0.033	0.184	0.274	0.276	-0.121
-0.138	-0.022	0.215	0.297	0.344	-0.037
0.033	-0.156	-0.023	0.089	0.071	0.122
-0.189	-0.027	0.013	-0.107	-0.112	-0.053
0.154	0.091	-0.231	-0.125	-0.164	-0.093
-0.175	0.054	0.181	0.145	-0.026	-0.085
-0.032	-0.147	-0.107	-0.207	-0.128	0.049
0.103	0.065	-0.095	-0.049	-0.026	-0.015
0.103	0.001	-0.096	-0.058	-0.093	0.029
0.090	0.039	-0.157	-0.026	-0.116	0.008

Community economic development plan?	Entrepreneruship a part of an econ. development. plan	Community recognizes import. of entrepreneurs	Comm. has well-developed progrs to support entre.	Reasons for entrepreneurship: Community wealth	Reasons for entre.: Downtown revitalization
0.027	0.136	0.029	-0.068	-0.210	0.018
0.138	0.154	-0.064	-0.047	-0.133	-0.125
-0.076	-0.059	0.073	0.206	0.058	0.083
-0.077	-0.040	-0.113	-0.059	0.132	-0.067
0.064	0.159	0.062	0.052	-0.119	-0.186
-0.041	0.169	-0.107	-0.170	0.000	0.156
0.213	-0.057	-0.116	-0.058	0.140	-0.088
0.013	-0.027	-0.153	0.111	0.116	-0.058
0.010	-0.083	-0.057	0.106	0.102	0.055
0.041	0.003	0.008	-0.053	-0.073	-0.129
-0.024	-0.095	0.190	-0.019	-0.200	0.074
0.166	-0.102	-0.052	0.043	-0.072	0.120
0.171	0.089	0.168	0.208	-0.133	-0.131
-0.129	0.035	-0.008	0.020	0.061	0.055
0.063	0.091	-0.101	-0.110	0.082	0.009
-0.015	0.008	-0.090	0.075	0.061	-0.180
0.020	-0.069	0.009	-0.025	-0.294	-0.020
0.320	0.170	0.080	0.151	-0.028	0.063
0.207	0.037	0.018	0.115	-0.061	-0.113
0.554	0.230	0.043	-0.061	0.021	-0.175
0.308	0.256	-0.075	-0.050	-0.092	-0.060
0.386	0.189	0.046	0.083	-0.120	-0.014
0.265	0.148	-0.031	0.110	0.056	-0.119
-0.125	-0.050	0.193	0.418	0.169	-0.114
-0.195	-0.128	0.137	0.318	0.179	-0.154
-0.012	-0.125	0.255	0.330	0.119	-0.185
-0.057	0.248	-0.130	-0.082	0.076	0.000
1.000	0.418	0.000	-0.052	-0.030	-0.169
0.418	1.000	-0.176	-0.279	-0.076	-0.155
0.000	-0.176	1.000	0.562	-0.006	0.110
-0.052	-0.279	0.562	1.000	0.096	0.039
-0.030	-0.076	-0.006	0.096	1.000	-0.050
-0.169	-0.155	0.110	0.039	-0.050	1.000
-0.127	0.009	-0.153	-0.262	-0.132	-0.008
-0.180	-0.176	-0.031	0.078	0.043	-0.121
0.084	0.081	-0.047	0.022	-0.321	-0.019
0.001	0.060	-0.042	0.094	-0.220	-0.149
0.073	0.189	-0.044	-0.253	-0.114	-0.048
0.029	0.036	0.129	-0.037	-0.119	-0.265
0.034	0.013	-0.197	-0.147	0.070	0.262
0.001	-0.131	-0.106	-0.017	0.032	0.066
0.136	-0.026	-0.103	-0.032	0.105	-0.009
0.051	-0.166	0.387	0.542	-0.006	0.184
-0.072	-0.060	0.387	0.390	0.115	0.039
0.071	0.120	-0.026	-0.218	-0.076	-0.057
-0.192	0.020	0.009	0.355	0.033	-0.016
-0.161	-0.119	0.242	0.290	-0.052	0.103
-0.241	-0.134	0.121	0.260	-0.125	0.140
0.006	-0.007	0.031	0.186	-0.194	-0.014
0.016	-0.104	0.236	0.359	-0.054	0.069
-0.130	-0.178	0.188	0.385	0.126	0.116
-0.059	-0.059	0.210	0.270	-0.051	0.021
-0.155	-0.141	0.021	0.147	0.233	-0.034
-0.024	0.131	-0.061	-0.239	0.066	-0.133
0.092	0.010	-0.130	0.092	0.079	0.095
0.089	0.112	-0.078	-0.138	-0.068	0.049
-0.171	-0.109	-0.112	0.006	0.039	0.034
0.103	0.122	-0.100	-0.150	-0.055	-0.010
0.039	0.140	0.201	-0.037	-0.160	0.024
-0.172	-0.259	0.191	0.138	-0.013	0.152
0.092	0.084	0.077	0.039	-0.199	0.148

Eco. Dev approach is priority of local policymakers?	Econ. dev approach is priority of state policymakers?	Indust. recruit.more important than entre. efforts.	Access to a local business incubator	Access to venture capital	Access to seed capital
-0.122	0.050	0.033	-0.154	-0.003	0.077
0.016	0.042	-0.243	0.021	-0.049	0.070
-0.207	0.116	-0.129	0.206	0.025	0.111
0.146	0.024	0.322	-0.013	0.088	-0.227
-0.205	-0.104	-0.145	-0.012	0.078	0.045
0.048	-0.065	0.104	-0.300	-0.185	0.104
0.266	0.035	0.009	0.034	0.056	-0.054
0.201	0.251	0.074	0.088	0.127	-0.126
0.093	0.098	0.170	0.041	0.142	-0.197
-0.071	0.114	0.037	-0.090	-0.027	-0.006
-0.104	-0.055	-0.148	-0.146	-0.157	0.137
0.035	0.079	0.019	-0.063	-0.237	0.041
-0.001	-0.238	-0.012	-0.023	-0.047	-0.051
0.135	-0.095	0.161	-0.003	-0.094	0.170
0.068	0.082	0.094	0.015	-0.051	0.114
0.196	0.119	0.027	0.076	0.093	-0.011
-0.076	-0.030	-0.078	0.054	-0.158	0.155
0.051	-0.030	-0.014	0.202	0.029	-0.004
-0.121	-0.175	0.080	-0.074	0.032	0.055
-0.063	-0.140	0.072	-0.001	0.191	-0.060
-0.020	-0.155	0.081	-0.031	-0.027	0.064
-0.033	0.019	-0.072	-0.048	0.108	0.034
-0.111	0.045	-0.051	0.042	0.056	-0.123
-0.127	0.051	0.007	0.163	0.193	-0.205
-0.171	0.159	-0.006	0.238	0.137	-0.169
-0.137	0.022	0.055	0.191	0.150	-0.076
0.008	-0.090	-0.013	-0.078	0.097	-0.145
0.034	0.001	0.136	0.051	-0.072	0.071
0.013	-0.131	-0.026	-0.166	-0.060	0.120
-0.197	-0.106	-0.103	0.387	0.387	-0.026
-0.147	-0.017	-0.032	0.542	0.390	-0.218
0.070	0.032	0.105	-0.006	0.115	-0.076
0.262	0.066	-0.009	0.184	0.039	-0.057
0.027	-0.030	-0.031	-0.326	-0.296	0.198
0.192	0.247	-0.055	0.141	0.059	-0.057
-0.063	-0.055	-0.133	0.092	0.014	-0.116
-0.114	-0.131	-0.210	0.042	0.119	-0.183
0.047	-0.085	0.201	-0.294	-0.157	0.167
-0.265	-0.026	-0.035	0.037	0.129	-0.011
1.000	0.304	0.111	-0.025	-0.183	0.006
0.304	1.000	0.115	0.087	-0.135	0.001
0.111	0.115	1.000	0.047	-0.057	-0.031
-0.025	0.087	0.047	1.000	0.411	-0.147
-0.183	-0.135	-0.057	0.411	1.000	-0.515
0.006	0.001	-0.031	-0.147	-0.515	1.000
-0.133	-0.040	-0.014	0.200	0.163	-0.159
0.029	-0.077	-0.105	0.349	0.470	-0.345
0.161	-0.147	0.076	0.271	0.316	-0.241
0.000	0.018	-0.046	0.364	0.327	-0.335
-0.054	-0.095	0.048	0.375	0.425	-0.497
0.057	0.037	-0.090	0.457	0.144	-0.038
-0.003	0.084	-0.201	0.427	0.237	-0.122
0.109	0.086	0.158	0.185	-0.002	0.000
-0.105	0.042	0.009	-0.152	0.032	0.094
0.384	0.280	-0.093	-0.103	-0.163	-0.089
0.002	0.019	-0.052	-0.231	-0.060	0.059
-0.126	-0.017	-0.071	0.227	0.258	-0.139
0.123	-0.098	0.075	-0.107	-0.120	0.063
-0.199	-0.048	-0.135	0.011	0.041	-0.098
-0.121	-0.137	-0.074	0.219	0.101	0.008
-0.250	-0.067	-0.117	0.153	-0.044	0.111

Access to advertising and marketing	Access to a buy local program	Access to local hiring programs	Access to local infrastructure assistance	Access to micro-lending	Access to networking and mentoring
-0.232	-0.206	-0.291	-0.281	-0.120	-0.290
-0.041	-0.045	-0.030	0.066	0.172	0.058
0.019	-0.112	-0.020	0.026	0.029	0.159
0.057	0.096	-0.010	0.232	0.173	0.005
0.082	0.086	-0.025	-0.143	-0.070	0.024
-0.104	-0.238	-0.034	-0.128	-0.150	-0.304
-0.085	0.227	0.174	0.278	0.135	0.106
0.154	0.163	0.123	0.301	0.207	0.231
0.220	0.178	0.176	0.150	0.184	0.074
-0.180	0.037	-0.034	-0.059	0.079	-0.074
-0.135	-0.195	-0.138	-0.297	-0.195	-0.200
-0.056	-0.112	-0.092	-0.085	-0.099	-0.072
-0.043	0.198	-0.035	-0.138	0.051	-0.028
0.096	-0.217	0.160	0.020	-0.189	0.059
-0.019	-0.182	-0.071	0.064	-0.142	0.105
0.074	0.130	0.020	0.101	-0.091	0.067
-0.020	0.013	0.036	0.004	-0.108	0.014
-0.157	0.119	-0.103	-0.025	0.113	0.104
-0.125	-0.040	-0.067	-0.148	-0.197	-0.196
-0.180	-0.118	-0.114	-0.078	0.129	-0.212
-0.097	-0.100	-0.027	0.068	0.145	-0.037
-0.077	-0.108	-0.087	-0.101	-0.093	-0.115
-0.088	-0.083	-0.101	0.047	0.092	0.097
0.398	0.225	0.202	0.217	0.265	0.305
0.268	0.101	0.144	0.202	0.167	0.340
0.275	0.158	0.080	0.137	0.060	0.280
0.064	-0.089	-0.077	0.060	0.035	-0.180
-0.192	-0.161	-0.241	0.006	0.016	-0.130
0.020	-0.119	-0.134	-0.007	-0.104	-0.178
0.009	0.242	0.121	0.031	0.236	0.188
0.355	0.290	0.260	0.186	0.359	0.385
0.033	-0.052	-0.125	-0.194	-0.054	0.126
-0.016	0.103	0.140	-0.014	0.069	0.116
-0.196	-0.298	-0.175	-0.322	-0.278	-0.264
0.155	0.239	0.151	0.265	0.110	0.116
0.126	0.057	0.039	0.193	0.194	-0.039
0.080	0.029	-0.031	0.109	0.091	-0.056
-0.143	-0.135	0.127	-0.013	-0.140	-0.190
-0.030	0.057	-0.095	0.088	0.051	-0.001
-0.133	0.029	0.161	0.000	-0.054	0.057
-0.040	-0.077	-0.147	0.018	-0.095	0.037
-0.014	-0.105	0.076	-0.046	0.048	-0.090
0.200	0.349	0.271	0.364	0.375	0.457
0.163	0.470	0.316	0.327	0.425	0.144
-0.159	-0.345	-0.241	-0.335	-0.497	-0.038
1.000	0.318	0.273	0.359	0.153	0.415
0.318	1.000	0.418	0.413	0.304	0.361
0.273	0.418	1.000	0.496	0.344	0.285
0.359	0.413	0.496	1.000	0.468	0.186
0.153	0.304	0.344	0.468	1.000	0.258
0.415	0.361	0.285	0.186	0.258	1.000
0.349	0.365	0.327	0.359	0.318	0.567
0.112	0.130	0.151	0.096	0.036	0.215
-0.014	-0.033	-0.197	-0.034	-0.080	-0.127
0.046	-0.006	0.050	0.104	0.064	0.104
-0.082	-0.174	-0.155	-0.124	-0.150	-0.187
0.157	0.198	0.185	0.191	0.228	0.062
-0.076	-0.040	-0.064	-0.037	-0.098	-0.211
-0.105	-0.043	-0.010	-0.038	0.047	-0.066
-0.041	0.012	0.101	-0.031	0.025	0.095
0.083	-0.031	0.032	0.048	0.098	0.016

Access to small business training courses	Constraints: Availability of loc. professionals	Constraints: Alternative local & regional projects	Constraints: Inadequate support from gov. agencies	Constraints: Lack of funding	Constraints: Locational factors
-0.178	-0.035	0.115	-0.188	0.018	-0.190
0.010	-0.047	0.078	0.043	-0.021	-0.012
0.142	0.109	-0.070	0.134	-0.125	0.125
-0.011	0.159	0.061	-0.073	0.077	-0.082
-0.042	-0.047	-0.011	-0.108	0.226	0.007
-0.245	-0.114	0.043	0.060	-0.012	-0.135
0.090	0.099	0.077	-0.041	-0.025	0.025
0.065	0.125	0.157	0.107	-0.098	0.006
0.008	0.023	-0.072	0.113	0.088	-0.020
-0.090	0.007	-0.067	0.234	-0.065	-0.023
-0.042	-0.292	-0.070	-0.007	0.076	-0.007
-0.038	-0.123	0.098	0.194	-0.033	-0.236
0.002	-0.043	-0.122	0.117	0.009	-0.102
-0.044	-0.051	-0.112	0.073	0.033	-0.034
-0.018	0.131	-0.047	-0.040	-0.070	-0.016
0.012	0.135	-0.056	0.072	-0.045	-0.055
0.006	-0.106	-0.126	0.003	0.006	0.058
0.040	-0.006	-0.151	0.014	-0.025	0.029
-0.254	-0.009	-0.079	-0.019	0.004	-0.204
-0.059	-0.128	0.066	-0.139	0.053	0.009
-0.125	-0.059	-0.056	0.106	-0.001	-0.110
-0.026	-0.138	0.033	-0.189	0.154	-0.175
0.033	-0.022	-0.156	-0.027	0.091	0.054
0.184	0.215	-0.023	0.013	-0.231	0.181
0.274	0.297	0.089	-0.107	-0.125	0.145
0.276	0.344	0.071	-0.112	-0.164	-0.026
-0.121	-0.037	0.122	-0.053	-0.093	-0.085
-0.059	-0.155	-0.024	0.092	0.089	-0.171
-0.059	-0.141	0.131	0.010	0.112	-0.109
0.210	0.021	-0.061	-0.130	-0.078	-0.112
0.270	0.147	-0.239	0.092	-0.138	0.006
-0.051	0.233	0.066	0.079	-0.068	0.039
0.021	-0.034	-0.133	0.095	0.049	0.034
-0.266	-0.067	0.281	-0.084	0.014	-0.065
0.239	0.221	-0.192	0.058	0.053	0.323
0.032	-0.021	-0.140	0.189	0.022	0.016
0.129	-0.189	-0.066	0.089	0.128	0.074
-0.204	-0.050	0.103	0.069	0.185	-0.160
0.011	0.018	0.183	-0.184	0.054	-0.075
-0.003	0.109	-0.105	0.384	0.002	-0.126
0.084	0.086	0.042	0.280	0.019	-0.017
-0.201	0.158	0.009	-0.093	-0.052	-0.071
0.427	0.185	-0.152	-0.103	-0.231	0.227
0.237	-0.002	0.032	-0.163	-0.060	0.258
-0.122	0.000	0.094	-0.089	0.059	-0.139
0.349	0.112	-0.014	0.046	-0.082	0.157
0.365	0.130	-0.033	-0.006	-0.174	0.198
0.327	0.151	-0.197	0.050	-0.155	0.185
0.359	0.096	-0.034	0.104	-0.124	0.191
0.318	0.036	-0.080	0.064	-0.150	0.228
0.567	0.215	-0.127	0.104	-0.187	0.062
1.000	0.070	-0.013	-0.014	-0.124	0.104
0.070	1.000	-0.142	-0.097	-0.364	-0.006
-0.013	-0.142	1.000	-0.186	-0.107	-0.179
-0.014	-0.097	-0.186	1.000	0.089	-0.235
-0.124	-0.364	-0.107	0.089	1.000	-0.085
0.104	-0.006	-0.179	-0.235	-0.085	1.000
-0.231	0.052	-0.131	0.057	-0.092	-0.111
0.086	-0.252	0.127	-0.189	-0.074	-0.172
0.061	-0.089	-0.361	-0.305	0.001	0.124
0.034	-0.122	-0.022	-0.251	0.057	0.038

Constraints: Local/state taxation	Constraints: Not a local responsibility	Constraints: Weak base of entrepreneurs	Financial support from gov. agencies for entre.
-0.022	0.157	0.081	0.131
-0.093	0.047	-0.066	0.083
-0.248	-0.091	0.066	0.187
-0.056	-0.107	0.052	-0.209
-0.005	0.068	-0.003	0.058
0.061	0.115	-0.067	0.026
-0.003	-0.164	-0.042	-0.101
-0.162	-0.107	-0.102	-0.031
-0.102	-0.070	0.125	-0.006
-0.047	0.220	-0.151	-0.003
0.068	0.154	0.096	0.042
0.165	0.090	-0.052	-0.075
0.103	0.014	-0.005	-0.055
0.020	-0.015	-0.001	0.027
0.025	-0.131	0.047	-0.004
0.021	-0.105	-0.172	-0.213
0.041	-0.016	0.089	0.211
-0.199	-0.026	0.059	0.160
0.128	-0.130	0.069	0.020
0.004	-0.060	0.052	0.108
-0.004	-0.030	-0.031	0.003
-0.032	0.103	0.103	0.090
-0.147	0.065	0.001	0.039
-0.107	-0.095	-0.096	-0.157
-0.207	-0.049	-0.058	-0.026
-0.128	-0.026	-0.093	-0.116
0.049	-0.015	0.029	0.008
0.103	0.039	-0.172	0.092
0.122	0.140	-0.259	0.084
-0.100	0.201	0.191	0.077
-0.150	-0.037	0.138	0.039
-0.055	-0.160	-0.013	-0.199
-0.010	0.024	0.152	0.148
0.051	0.131	-0.085	0.048
0.024	-0.244	-0.020	-0.084
0.106	0.118	-0.090	-0.007
0.028	-0.046	0.081	-0.054
0.133	0.196	-0.279	-0.196
-0.080	0.118	0.117	0.067
0.123	-0.199	-0.121	-0.250
-0.098	-0.048	-0.137	-0.067
0.075	-0.135	-0.074	-0.117
-0.107	0.011	0.219	0.153
-0.120	0.041	0.101	-0.044
0.063	-0.098	0.008	0.111
-0.076	-0.105	-0.041	0.083
-0.040	-0.043	0.012	-0.031
-0.064	-0.010	0.101	0.032
-0.037	-0.038	-0.031	0.048
-0.098	0.047	0.025	0.098
-0.211	-0.066	0.095	0.016
-0.231	0.086	0.061	0.034
0.052	-0.252	-0.089	-0.122
-0.131	0.127	-0.361	-0.022
0.057	-0.189	-0.305	-0.251
-0.092	-0.074	0.001	0.057
-0.111	-0.172	0.124	0.038
1.000	-0.151	-0.170	-0.011
-0.151	1.000	-0.016	0.074
-0.170	-0.016	1.000	0.209
-0.011	0.074	0.209	1.000

APPENDIX THREE: OVERVIEW OF STATE POLICY RESTRICTIONS

State	**Policy Restriction**
Alabama	Municipalities are forbidden from using local funds or taxes to pay for start up expenses on capital intensive projects until the project is constructed and revenues can cover expenses.
Arkansas	Municipalities are forbidden from providing local exchange services.
Colorado	Must hold a referendum if municipalities want to provide cable, telecommunications or Broadband services unless incumbents will not provide the services in questions at the request of the community.
Florida	Imposes ad-valorem taxes on municipal telecommunications unlike other public municipal services.
Louisiana	Must hold a referendum if municipalities want to provide cable, telecommunications or Broadband services. The municipality must also impute the various costs that a private provider might pay if they provided the service.
Michigan	May provide telecommunications services if the municipality has requested at least three qualified private bids for the service.
Minnesota	Municipalities must obtain a super majority (65%) of all local voters before providing local exchange services or facilities.
Missouri	Municipalities are forbidden from selling or leasing telecommunications services unless it is for internal purposes or for educational, health, or emergency purposes.
Nebraska	Generally prohibits public agencies from providing wholesale or retail Broadband, Internet, telecommunications or cable service.
Nevada	Municipalities with populations of 25,000 or more or counties of 50,000 or more are forbidden from telecommunications services as defined by federal law.
Pennsylvania	Municipalities are forbidden from providing telecommunications services unless the local telephone company refuses to provide the service within 14 months of the initial request. The only criteria under consideration for whether the community is un-served are data speed on any kind.
South Carolina	Imposes substantial and burdensome procedural requirements. Among other things, municipal providers must impute into their rates all costs that private firms would incur, including income taxes.
Tennessee	Municipal provision in only allowed after public disclosure of anti-competitive assurances, and public hearing and voting requirements.
Texas	Municipalities are forbidden from providing telecommunications services either directly or indirectly.
Utah	Imposes substantial and burdensome procedural and accounting requirements.
Virginia	Municipal utilities can become municipal local exchange carriers and offer all communications services as long as they do not subsidize services, do not charge rates lower than incumbents, impute private sector costs into their rates, and meet other procedural, reporting and financing requirements.
Washington	Public utility districts may not provide communications services directly to consumers
Wisconsin	Feasibility studies and public hearings are all requirements before municipalities can consider providing telecom, cable, or internet services. It also prohibits subsidization of most cable and telecom services.

APPENDIX FOUR: MEU SURVEY RESULTS

Table A4.1: Question: How important is ICT to the future of these different community sectors (% of respondents)?

	Main Street/Small Businesses	**Industrial Businesses**	**Health Sector**	**Education Sector**	**Govt Sector**	**Households**	**Workforce development**
Critical	18.18	16.67	33.33	**41.67**	33.33	0.00	27.27
Very Important	**54.55**	**75.00**	**41.67**	41.67	**58.33**	33.33	**36.36**
Somewhat Important	27.27	8.33	25.00	16.67	8.33	**58.33**	36.36
Not at all Important	0.00	0.00	0.00	0.00	0.00	8.33	0.00
Do Not Know	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A4.2: Question: Rate the importance of using Information Communications Technology (ICT) to advance the following community strategies as they relate to business and economic development (% of respondents).

	Increasing competitiveness	**Enhancing workforce development- education and skills**	**Improving ready access to suppliers**	**Improving communicatio n with consumers**	**Enhancing regional marketing**	**Increasing employment opportunities**	**Improving new business recruitment**
Critical	25.00	8.33	8.33	16.67	18.18	25.00	25.00
Very Important	**58.33**	**50.00**	**66.67**	33.33	**54.55**	**41.67**	**41.67**
Somewhat Important	16.67	41.67	16.67	**41.67**	9.09	16.67	16.67
Not at all Important	0.00	0.00	8.33	0.00	9.09	8.33	8.33
Don't Know	0.00	0.00	0.00	8.33	9.09	8.33	8.33

APPENDIX FIVE: BIVARIATE RELATIONSHIP BETWEEN STATE POLICY RESTRICTIONS AND DEPENDENT VARIABLES

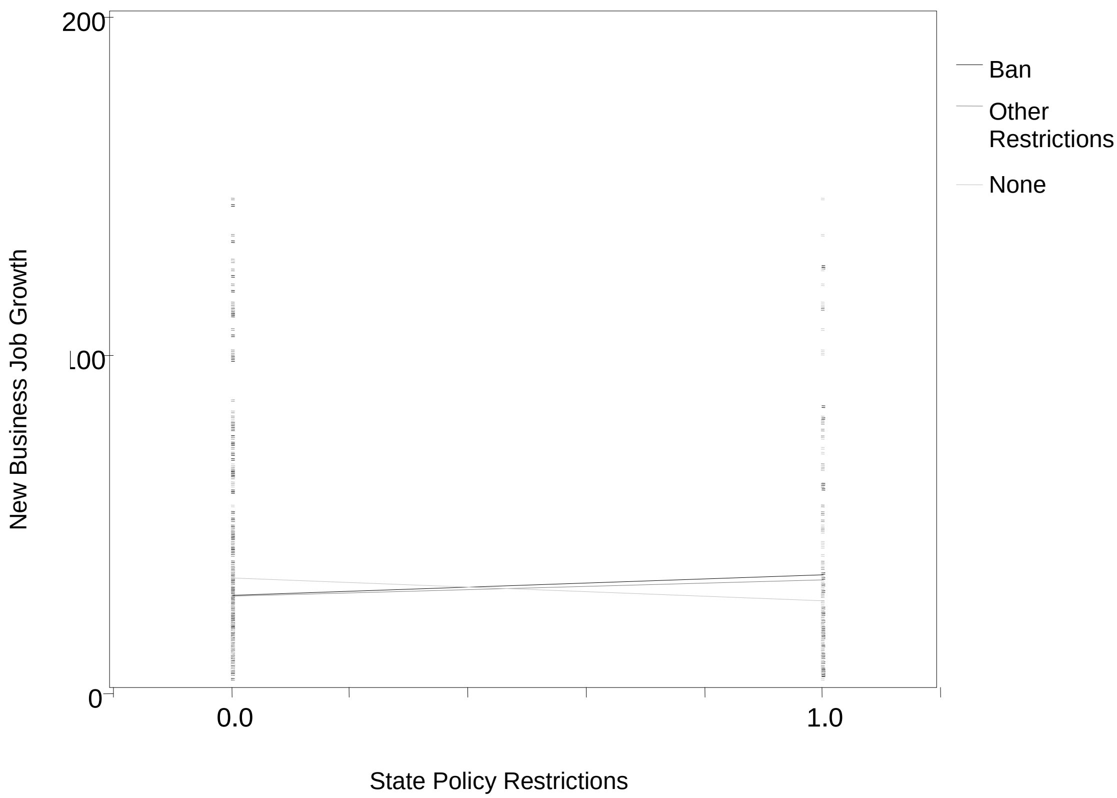

Figure A5.1: Bivariate Relationship between State Policy Restrictions and New Business Job Growth

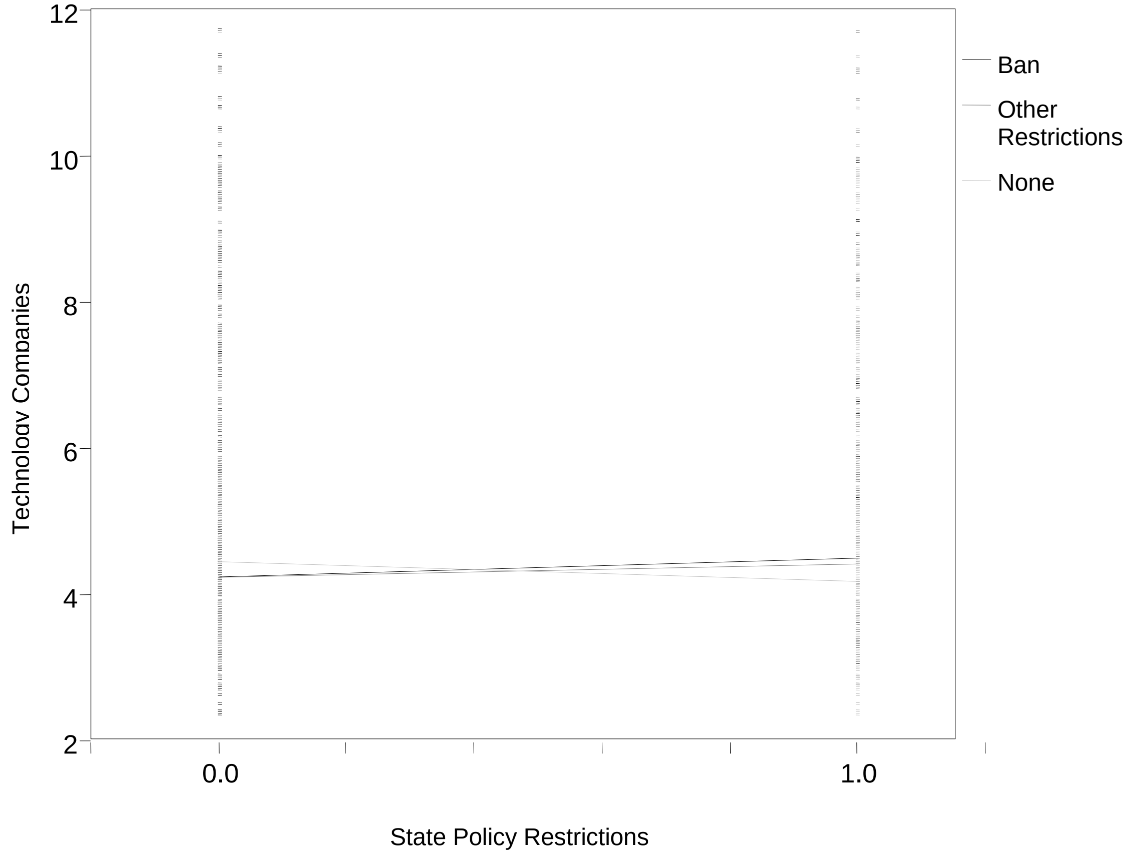

Figure A5.2: Bivariate Relationship between State Policy Restrictions and Number of Technology Companies

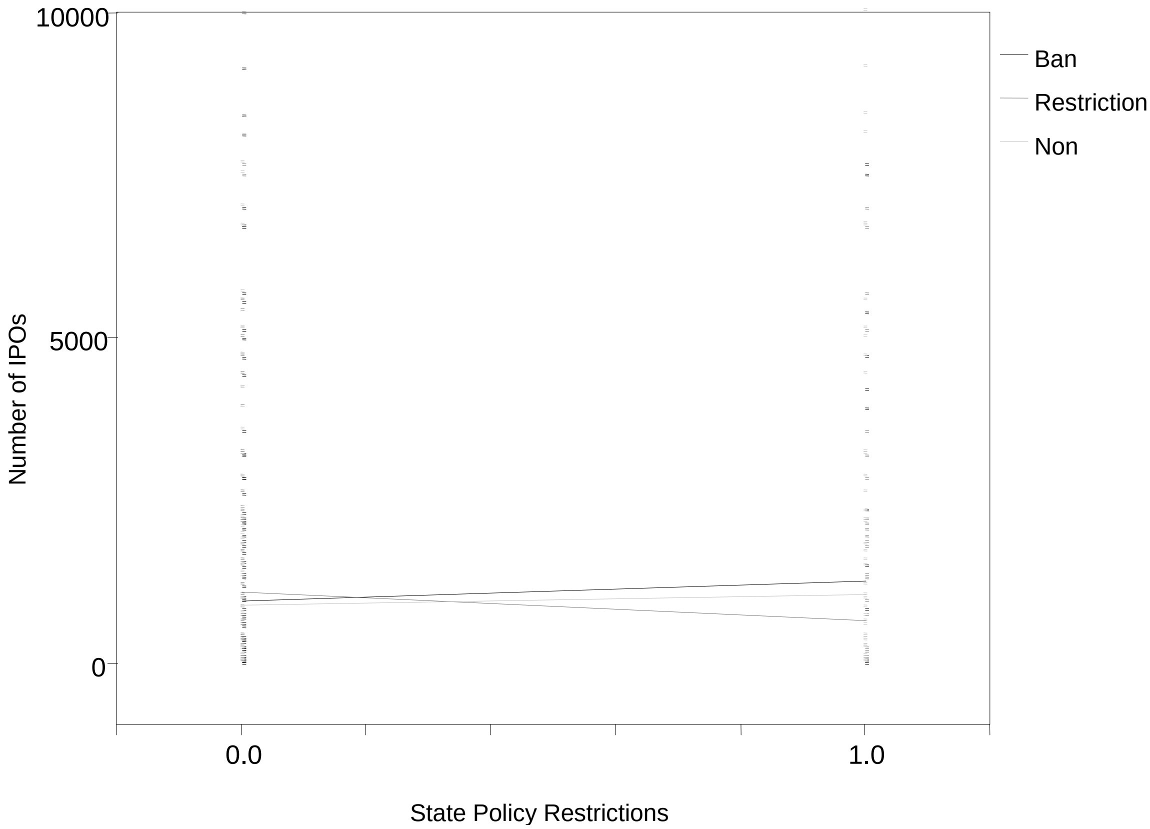

Figure 2: Bivariate Relationship between State Policy Restrictions and Number of IPOS

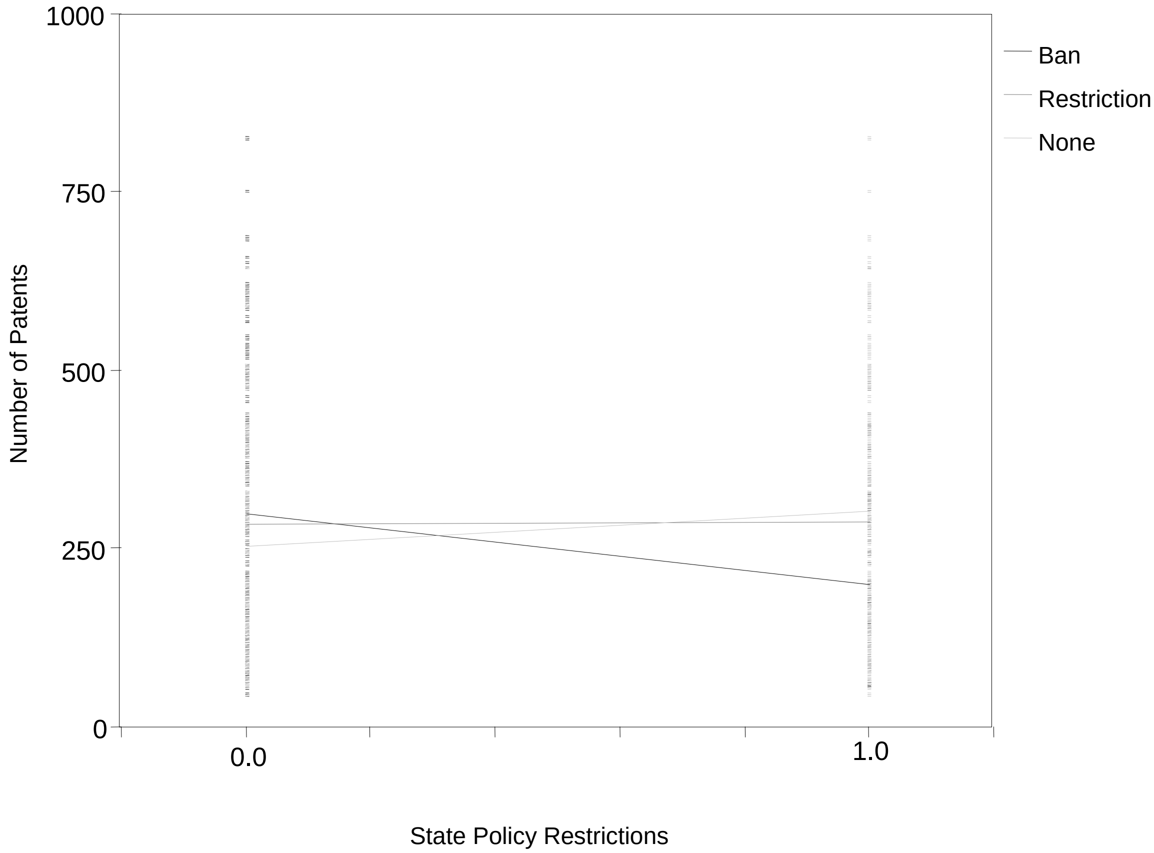

Figure A5.4: Bivariate Relationship between State Policy Restrictions and Number of Patents

APPENDIX SIX: ADDITIONAL REGRESSION MODELS

Table A6.1 presents the results for a random state/time fixed effects model with the number of technology companies in a state as the dependent variable. The adjusted R-squared is .879, which indicates a significant amount of the variation in the number of technology companied is explained by this set of parameters. College attainment, federal research and development, the percentage of households with computers, the number of

Table A6.1: Regression Estimates for Technology Companies

Term	**Estimate**	**Std Error**	**Prob>|t|**
Intercept	-1.522413	0.996572	0.1324
College Attainment	0.1955295	0.041455	<.0001*
Federal R&D	0.0010875	0.000444	0.0179*
Percent Household Computers	0.0555602	0.024518	0.0248*
Median Income	-6.68E-05	2.42E-05	0.0067*
Patents	0.0015775	0.000679	0.0239*
Population Density	-0.000794	0.000621	0.2063
Private Lending	-4.13E-05	2.75E-05	0.1343
Private R&D	0.0003646	0.000163	0.0274*
2001	3.5038867	0.440564	<.0001*
2002	2.7369853	0.177374	<.0001*
2003	-4.177705	0.183189	<.0001*
2004	1.4616275	0.187313	<.0001*
2006	1.0797689	0.188726	<.0001*
Observations	350		
RSquare	0.879279		
RSquare Adj	0.873792		
Root Mean Square Error	1.255211		

patents, and private research and development all have a positive, statistically significant relationship with the number of technology companies in a state. However, the median income has a very small but negative, statistically significant relationship with the number of technology companies in a state.

Table A6.2 presents the results for a random state/time fixed effects model with the number of annual patents in a state as the dependent variable. The adjusted R-squared is .982, which indicates a significant amount of the variation in the number of patents in a state is explained by this set of parameters. The lowest state corporate tax rate, population density, private research and development, royalties, and state income distribution are all positive and statistically significant with the number of annual patents in a state. However, the highest state corporate tax rate and long-term employment growth have negative, statistically significant relationships with patent activity in a state.

Table A6.3 presents the results for a random state/time fixed effects model with the number of new companies as the dependent variable. The adjusted R-squared is .905, which indicates a significant amount of the variation in the number of new companies in a state is explained by this set of parameters. This model uses the Ban ICT restriction dummy and the interaction term of ban with the percentage of households with computers was found to be significant. The results of these marginal effects reveal that a state with a ban on local involvement in ICT policy efforts has a very small decrease in the number of new companies reported annually compared to state without this ban. This confirms that the ICT policy issue has layers of complexity that future research should consider exploring. In this model high school attainment, the percentage of households with computers, state income distribution, the number of patents, and venture capital all have a positive, statistically significant relationship with the number of new companies in a state. However, the percentage of businesses that provide health care for their employees

Table A6.2: Regression Estimates for State Patent Activity

Term	**Estimate**	**Std Error**	**Prob>|t|**
Intercept	244.89954	46.14469	<.0001
Percent Business closings	-1.884311	0.995342	0.0595
Corporate Taxes/Lowest	10.537066	3.300212	0.0016*
Corporate Taxes/ Highest	-10.12506	3.341278	0.0027*
IPOs	0.0007235	0.000508	0.156
Long term employment growth	-1.22708	0.46191	0.0084*
Median Income	0.0004373	0.000717	0.5423
Population Density	0.1965981	0.075954	0.0128*
Private R&D	0.0128863	0.004569	0.0052*
Royalties	0.3717055	0.176547	0.0363*
Income Distribution	0.129453	0.058989	0.0289*
2000	18.272607	3.633997	<.0001*
2001	11.627379	3.852948	0.0028*
2002	14.556268	3.38676	<.0001*
2003	1.6640595	3.630256	0.6471
2004	7.4899059	3.666752	0.0422*
2006	-11.49771	3.385501	0.0008*
University spinoffs	-0.626514	0.628544	0.3199
Observations	350		
RSquare	0.983363		
RSquare Adj	0.982451		
Root Mean Square Error	22.82213		

and the state percentage in poverty have a negative, statistically significant relationship with the number of new companies in a state.

Table A6.3: Regression Estimates for the Number of New Companies

Term	Estimate	Std Error	Prob>|t|
Intercept	-0.275889	2.753028	0.9202
Ban	0.5387665	0.398923	0.1794
Ban*Percent HHD with Computers	-0.009913	0.005137	0.0546
Corporate Taxes	-0.05842	0.041525	0.1606
Health Care	-0.069918	0.020225	0.0006*
High School Attainment	0.1017319	0.026301	0.0001*
Percent HHD With Computers	0.0498426	0.015817	0.0018*
Income Distribution	0.129453	0.058989	0.0289*
Patents	0.0011246	0.000604	0.0638
Poverty	-0.117679	0.0463	0.0115*
2000	-0.275889	2.753028	0.9202
2001	1.2440028	0.228281	<.0001*
2002	0.9920806	0.228885	<.0001*
2003	0.2605217	0.090712	0.0044*
2004	-0.744619	0.123768	<.0001*
2006	-0.655601	0.120672	<.0001*
Venture Capital	0.0007716	0.000205	0.0002*
Observations	350		
RSquare	0.909326		
RSquare Adj	0.904969		
Root Mean Square Error	0.637356		

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