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*Cathy Plummer Hill*

**Entrepreneurship in rural areas**  
**Examining the influence of postsecondary education**

by

Cathy P. Hill

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree  
Of  
Doctor of Business Administration  
  
In the Robinson College of Business  
Of  
Georgia State University

GEORGIA STATE UNIVERSITY  
ROBINSON COLLEGE OF BUSINESS

2022

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## ACCEPTANCE

This dissertation was prepared under the direction of the CATHY PLUMMER HILL Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctor of Business Administration in the J. Mack Robinson College of Business of Georgia State University.

Richard D. Phillips, Dean

## DISSERTATION COMMITTEE

*Dr. Danny Norton Bellenger (Chair)*  
*Dr. Wesley James Johnston*  
*Dr. Likoebe Mohau Maruping*

## DEDICATIONS

My work is dedicated to Candace Lynette Hill and Mitchell Matthew Hill, Jr. with gratitude for the bond of unconditional love that we share. The most wonderful achievement of my life was to be miraculously blessed with the opportunity to be your mother. I give thanks every day that you are on this journey with me. I pray that your life's work will continue to build upon the six pillars of character: Trustworthiness, respect, responsibility, fairness, caring and citizenship ("Character Counts!," 2022). I hope that this work inspires you with the spirit of entrepreneurship: faith, self-confidence, creativity, courage, tenacity, passion, resilience, zest and an unquenchable thirst for knowledge! "If any of you lacks wisdom, let him ask God, who gives generously to all without reproach, and it will be given." James 1:5

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“For the Lord gives wisdom; out of his mouth cometh knowledge and understanding”

Proverbs 2:6

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## ABSTRACT

Almost nineteen (19) percent of the United States population lives in rural areas according to the 2010 Census. Deficiencies in diversity of skilled labor, business support networks, and consumer demand have resulted in major barriers to economic prosperity in many of these areas. State and local governments commit valuable time and resources to economic development programs to revitalize rural communities. While post-secondary education institutions significantly augment the ecosystem, research has shown that the framework of the institution will determine the extent of the institution's impact on entrepreneurship and economic growth. This study undertakes the research questions "Does post-secondary education influence economic performance through entrepreneurship in rural areas? What contributes to post-secondary education's influence on entrepreneurship in rural areas?" This research used a mixed method, empirical study. Quantitative analysis is used to examine the degree that postsecondary education, entrepreneurial activity and economic performance are related to each other and to measure the strength of the association between variables. Descriptive statistics provide a summary of the variables under review. Secondly, a qualitative study provides deeper insight for understanding quantitative findings. Data from 85 rural Georgia counties provide an opportunity sample used for this research. This study reveals that institutions are performing in four principal roles: organizational, intermediary, knowledge and policy that produce resources influencing entrepreneurship and economic performance in rural areas. Findings from this study may lead to better decision making about strategic use of postsecondary education resources for economic development in rural areas.

# I INTRODUCTION

## I.1 Rural Areas

Rural areas are often envisioned as carefree, sprawling farmlands scattered with general stores, small gathering spaces and close-knit communities. In reality, rural America is diverse in its topography, natural resources, culture and economy. Almost 60 million people, about 19 percent of the population, lived in rural areas of the United States based on the 2010 Census. The United States Census criteria for urban versus rural areas is based on total population thresholds and density. The U.S. Census Bureau (Ratcliffe, Burd, Holder, & Fields, 2016) defines an urban area as core census block groups or blocks that have a population density of at least 1,000 people per square mile and surrounding census blocks that have an overall density of at least 500 people per square mile. Subsequently, all territory outside of urban areas is classified as rural.

Researchers have found that rural areas are more frequently characterized by high levels of poverty and low levels of economic activity, infrastructure development, and essential services. Porter, Miller, and Bryden (2004) note that "The consensus is that rural areas in the U.S. are underperforming metropolitan areas and that the gap is widening". In fact, the average income in rural areas is lower than in urban areas and the number of people living below specified poverty lines in rural areas is higher than in urban areas (Galvão, Mascarenhas, Marques, Braga, & Ferreira, 2020). Historically, the economy in these regions was dominated by agriculture or other resource-based industries which have seen increased mechanization and restructuring that led to lower growth, persistent unemployment, and a highly-segmented labor market that is not

adaptable to change (Goetz, Partridge, & Stephens, 2018; Kilkenny & Partridge, 2009; Weiler, 2001). Many rural areas are further disadvantaged because of factors such as low education levels, insufficient infrastructure, and high transport costs (Goetz et al., 2018; Partridge & Olfert, 2011). These deficits indicate that many rural areas are resource-constrained environments with poor infrastructure, lack of appropriate human capital, limited networks, low knowledge creation, and poor access to finance capital.

Although nearly half (46.7 percent) of United States citizens living in rural areas are in the South region (Ratcliffe et al., 2016), a review of the literature shows that the characteristics noted above are geographically observed across the U.S. A Brookings Institute study in 2003, warned that Pennsylvania's rural areas were characterized by an aging population and brain drain, leaving them without needed education and skill (Trauth, DiRaimo, Hoover, & Hallacher, 2015). A remote and underserved county in the state of Maine is described as an area where residents face disadvantages and hardships from local markets that are small, lacking opportunity, under-developed infrastructure, and perceived as neglected by controllers of state-level purse strings (T. B. Porter, 2015). Rural communities in the U.S. West are characterized by centuries-long legacy of colonization, federal control of natural resources, and recurrent political disputes that have resulted in social conflict, state and private sector retreat, and general declines in social and economic conditions (Abrams, Davis, & Moseley, 2015). Rural regions in Mississippi are described as deprived socially and economically with certain segments of its population lacking access to basic necessities, employment, economic opportunities, health services, and social capital (Liew, 2016). As of 2018, the average poverty rate for rural counties in Georgia was at 20.9%(USDA, 2019).

These diverse situations illustrate the widespread economic challenges of rural areas across America. Because today's global economy thrives on a capable worker, instant communications and global markets; the lack of skill diversity, remoteness from important business support networks, and limited local demand for innovative products and services have resulted in major barriers to economic prosperity in rural areas (Dabson, 2001). These barriers highlight a need to understand (a) what mechanisms can drive changes (b) what institutions can play a role in mitigating economic challenges and (c) what economic development value is generated from institutional resources in constrained rural environments.

## **I.2 Economic Development and Entrepreneurship**

In the United States, where federal policies for rural development are largely absent (Acs & Malecki, 2003), state and local governments commit valuable time and resources to economic development programs in an attempt to revitalize rural communities (Falcone, Allen, & Vatter-Vance, 1996; Henderson & Novack, 2003; Lyons, 2002; Ring, Peredo, & Chrisman, 2010). Many of these economic development and political leaders traditionally relied on low cost land and labor to recruit large employers however globalization has shattered that competitive positioning. Innovative, entrepreneurial solutions are now needed to create opportunities for prosperity in the current global economy (Henderson & Novack, 2003). As traditional strategies of recruiting plants and relocating businesses to rural areas have become increasingly costly, ineffective and disappointing (Rork & Policy, 2005; Yu & Artz, 2019); policies

promoting entrepreneurship and small business development are gaining popularity as a method for boosting rural economic growth (Dabson, 2001).

Joseph Schumpeter (2021) was the first economist to place the entrepreneur at the heart of capitalism. He defined entrepreneurs by their role of combining objects and forces in a new and profitable manner. Schumpeter's concept of entrepreneurship encompasses the following five cases:

(i) The introduction of a new good — that is one with which consumers are not yet familiar — or of a new quality of a good. (2) The introduction of a new method of production, that is one not yet tested by experience in the branch of manufacture concerned, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially. (3) The opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before. (4) The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created. (5) The carrying out of the new organisation of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position(1934) .

Substantial research has concluded that entrepreneurial activity has positive long-run economic influence on wealth, productivity, and growth (Bjørnskov & Foss,

2016). Not only has entrepreneurship been recognized as a generator of jobs and innovation but several studies have established that job creation and economic development are dependent on entrepreneurship (Galvão et al., 2020; Minniti, 2008; Uzoma Ihugba, 2014) The US Small Business Administration reported in 2012 that small businesses create over 64% of net new private-sector jobs. Consistent with these findings, many local governments have placed increased emphasis on the formation and growth of small businesses, seeking to influence job creation and economic growth in their regions (Betz, Partridge, Kraybill, & Lobao, 2012).

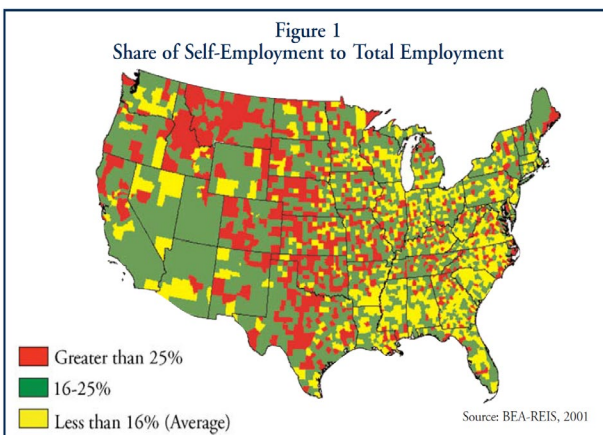
The development of rural entrepreneurship has gained prominence as a local development technique due to its low cost and high job creation potential (Fortunato, 2014; Galvão et al., 2020). The relationship between long term, regional, employment growth and entrepreneurship is also strong. There is a multiplication effect of entrepreneurship in rural communities because it results in skills diversification among the rural population, attracts new residents, spurs innovation in the market and stimulates growth (Akgün, Nijkamp, Baycan, & Brons, 2010; Galvão et al., 2020). Entrepreneurs also significantly impact local economies by helping to connect them to the larger, global economy (Henderson, 2002; Starks, 2012). Beyond the direct economic value of entrepreneurship, MacDonald and Jolliffe (2003) and Tregear(2005) , found that entrepreneurial activity motivated by rural artisan professions or tourism can also contribute to the enhancement of local resources, cultural heritage, and the quality of life. Low found that entrepreneurial activity of all origins creates new jobs and wealth that also have spillover benefits into the greater region (S. A. Low, Henderson, & Weiler, 2005).

The most distressed rural communities, by necessity, will typically have a significant representation of entrepreneurs (S. Low, 2004; S. A. Low et al., 2005) who respond to lack of employment opportunities by starting new businesses. Case studies situated in remote, rural, western United States areas provided strong evidence that overall entrepreneurship can be an important asset to many rural communities because of their positive impact on the vitality of communities (Abrams et al., 2015). For example, entrepreneurs are more likely to be involved in local community improvement activities, and they frequently hire local people for job openings. They often provide opportunities for young people to work side by side with local entrepreneurs. Regardless of the stimuli for business startups, there is growing evidence that having more local entrepreneurs and self-employed can help sustain growth and prosperity (Goetz et al., 2018; Partridge & Olfert, 2011). According to Bryden and Hart (2005), entrepreneurship of all forms in rural areas helps diversify the rural economy and sustain a more resilient base of labor.

The precise links between entrepreneurship and regional prosperity are the focus of ongoing research. The dispersion of entrepreneurs and the concentration of high-value entrepreneurs are two characteristics that convey the value of entrepreneurial activity to a local economy. Sarah Low of the Federal Reserve Bank of Kansas City defined entrepreneurial breadth as the widespread dispersion of entrepreneurs and entrepreneurial depth is the concentration of high-value entrepreneurs (2004). Entrepreneurial breadth which is determined by the ratio of self-employment to total employment sheds valuable light on the viability of regional entrepreneurial activity. Entrepreneurial activity is particularly high in rural counties as shown on Figure 1 .

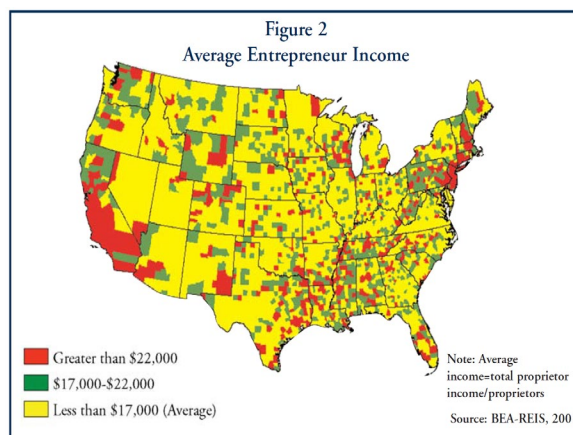
On the other hand, entrepreneurial depth conveys the value of entrepreneurial activities. High-value entrepreneurs earn more income, create more value, and enhance regional growth and prosperity more than other entrepreneurs. Regions with a greater depth of entrepreneurship have self-employed workers with higher average income which in turn causes the region as a whole to be more prosperous. Entrepreneurial depth varies widely throughout the United states however areas with a high proportion of self-employment are usually not imbued with high value entrepreneurs as shown in Figure 2 (S. Low, 2004). Low concluded that entrepreneurship creates jobs and wealth within a region which ultimately leads to greater prosperity. Additional research can shed light on the environmental characteristics, systems, and resources needed to boost economic prosperity in rural areas through entrepreneurial activity.

**Figure 1: Entrepreneurial breadth in U. S.**



(S. Low, 2004)

**Figure 2: Entrepreneurial depth in U. S.**



(S. Low, 2004)

### I.3 Entrepreneurial Ecosystems

The systems and support environment for business development are commonly referred to as the ecosystem. Given constraints that rural areas have experienced



regarding economic growth, recent studies have begun to consider the environmental conditions rural entrepreneurs face related to collaborative networks, funding and political support for entrepreneurship development (Galvão et al., 2020; Markley, Lyons, & Macke, 2015). The concept of entrepreneurial ecosystems emerged from a study conducted by Moore(1993), aiming to explain the interdependent actors who share a vision of value creation and work to promote innovation and productive entrepreneurship within a given business setting(Galvão et al., 2020; Moore, 1993). Researchers have evolved the definition of entrepreneurial ecosystem into “the union of localized cultural outlooks, social networks, investment capital, universities, and active economic policies that create environments supportive of innovation-based ventures” (Galvão et al., 2020; Spigel & Practice, 2017). External support and expertise within an ecosystem are extremely important to small and medium-sized enterprises (SMEs) as these entrepreneurs typically draw the bulk of in-person business support from within 25 km of their businesses (Bennett & Smith, 2002).

Upon examining the attributes of a successful entrepreneurial ecosystem within a review of prior research; Bedő, Erdős, and Pittaway (2020) concluded that resource-constrained environments such as those typically found in rural areas have many gaps. Lack of business density, poor population fluidity, lack of business incubators, poor infrastructure, lack of appropriate human capital, inadequate social networks, low knowledge creation, and poor access to finance in rural locations limit the ability to engage in high value-added entrepreneurship (Bedő et al., 2020). Building an effective entrepreneurship ecosystem in such context is inherently challenging.

#### **I.4 Postsecondary Education Frameworks**

Models of entrepreneurial ecosystems usually include the presence of postsecondary education (PSE) institutions among the systems of support. PSE institutions are seen to be important for conducting research, creating intellectual property, and for the preparation of professional employees (Audretsch, Falck, Feldman, & Heblich, 2012; Bedó et al., 2020). While postsecondary education significantly augments the ecosystem, research has shown that the “nature of the university” itself will determine the extent of the impact. (Bedó et al., 2020) This research will refer to the “nature of the university” as the postsecondary education framework. The modern Western university evolved from medieval schools known as *studia generalia* that were established for the transmission (teaching) of knowledge to clerks and monks. This model transformed over centuries into an institution in which knowledge is created (research) and transferred (teaching). A ‘third mission’ was conceptualized to acknowledge that improving regional or national economic performance was added to the postsecondary education model of research and teaching (Pugh, Hamilton, Jack, & Gibbons, 2016). In an effort to transition regions from declining manufacturing into knowledge-based industries, regional government and business actors developed strategies to establish “entrepreneurial universities” that proactively collaborate with industry and government to improve the regional innovation environment (Henry Etzkowitz, 2013). This “entrepreneurial university” model is centered on the idea that PSE institutions are protagonist in the entrepreneurial ecosystem that promote regional economic development by creating, transferring and exploiting knowledge. Within this context, Etzkowitz developed a widely cited model of

university-industry-government relations referred to as the “Triple Helix,” in which knowledge is transferred from PSE research universities to industry, and then through government to society (2013).

The term "university" includes all types of institutions of higher education that provide society with education, research, and the broad stream of third-mission activities that involve knowledge transfer, continuing education, lifelong learning, and broader engagement in regional development (Brekke, 2021). “Institution of higher learning” is also a term formerly defined by the U.S. Department of Education as a college level institution that was accredited by an agency or association recognized by the Secretary of Education (USDEd, 2021b). In 1986, US Department of Education expanded their universe to include all institutions whose primary purpose was the provision of postsecondary education and that participate in or are eligible to participate in any federal student financial assistance program authorized by Title IV of the Higher Education Act of 1965 and its amendments (IPEDS, 2019). In 2017–18, there were a total of 6,642 providers of postsecondary education in the United States (the 50 states and the District of Columbia) and other jurisdictions, such as the U.S. Virgin Islands (IPEDS, 2019). With this in mind, the terms university, postsecondary education (PSE), and higher education institution (HEI) will be used interchangeably in this study.

Postsecondary education impact is largely influenced by its capacity to equip students, faculty and the institution itself with tools for interfacing effectively with industry (H. Etzkowitz, Dzisah, & Clouser, 2021). As previously chronicled in the evolution of universities, researchers have formulated a variety of models that describe a growing intimacy among university, industry and government, in structure and content.

Of particular interest for this study are those models where the university plays a leadership role in a Triple Helix of university–industry–government relations to promote regional economic advancement and renewal. A recent literature review by Thomas Brekke concluded that higher education institutions contribute to regional economic development in four principal roles: organizational, intermediary, knowledge, and policy (2021). This study will examine postsecondary education’s impact on entrepreneurial activity as these four principal roles are fulfilled.

The organizational role is centered on the university’s internal organizational structure or readiness. Internal organizational readiness can promote or hamper a university’s opportunities to interact with and transfer knowledge to regional firms (Brekke, 2021). Some studies have shown that the university’s effect on employment growth is greatest in regions with a high concentration of skills capable of applying the knowledge created in the university while other studies have emphasized that a university’s more valuable role is to create human capital (Brekke, 2021). Brekke’s study on the university’s role in regional economic development emphasized that when the university’s capacity for knowledge transference aligns with the profile of the region’s economic structure, it enhances interactive learning and resource mobility between universities and society (2021). Brekke’s review of literature identified gradual changes in the university–industry relationship toward a perspective where universities become key actors in the transfer of knowledge within global, national, and regional knowledge systems. One study of organizational capacity across 159 universities in the United Kingdom determined that the competitiveness of a region is associated with the

structure, intensity and performance of the university's entrepreneurial activities (Zhang, MacKenzie, Jones-Evans, & Huggins, 2016).

The intermediary role of postsecondary education emphasizes institutionalized collaboration among academia, private industry, and government (Brekke, 2021). Universities use a wide range of mechanisms (spin-off, research collaboration, licenses, and patents) in an effort to contribute to regional economic development. Etzkowitz, Webster, and Healy note a "second academic revolution" that took place in the 1990's because universities became increasingly involved as intermediaries for economic and social development (1998). The largest percentage of studies reviewed by Brekke (2021) emphasized this intermediary role of universities resulting from research spillover or spin-offs and infrastructure solutions such as technology transfer offices (TTOs) or innovation hubs. TTOs and innovation hubs as intermediary structures are designed to support the commercialization of academic research and management of intellectual property rights. In a 1980 – 2000 review of technology patent portfolios, Veugelers, Callaert, Song and Van Looy determined that American universities are playing a pivotal role in terms of wealth creation through corporate 'use' of university patents (2012). University spin-offs (USOs) or spin-outs are independent entities formed with staff as a new venture based on commercializing academic research efforts for the purpose of generating and sustaining regional economic growth and competitiveness.

The university's knowledge role acknowledges that stimulating innovation involves dynamically introducing and exploiting unique knowledge resources (Brekke, 2021). Universities can bridge contextualized learning capacities and diffuse new knowledge into a region's business life for a new domain of opportunity (Liew, 2016).

Etzkowitz, et al documented a novel program labeled the Link Model of Entrepreneurial Culture Transfer that exemplifies the university's role in knowledge dynamics (2021). A Link model may include instructional collaboration, student exchange or faculty exchange. The Edinburgh-Stanford Link (ESL) of research, teaching and commercialization collaboration is an example of a link model between the Universities of Stanford in California and Edinburgh in Scotland (H. Etzkowitz et al., 2021). This Link model is built on the establishment of regional, national and international collaborations or “links” between universities in order to transfer entrepreneurial culture. The Center for Women’s Entrepreneurship (CWE) at Chatham University provides another example of how universities have advanced their educational missions and contributed to the financial vitality of their communities. Mary Riebe (2012) described this program as a model for re-envisioning and expanding universities’ business offerings by delivering innovative programs that nurture nontraditional skills and perspectives found to be powerful indices of success for women entrepreneurs.

Universities contribute to innovative policy frameworks through local or regional engagement practices that embed universities into policy development, implementation or assessment for regional innovation. In this role, universities are needed to inform policy makers regarding advancing regional development and innovation (Brekke, 2021). By combining insights gained from research, universities can evaluate empirical evidence to inform the policy making process (Pugh et al., 2016). An example of long term policy deficits were documented by Hui Liew (2016) in the Lower Mississippi Delta (LMD) of Arkansas, Louisiana, and Mississippi. She observed the need for poverty eradication and achieving equitable resource allocation in response to critical issues

and obstacles to overcoming inequality. After determining that strategies promoting economic growth could not fully reduce the problems associated with unemployment or underemployment in these rural areas, her study recommended that state and local governments should tackle employment challenges by viewing entrepreneurship as the core of their development efforts. Their conclusion included recommendations for collaborations that may lead to policy implementations with profound impacts on the various dimensions of sustainability (Liew, 2016). This is a meaningful example where researchers proposed that new policy solutions for economic development may require a bottom-up process that brings together local authorities, universities, business, and civil society into systematic, interactive and experimental learning that is aimed at identifying future growth potential (Brekke, 2021)

The information presented demonstrates an array of postsecondary education frameworks that provide society with education, research, and third-mission activities for engagement in regional economic development. When the PSE framework is compatible with the profile of the region's economic structure it enhances interactive learning and resource mobility between PSE institutions and society (Brekke, 2021). Because rural areas face major barriers to economic prosperity resulting from a lack of resources, skill diversity, and support networks, the influence of postsecondary education frameworks for generating entrepreneurial viability is worthy of further study. The research question that this study will undertake is "Does postsecondary education influence economic performance through entrepreneurship in rural areas and what contributes to post-secondary education's influence on entrepreneurship in rural areas?"

## II LITERATURE REVIEW

### II.1 State of Academic Literature

This research explores the influence of postsecondary education on entrepreneurial activity in rural areas. To understand the academic research surrounding this topic, I have conducted a systematic literature review. This literature review summarizes the search strategy, publication results, and key findings specifically relevant to this study.

#### *II.1.1 Search Strategy*

A systematic literature review of scholarly business databases was performed for this study in six steps: 1) Establishing search terms, 2) electronic search of the three selected business-related databases, 3) electronic screening within each of the databases based on research relevant filters as available (i.e., language, location, date, peer-reviewed, scholarly), 4) removing duplicate references across the databases, 5) manually reviewing abstracts and citations to screen for relevance (6) manually reading full text and reference documents for foundational and synthesis studies. See Table 1 for an outline of the process used. The business studies librarian at Georgia State University recommended the ABI/INFORM Collection, Business Source Complete (EBSCO), and World of Science as top business content databases accessible through the electronic library. The initial electronic search focused on English language articles and limited the geographic focus to the United States by using location as a filter in order to capture publications that studied entrepreneurship in rural areas of the U.S. The review period began with 2011 because it was the year that followed a deep recession in the U.S. which renewed focus on rural economies. Lastly, peer-reviewed



and scholarly-reviewed publications were selected because of the importance of academic oversight in assuring the quality of the research. I believe that this provides a representative sample of extant literature.

The search for relevant literature began with a review of previously acquired articles to generate a comprehensive list of "potential search" terms customized to my topic. The EBSCO thesaurus eliminated use of the term "postsecondary" and directed the search to the use of terms "University" and "College" because "postsecondary" could not be found. Seven primary search terms were identified by applying the database thesauri terms. The primary search terms used were (1) Entrepren\* OR New business\* OR Self-employment (2) University OR College OR Higher Education\* and (3) Rural. Scholarly business databases were searched using various combinations of primary search terms. The primary search was performed electronically and each of the databases was screened using the following filters and search limiters: (1) Scholarly (Peer Reviewed) Journals,(2) Published Date (3) Publication Type: Academic Journals only, and (4) Language: English (only). The resulting list was manually screened to remove duplicates and abstracts were read to screen for relevance. Finally, text and references of relevant studies were manually reviewed to identify foundational studies and literature reviews on entrepreneurship theories, entrepreneurial ecosystems, and university/higher education institutions.

Studies identified using primary search terms were limited geographically to the United States consistent with the research focus area. With a manual review of references, the geographic footprint of scholarly research was expanded to obtain a

global perspective of studies on entrepreneurship theories, entrepreneurial ecosystems, and postsecondary education contributions to regional economic development.

**Table 1:** *Outline of systematic literature review*

Research Step	Description	Results
1	Review relevant literature previously acquired to generate a comprehensive list of "potential search" terms customized to my topic.	19 terms
	Collapsed list of "potential search" terms to eliminate redundancy and identify the thesauri terms from database research.	7 key terms
	<p style="text-align: center;"><b>PRIMARY SEARCH TERMS</b></p> <ol style="list-style-type: none"> <li>1. Entrepren* OR New business* OR Self-employment</li> <li>2. University OR College OR Higher Education*</li> <li>3. Rural*</li> </ol>	
2	Searched 3 scholarly business databases using primary search terms and combinations of primary search terms.	
3	Electronic screening within each of the databases based on the following filters and search limiters: Scholarly (Peer Reviewed) Journals, Published Date:, Publication Type: Academic Journals only, Location: United States and Language: English (only) Database search steps expanded in Appendix	See Results in Appendix
4	Collapsed list of findings from scholarly business database searches by screening to remove duplicates	
5	Manually reviewed findings from scholarly business database searches by reading abstracts for relevance	
6	Manually reviewed text and references of relevant studies to identify foundational studies and systematic literature studies on entrepreneurship theories, entrepreneurial ecosystems and university/higher education institution.	

The 73 references are distributed across 40 journals, seven books, two conference proceedings and five governmental agencies. Eighteen of the articles were published within the past five years. The earliest scholarly journal article was published in 1980 and the oldest publication referenced is the 1934 book "The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle" authored by Joseph A. Schumpeter. Joseph Schumpeter was an Austrian American economist who became known for his foundational work on the

importance of entrepreneurs and innovation. The geographic setting of the research was widely dispersed; however, 39 of the journal articles were situated in the United States consistent with my research focus.

### ***II.1.2 Rural Entrepreneurship Studies***

There is consistent evidence in the literature that entrepreneurship of all forms in rural areas helps diversify the local economy. Research shows that rural areas are fostering entrepreneurs however it is more difficult for firms in rural areas to find sources of information, skilled labor, suppliers, customers, technology, and capital as compared to urban areas. It also is more problematic to build networks that can overcome these shortcomings (Acs & Malecki, 2003). Most studies attempted to answer the question of why some rural areas grow and others do not. Analyzing results of a 2011 survey of entrepreneurs in Humboldt County, California researchers found that the use of business connections, small business support, marketing support and mentors with an industry or community perspective are important in small rural communities (Eschker et al., 2017). In studying differing requirements of entrepreneurs, Crowell, Lyon-Hill, & Tate (2018) found that small and medium-sized enterprises (SMEs) commonly need entrepreneurial education programming, subsidized main street office space and supportive pathways through government regulatory systems. In the rural literature, many of these studies were qualitative and only partially generalizable. Because there is a prevalence of case studies, the findings are highly dependent on the perception of researchers and the entrepreneurs interviewed. In a review of the literature on entrepreneurship and rural economic development in the United States, Fortunato argued that rural entrepreneurship is a distinct area of entrepreneurship research and

practice, with alternative opportunities for local development that do not necessarily follow the mainstream literature (2014).

Researchers have proposed that the continuing challenge for research is to assess what resources have the greatest impact on entrepreneurial success over time (Eschker, Gold, & Lane, 2017) (Fortunato, 2014; Galvão et al., 2020; Goetz et al., 2018). Fortunato recognized a need for new strategies for entrepreneurship development that includes new forms of learning, connecting, and bridging knowledge gaps across areas without the close proximity advantage of cities (2014). Identifying effective types of infrastructure and technical assistance could facilitate growth and development of local businesses in rural areas (Goetz et al., 2018)

### ***II.1.3 Entrepreneurship Performance Measures***

When assessing the performance of small businesses, researchers have used indicators such as profit maximization; productivity; founder's leadership traits; characteristics of successful firms; engagement within networks; lifespan of the business; growth in number of employees; or geographic expansion (Eschker et al., 2017). Studies that examined the drivers of successful performance of small businesses in rural environments, have found a heavy reliance on networking support, marketing support and previous businesses experience while the impact of access to funding has mixed findings (Eschker et al., 2017). A mixed-methods case study of Roanoke–Blacksburg region in western Virginia used entrepreneurial metrics, network relationships, surveys of entrepreneurs and stakeholder interviews to examine start up activity (Cowell et al., 2018). Recommendations for developing a holistic framework that rural small business startups can use to increase their chances of success require

examining the specific areas of support that are actually beneficial (Eschker et al., 2017)

#### ***II.1.4 Entrepreneurial Ecosystems***

Studies regarding entrepreneurial ecosystems emphasize the importance of external advice to SMEs. Using results of the University of Cambridge Centre for Business Research's 1999 Economic and Social Research Council (ESRC) survey of 1309 employees of SMEs, researchers evaluated the relationship between geographic separation of the SME and their supplier of intensive external advice (Bennett & Smith, 2002). The findings determined that over 70% of advisors are within 25 km of the SME client. Much of the literature exploring ecosystems has undertaken qualitative historical reviews of locations (Audretsch et al., 2012; Lewis, Harper-Anderson, & Molnar, 2011; Neck, Meyer, Cohen, & Corbett, 2004) and identification of common attributes that seem to apply across ecosystems (Audretsch et al., 2012; Bedó et al., 2020; Lewis et al., 2011; Neck et al., 2004; Van de Ven, 2007). These studies generally explore partnerships within an entrepreneurial ecosystem that includes postsecondary education, industry, nonprofit organizations, financial institutions, and professional organizations that integrate all areas of knowledge for the creation of economic, social, cultural or environmental value (de Araujo Ruiz, Martens, & da Costa, 2020).

"Does the Environment Matter? Mapping Academic Knowledge on Entrepreneurial Ecosystems in GEM" authored by Seguf-Mas, Elies, Tormo-Carb, Guillermina, Jimenez-Arribas, Irene (2019), conducted a bibliometric analysis and comprehensive review of research into entrepreneurial ecosystems. Their work analyzed 62 articles on entrepreneurial ecosystems from a wide range of journals

conducted by 129 authors representing eighty-nine different institutions over a 13-year period (2004-2016) and identified the main topics and themes used in the scientific literature. 2004 was identified as the year of the first publication with the term entrepreneurial ecosystems appearing in Web of Science. The review identified entrepreneurship research situated according to three main approaches: ( 1) 45% (33 articles) of the articles applied an economic view, where scholars highlight aspects of economic rationality and argue that new venture creation is due to economic issues (2) 11% ( 8 articles) applied the psychological view where scholars discuss individual factors or psychological traits that determine entrepreneurial activity ( 3) 44% (32 articles) applied the sociological and institutional view where scholars affirm that the sociocultural environment determines decisions about new venture creation. About half the articles used a regression model; 13 articles used descriptive statistics; seven (7) were literature reviews and 6 used structural equation models. The study conclusions addressed factors that facilitate or impede entrepreneurial activity. Several articles affirmed that the geographic area and human capital influence entrepreneurship.

Ecosystems in small cities, underpopulated rural areas, university towns and outside the USA have not been considered much. Research on rural entrepreneurship is relatively scarce (Stathopoulou, Psaltopoulos, & Skuras, 2004). In studying the differing requirements of entrepreneurs in diverse settings, Cowell et al. (2018) suggested that the rural component of the entrepreneurial ecosystem is ripe for further study.

### ***II.1.5 Postsecondary Education***

Most literature on entrepreneurial ecosystems included an analysis of partnerships with postsecondary education institutions. Many of the studies regarding postsecondary education and entrepreneurship are focused on demonstrating how industry and PSE institutions are integrated through shared resources, people, and practices to achieve the broader interests of firm formation and regional economic development. With postsecondary education as a primary subject of this systematic literature review, the resulting studies confirmed that PSE institutions play an important role in entrepreneurial ecosystems and are increasingly the focus of public policy. The mission of postsecondary education in entrepreneurial ecosystems ranges from providing basic teaching and research to playing a key role as protagonist in an entrepreneurial ecosystem (de Araujo Ruiz et al., 2020). Entrepreneurship resources generated from PSE functions can include all programs that expand the opportunity for value creation and develop entrepreneurial actions regardless of whether they are considered as economic, social, commercial or cultural (de Araujo Ruiz et al., 2020).

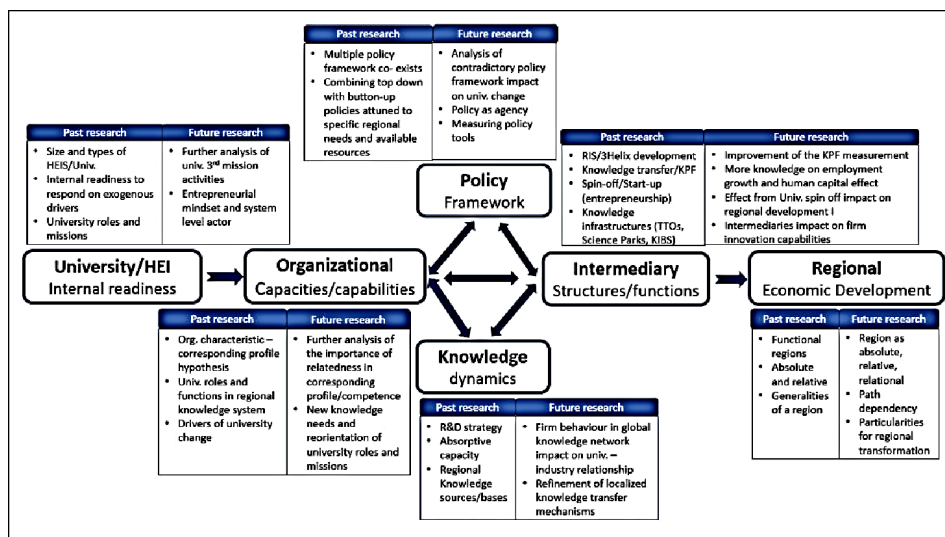
Bedó et al. (2020) proposed a conceptual framework outlining the structure, components and mechanisms that enable universities in constrained environments to operate as catalytic agents in the creation of entrepreneurial ecosystems. The study considered how entrepreneurship education programs improve local human capital base, engagement in entrepreneurship and engagement in local economic development. The proposed model suggests that postsecondary education institutions with entrepreneurship programs and entrepreneurial strategies should enhance entrepreneurship ecosystems in rural locations over time. Recommendations for future

study include analyzing how the geographic context, organization, level of resources and time commitments of PSEs generate economic benefits for rural entrepreneurs and their communities.

Thomas Brekke (2021) conducted a study "What Do We Know about the University Contribution to Regional Economic Development? A Conceptual Framework" with an objective of investigating university and HEI contributions to regional economic development. This research reviewed 193 peer reviewed articles identified over the period from 1994 to 2019. Brekke identified four principal roles of postsecondary education: (1) organizational, (2) intermediary, (3) knowledge, and (4) policy. The comprehensive literature research revealed that different methodological approaches and definitions of core concepts have been used, making it difficult to draw conclusions for policy and management purposes (Brekke, 2021). The studies revealed that university characteristics represent a key explanatory variable for university engagement and knowledge transfer. Brekke developed the conceptual framework shown in Figure 3 to portray the four principal roles of postsecondary education identified from the literature: organizational, intermediary, knowledge, and policy. He proposed that a future direction of research studies should explore how intermediary functions, structure, and roles might work as a regional system-level entrepreneur that creates, changes, and stabilizes processes. Brekke also proposed that his recently developed conceptual framework should be tested in light of the different types of regions (institutionally thick and thin), university roles (engagement, entrepreneurial, development, etc.), institutional characteristics, and the historical processes of path development.



**Figure 3: Brekke's conceptual framework of the four principal roles of University/HEI**



(Brekke, 2021)

### II.1.6 Related Studies

The relationship between innovation and economic growth has been the topic of numerous theoretical and empirical research efforts. Previous studies have identified a strong positive correlation between university Research & Development (R&D) and local innovative activity. Building on this foundation, researchers hypothesized that new firms will tend to form in areas characterized by high levels of university R&D expenditures and that these births will in turn stimulate the local economy by generating increases in employment level and growth. In this study “The Influence of University R&D Expenditures on New Business Formations and Employment Growth”, Bruce A. Kirchhoff, Scott L. Newbert, Iftekhar Hasan, and Catherine Armington (2007) argued that as newly formed, rapidly growing firms increase employment, it would have a secondary effect on the service firms that grow to support the new firms. The study used the U. S. Department of Agriculture’s labor market areas (LMAs) as the “local” measure for aggregating county-level data to construct local economic units. University R&D spending was the primary independent variable. This data was obtained from a

National Science Foundation survey of universities and colleges in the U. S. which is conducted annually collecting data on spending for science and engineering.

Population, foreign born population, rate of change in gross domestic product (GDP) for the United States, passage of time, proportion of the labor force employed by the government, and personal income per capita were included in the analysis as control variables. Total employment, employment change and firm births by LMA for 1990 through 1996 were the three dependent variables used to examine economic development in this analysis. This quantitative study used two-stage least squares (2SLS) regression analysis to analyze the relationship between economic development and growth, new business formation, and R & D expenditures.

The findings showed a positive significant coefficient existed for university R & D expenditures in the regression models, with new business formation, employment level and employment change as the dependent variables(Kirchhoff et al., 2007). Although causality could not be determined, the strength and nature of the relationships among R&D, firm births, and employment were definitively assessed. The study concluded that holding other variables constant, university R & D expenditures stimulate new firm formations, which in turn, affect employment level and change. The study's conclusion is that university spending on R & D may attract innovative new firms, indirectly stimulate local demand and in turn spawn new firms, resulting in increases in employment across all sectors of the economy. The researchers suggest that additional study is needed to assess other areas where universities may have a significant impact on firm births which ultimately contribute to overall economic growth.

## II.2 Theoretical Framework

A review of academic research on entrepreneurship identified that scholars have brought forward theories rooted in economics, psychology, sociology, anthropology, and management (Simpeh, 2011). Most entrepreneurship research has been situated according to three main themes: (1) the economic view where scholars highlight aspects of economic rationality and argue that new venture creation is due to economic factors (2) the psychological view, where scholars examine the individual factors or psychological traits that determine entrepreneurial activity and (3) the sociological and institutional view where scholars affirm that the sociocultural environment determines decisions about new venture creation (Seguí-Mas et al., 2019). This study is positioned within economic research streams.

Kwabena Nkansah Simpeh (2011) conducted a literary review of entrepreneurship theories "Entrepreneurship theories and Empirical research: A Summary Review of the Literature". The article examined six entrepreneurship theories with underlying empirical studies and integrated the diverse viewpoints. These theories are (1) Economic entrepreneurship theory, (2) Psychological entrepreneurship theory, (3) Sociological entrepreneurship theory, (4) Anthropological entrepreneurship theory, (5) Opportunity-Based entrepreneurship theory, and (6) Resource-Based entrepreneurship theory. This study is positioned within Resource-based entrepreneurship theory.

### ***II.2.1 Foundational Theories***

Joseph Schumpeter (1883–1950) was a brilliant and unconventional economist who was influential because of his insight into the nature of capitalism. The Theory of Economic Development is one of his most important books and the one that made him famous. In the Theory of Economic Development Schumpeter (1934) regarded the productive conditions of the whole economic system as combinations of materials and forces. The carrying out of new combinations he termed “enterprise” and the individuals whose function it is to carry them out he called “entrepreneurs.” Schumpeter suggested five situations where the phenomena of new combinations by entrepreneurs occurs. The entrepreneur “reforms or revolutionizes the pattern of production by exploiting an invention or an untried technology for producing a new commodity or producing an old one in a new way; by opening up a new source of supply of materials or a new outlet for products; or by reorganizing an industry”(Schumpeter, 1934) . Schumpeter proposed a second definition of economic development based upon the “carrying out of new combinations” arguing that “development consists primarily in employing existing resources in a different way, in doing new things with them”(1934).

Birger Wernerfelt (1984) introduced a “Resource-based View of the Firm” to develop simple economic tools for analyzing a firm's resource position and to look at some strategic options for managing the firm's resource position over time. He defined a firm's tangible and intangible resources as the assets or factors which are tied semi-permanently to the firm (Wernerfelt, 1984). Resources can be physical assets, human skills, knowledge, or experience (Caves, 1980). Scholars have analyzed the dynamics between profitability and resources with optimal growth models for maximizing market

imperfection by building on the firm's most unique resource or resource position (Wernerfelt, 1984). Wernerfelt argued that it's possible to infer the minimum necessary resource commitments from the size of the firm's activity in different product markets (1984). Consequently, a firm's resource profile dictates its optimal product-market activities. These theories established a foundation for resource-based entrepreneurship theories which can be used to demonstrate that new ventures can be developed by exploiting tangible and intangible assets accessible to rural areas.

### ***II.2.2 Resource-Based Entrepreneurship Theories***

Entrepreneurship researchers have found Resource-based theory (RBT) to be a very helpful tool for probing and better understanding entrepreneurship related phenomena. RBT theories of entrepreneurship argue that access to resources by founders is an important predictor of opportunity-based entrepreneurship and new venture growth. Using the resource as the unit of analysis, one relevant study examined entrepreneurship from individual opportunity recognition, to the firm's organizational capabilities, to the market (Alvarez & Busenitz, 2001). In all three instances, researchers found that entrepreneurship generally involved the founder's unique awareness of opportunities, ability to acquire the resources needed to exploit the opportunity, and ability to carry out new combinations (Alvarez & Busenitz, 2001). In a summary review of literature, Simpeh found that RBT theories of entrepreneurship have primarily examined the relationship between entrepreneurship and three classes of resources: financial, social, and human resources (2011) .

### **II.2.2.1 Financial Capital / Liquidity Theories**

Financial capital / liquidity theories suggest that people with financial capital are more able to acquire resources to effectively exploit entrepreneurial opportunities. Schumpeter describes financial capital as a fund of purchasing power derived from “money and other assets calculated in money” and he suggest that it is an essential factor In the entrepreneur’s carrying out of new combinations (1934). Although he did not consider concrete goods to be equivalent to capital, he acknowledged that concrete goods can be conceived as “potential capital”. Schumpeter evaluated all the goods which the entrepreneur needs on the same level regardless of whether they were services of natural agents, labor, machinery, or raw material. He argued that when they are all needed by the firm nothing distinguishes one of these wants from the others.

A review of empirical research showed that the founding of new firms is more common when people have access to financial capital (Simpeh, 2011). One quantitative study used a multinomial logit model to estimate how financial capital affected the income-earning choices made by entrepreneurs (Holtz-Eakin, Joulfaian, & Rosen, 1994). The results confirmed that liquidity constraints exert a noticeable influence on the viability of entrepreneurial enterprises thereby increasing the likelihood of entrepreneurial failure. If entrepreneurs can attain their profit-maximizing levels of capital, their enterprises are more likely to survive and perform better.

### **II.2.2.2 Social Capital or Social Network Theories**

Economists have given substantial attention to the relationship between social structure or networks on the economy. Granovetter (2005) suggest three main reasons for this relationship. First, social networks affect the flow and the quality of information,

much of which is subtle and nuanced. Second, social networks provide an important gateway providing access to necessary and sometimes rare resources. Third, trust in the context of a social network has been observed to influence economic flexibility in trade relations. Literature on social capital or social network theories show that entrepreneurs' access to a larger social network facilitates recognition that a given entrepreneurial opportunity exists, acquisition of needed resources and transformation of the opportunity into a business start-up (Simeh, 2011).

### **II.2.2.3 Human Capital Theories**

Schumpeter (1934) suggested that “the carrying out of new combinations is a special function, and the privilege of a type of people who are much less numerous than all those who have the “objective” possibility of doing it. Therefore, finally, entrepreneurs are a special type, and their behavior a special problem, the motive power of a great number of significant phenomena.” In their examination of the relationship between resource-based theory and entrepreneurship, Alvarez and Busenitz advanced the importance of human capital in RBT by arguing that individual-specific factors do facilitate opportunity recognition and the ability to carry out new combinations (2001). A summary review of literature revealed that education and experience represent the human capital resources most analyzed in RBT for their relationship to increased opportunity identification and entrepreneurial success(Simeh, 2011).

### **II.3 Literary Question – Impact on Entrepreneurial Activity**

Given the widely recognized economic challenges of rural areas, there have been extensive studies of economic development strategies. As noted in the literature review, previous studies have established the relationship between economic development and entrepreneurship. Economic development practices now attempt to influence job and economic growth within their jurisdictions. Economic development activities in rural areas place more significant demands on time and resources as compared to urban areas and often rely upon partnerships and collaboration among such institutions as chambers of commerce, economic development professionals, and postsecondary education institutions, as well as establishments providing grants, investments, and loans from government, private capital and NGO sources (Falcone et al., 1996). Drawing on literary research presented regarding the role of postsecondary education institutions in entrepreneurial ecosystems, coupled with RBT built upon Schumpeter's (1934) theory that entrepreneurial firms play a critical role in economic development by employing resources in the carrying out of new combinations, this study will examine the application of resource based theories (RBT) across the three classes of resources noted in Simpeh's review of literature on entrepreneurship theories: financial, social, and human capital. This review of literature identified recommendations for further examination of how geographic context, organization, level of resources and time commitments of postsecondary education are related to economic performance of host communities.



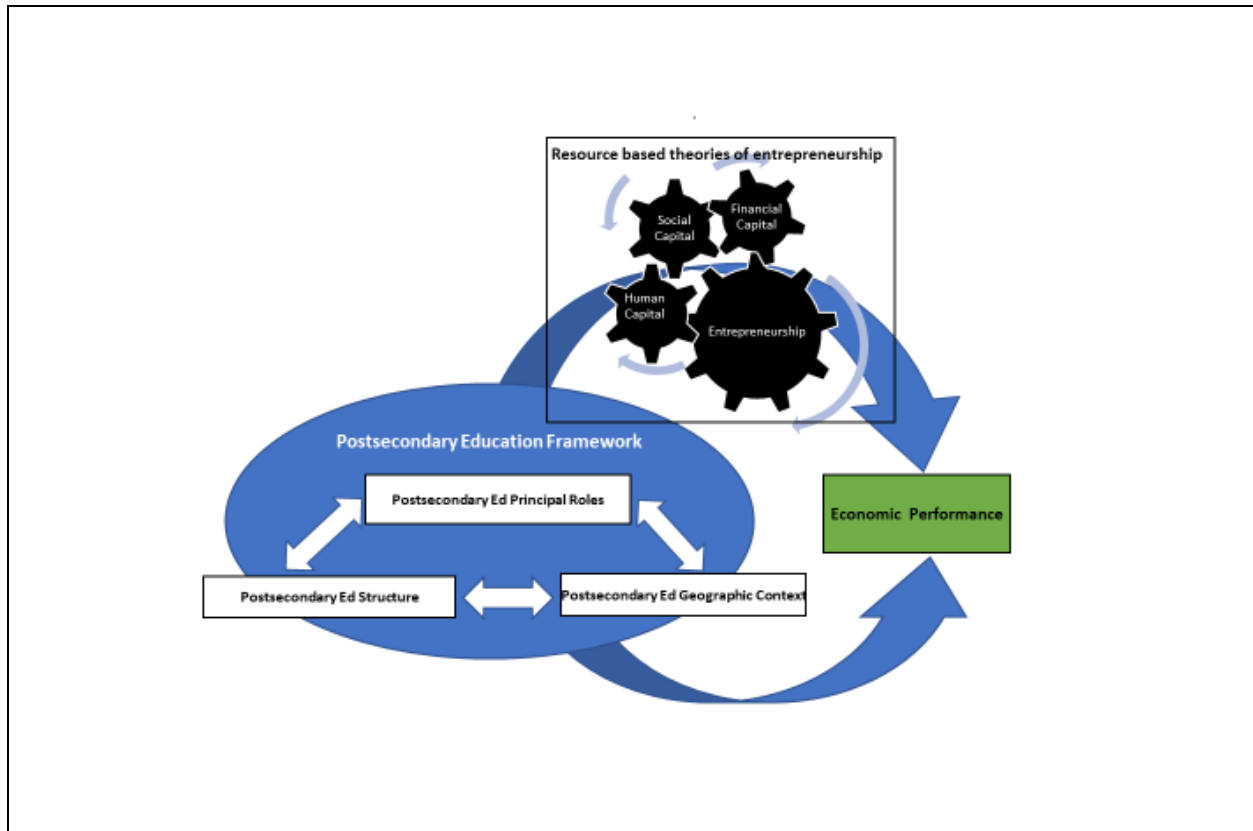
Despite a long tradition of research in the area of entrepreneurship, this study argues that further examination is needed to expand knowledge of the relationship between postsecondary education and entrepreneurial activity in a rural context. This study will examine Brekke's "Conceptual framework of the four principal roles of Higher Education Institutions": (1) organizational, (2) intermediary, (3) knowledge, and (4) policy for regional development and innovation. Brekke proposed that his conceptual framework should be tested considering the different types of regional context, university roles, and institutional characteristics. Of great importance to this study is advancing knowledge of the influence of postsecondary education institutions on entrepreneurial activity in a rural context. This study offers two propositions that require examination of the relationship between rural geographic context, postsecondary education structures, postsecondary education roles and entrepreneurial activity:

**Proposition 1:** Postsecondary education will have a positive and significant relationship to entrepreneurship in rural areas such that overall economic performance improves.

**Proposition 2:** Entrepreneurship will mediate the relationship between postsecondary education and economic performance in rural context such that economic performance will increase.

Figure 4 presents a conceptual model that integrates Brekke's "Conceptual framework of the four principal roles of university/HEI" and resource-based theories of entrepreneurship that will be examined in this study.

**Figure 4:** *Conceptual model of four principal roles of university/PSE for regional economic development and resource-based theories of entrepreneurship*



### **III RESEARCH FRAMING AND METHODOLOGY**

#### **III.1 Research Question**

The purpose of this study is to answer the following research questions:

**“Does postsecondary education influence economic performance through entrepreneurship in rural areas?”**

**and**

**What contributes to postsecondary education’s influence on entrepreneurship in rural areas?**

There should be a positive relationship between postsecondary education and entrepreneurship in rural areas such that overall economic performance improves. Contributing to knowledge of postsecondary education’s influence on economic performance through entrepreneurial activity in rural areas, can lead to better decision making about strategic use of postsecondary education as a tool for economic development.

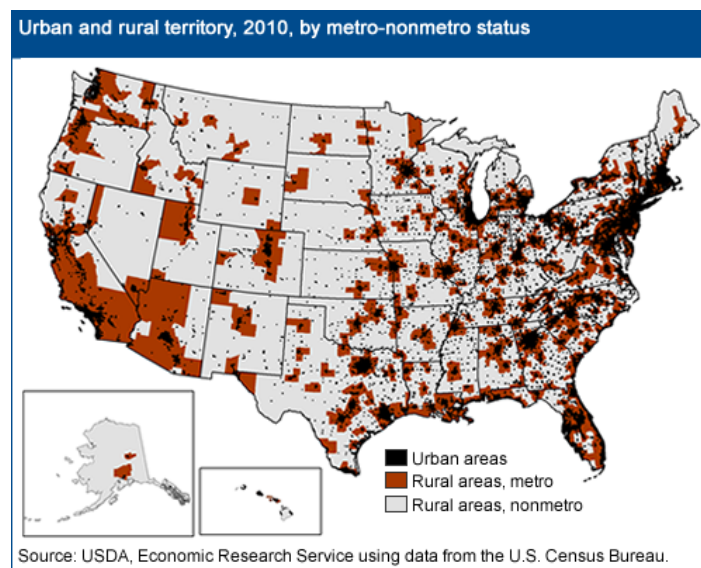
#### **III.2 Target Population**

The target population for this study of entrepreneurship is rural counties in the United States (Figure 5). While there are several definitions of rural, the U.S. Census Bureau's Economic Research Service (ERS) Rural-Urban Commuting Area Codes designations will be used for this research. ERS Rural-Urban Commuting Area Codes (RUCAs) system classifies a metro area as “one or more counties containing a core urban area of 50,000 or more people, together with any adjacent counties that have a high

degree of social and economic integration (as measured by commuting to work) with the urban core” (USDA-ERS, 2019).

Studies designed to track and explain economic changes typically use this metro-nonmetro classification, because it reflects a regional, labor-market concept and allows the use of widely available county-level data. This definition uses a 25% commuting rate threshold and a minimum population of 50,000 in defining metropolitan or urban thresholds. Rural counties are designated as any county that is not included in the urban category (Ratcliffe et al., 2016). Almost sixty (57.6) million people or 20% of U.S. population and 81% of U.S. land area were designated as rural using this definition in 2010.

**Figure 5: Rural Counties in the United States**



(USDA, 2019)

### III.3 Research Approach

This research used a mixed method, empirical study. The primary research method was quantitative analysis that was used to examine the degree to which variables are related to each other and to measure the strength of the association

between variables. Descriptive statistics was used to describe how the variables are represented in our study sample. Secondly, the study applied qualitative methods that provided deeper insight on common themes and institutional roles.

### **III.4 Quantitative Method – Primary Examination of Relationships**

#### ***III.4.1 Variance Model***

##### **III.4.1.1 Concepts**

This study proposes that there is a positive relationship between postsecondary education, entrepreneurship, and economic performance.

**Postsecondary education framework** refers to the infrastructure for educational offerings delivered by postsecondary educational institutions.

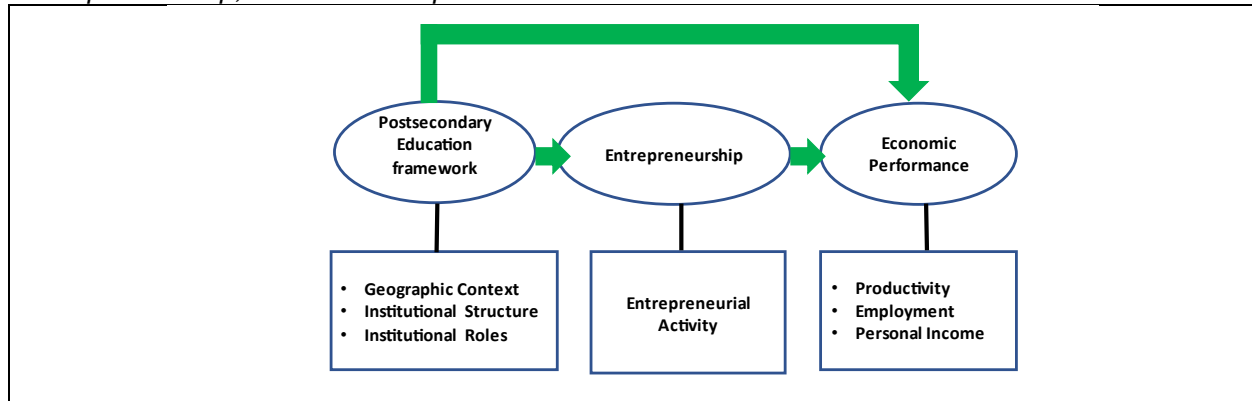
Postsecondary education in the United States includes education beyond the secondary school level.

**Entrepreneurship** refers to the activities focused on the act of combining resources in a new and profitable manner.

**Economic performance** refers to the economy's outcomes from the production and consumption of goods and services.

The variance model in Figure 6 provides a diagram of the proposed relationships among these core concepts and introduces the constructs that will be used in the structural model.

**Figure 6:** Variance Model of proposed relationship between postsecondary education, entrepreneurship, and economic performance



### III.4.1.2 Constructs

#### III.4.1.2.1 Postsecondary Education Framework

An outcome of the review of literature was recognition that the terms university, postsecondary education institution (PSE), and higher education institution (HEI) are used interchangeably. The National Center for Education Statistics (NCES) is the primary federal entity for collecting, analyzing, and reporting data related to education in the United States. NCES fulfills a congressional mandate to collect, collate, analyze, and report full and complete statistics on the condition of education in the United States (USDEd, 2021c). Postsecondary education framework is operationalized using NCES classifications for Geographic Context and Institutional Structure. These terms are used by the United States Department of Education and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) (USDEd, 2021c).

- **Geographic context** provides information about school location to investigate the impact of administration location on delivery of academic programs including

remote distance learning. This information also helps to identify associations with other types of geographic variables.

- **Institutional Structure** provides information on the governance, administration, educational offerings and mission of higher education institutions.

#### ***III.4.1.2.2 Entrepreneurship***

Entrepreneurship is operationalized using **Entrepreneurial Activity**. The dispersion of entrepreneurs and the concentration of high-value entrepreneurs are the two important characteristics of entrepreneurial activity that this study used to evaluate entrepreneurship's value to a local economy.

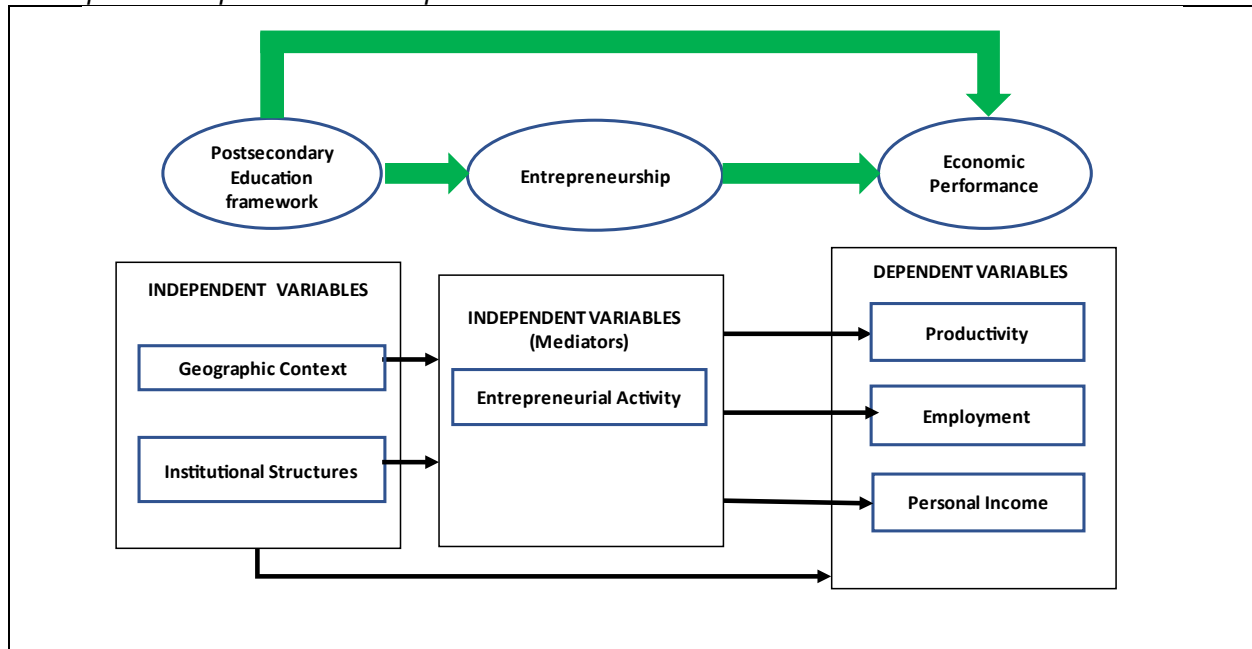
#### ***III.4.1.2.3 Economic Performance***

Economic performance is operationalized using Productivity, Employment and Personal Incomes. These constructs are used to study economic performance in much of the literature and a related study "The Influence of University R & D Expenditures on New Business Formations and Employment Growth" ; Bruce A. Kirchoff, Scott L. Newbert, Iftexhar Hasan, and Catherine Armington (2007)

#### ***III.4.2 Hypothesis***

Using the constructs presented, a factor model is presented showing the sequence of the constructs and the relationships between them based on theory. Hypothesis are listed in Table 2 and the hypothesized factor model is presented in Figure 7.

**Figure 7:** Model of hypothesized relationship between postsecondary education, entrepreneurship and economic performance constructs.





**Table 2: Research Hypothesis**

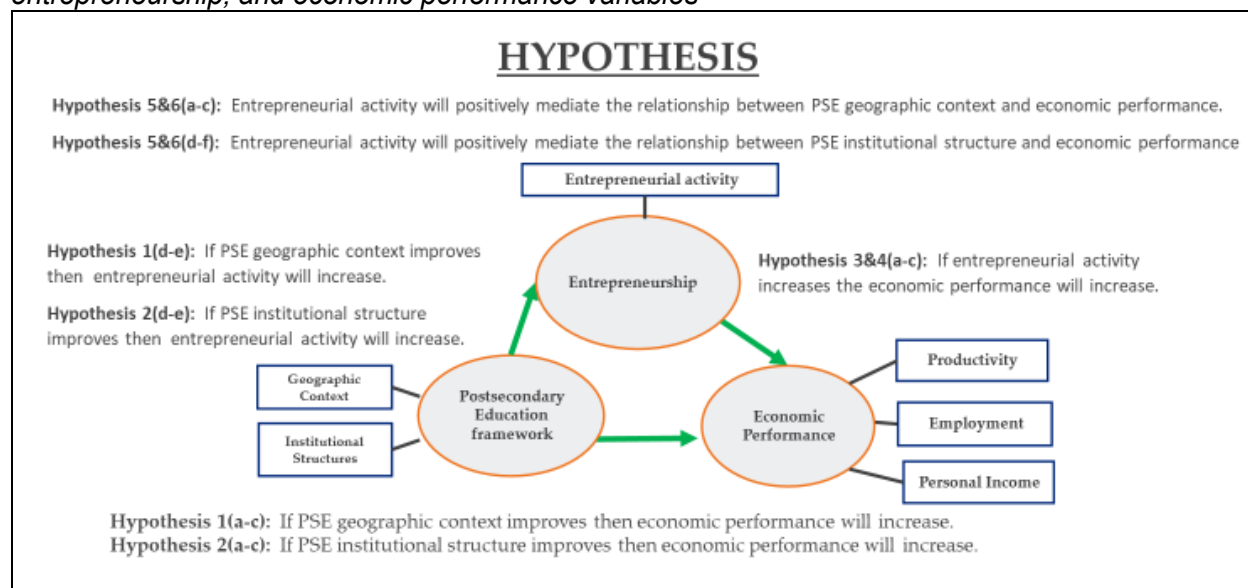
<b>Hypothesis 1(a)</b>	If geographic context of postsecondary education improves then productivity will increase.
<b>Hypothesis 1(b)</b>	If geographic context of postsecondary education improves then employment will increase.
<b>Hypothesis 1(c)</b>	If geographic context of postsecondary education improves then personal income will increase.
<b>Hypothesis 1(d)</b>	If geographic context of postsecondary education improves then dispersion of entrepreneurial activity will increase.
<b>Hypothesis 1(e)</b>	If geographic context of postsecondary education improves then Concentration of high worth entrepreneurial activity will increase.
<b>Hypothesis 2(a)</b>	If institutional structure of postsecondary education improves then productivity will increase.
<b>Hypothesis 2(b)</b>	If institutional structure of postsecondary education improves then employment will increase.
<b>Hypothesis 2(c)</b>	If institutional structure of postsecondary education improves then personal income will increase.
<b>Hypothesis 2(d)</b>	If institutional structure of postsecondary education improves then dispersion of entrepreneurial activity will increase.
<b>Hypothesis 2(e)</b>	If institutional structure of postsecondary education improves then Concentration of high worth entrepreneurial activity will increase.
<b>Hypothesis 3(a)</b>	If dispersion of entrepreneurial activity increases then productivity will increase.
<b>Hypothesis 3(b)</b>	If dispersion of entrepreneurial activity increases then employment will increase.
<b>Hypothesis 3(c)</b>	If dispersion of entrepreneurial activity increases then personal income will increase.
<b>Hypothesis 4(a)</b>	If concentration of high worth entrepreneurial activity increases then productivity will increase.
<b>Hypothesis 4(b)</b>	If concentration of high worth entrepreneurial activity increases then employment will increase.
<b>Hypothesis 4(c)</b>	If concentration of high worth entrepreneurial activity increases then personal income will increase.
<b>Hypothesis 5(a)</b>	Dispersion of entrepreneurial activity will mediate the relationship between geographic context and productivity in rural context such that productivity will increase.
<b>Hypothesis 5(b)</b>	Dispersion of entrepreneurial activity will mediate the relationship between geographic context and employment in rural context such that employment will increase.
<b>Hypothesis 5(c)</b>	Dispersion of entrepreneurial activity will mediate the relationship between geographic context and personal income in rural context such that personal income will increase.
<b>Hypothesis 5(d)</b>	Dispersion of entrepreneurial activity will mediate the relationship between postsecondary education structure and productivity in rural context such that productivity will increase.
<b>Hypothesis 5(e)</b>	Dispersion of entrepreneurial activity will mediate the relationship between postsecondary education structure and employment in rural context such that employment will increase.
<b>Hypothesis 5(f)</b>	Dispersion of entrepreneurial activity will mediate the relationship between postsecondary education structure and personal income in rural context such that personal income will increase.

<b>Hypothesis 6(a)</b>	Concentration of high worth entrepreneurial activity will mediate the relationship between geographic context and productivity in rural context such that productivity will increase.
<b>Hypothesis 6(b)</b>	Concentration of high worth entrepreneurial activity will mediate the relationship between geographic context and employment in rural context such that employment will increase.
<b>Hypothesis 6(c)</b>	Concentration of high worth entrepreneurial activity will mediate the relationship between geographic context and personal income in rural context such that personal income will increase.
<b>Hypothesis 6(d)</b>	Concentration of high worth entrepreneurial activity will mediate the relationship between postsecondary education structure and productivity in rural context such that productivity will increase.
<b>Hypothesis 6(e)</b>	Concentration of high worth entrepreneurial activity will mediate the relationship between postsecondary education structure and employment in rural context such that employment will increase.
<b>Hypothesis 6(f)</b>	Concentration of high worth entrepreneurial activity will mediate the relationship between postsecondary education structure and personal income in rural context such that personal income will increase.

### III.4.3 Structural Model

The Structural model in Figure 8 presents the hypothetical relationship between constructs for postsecondary education, entrepreneurship, and economic performance.

**Figure 8:** Structural Model of hypothetical relationship between postsecondary education, entrepreneurship, and economic performance variables



#### ***III.4.4 Method of Analysis***

Descriptive Statistics is used along with tables and charts to examine data on postsecondary education, entrepreneurship, productivity, employment, and personal incomes. SPSS data analysis tools were used to compute descriptive measures.

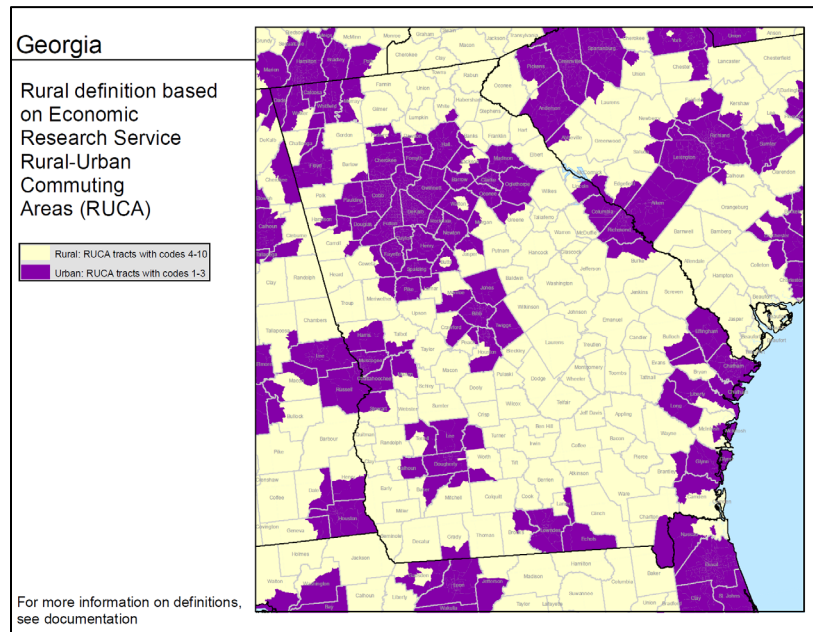
SPSS Regression Analysis is used to determine:

1. Relationship between postsecondary education, entrepreneurship and percent changes in per capita productivity, employment and personal incomes
2. Model that describes the relationship
3. Strength of the model for predicting the influence of postsecondary education and entrepreneurship on percent changes in per capita productivity, employment and personal incomes
4. Statistical significance of direct and indirect relationships between postsecondary education, entrepreneurship and percent changes in per capita productivity, employment and personal incomes

#### ***III.4.5 Sample and Unit of Analysis***

This study examines postsecondary education, entrepreneurship and economic performance as measured at the county level. According to the US Department of Agriculture Economic Research Services, counties are the standard building block for publishing economic data and for conducting research to track and explain regional population and economic trends (USDA, 2019). This study sample is composed of rural (non-metropolitan) counties in Georgia using 2013 Rural-Urban Computing Area Codes (USDA, 2013). Data from 85 rural Georgia counties provided an opportunity sample to test the hypotheses. Figure 9 shows the representation of Georgia's rural counties that comprise the study's sample.

**Figure 9: Georgia's rural counties**

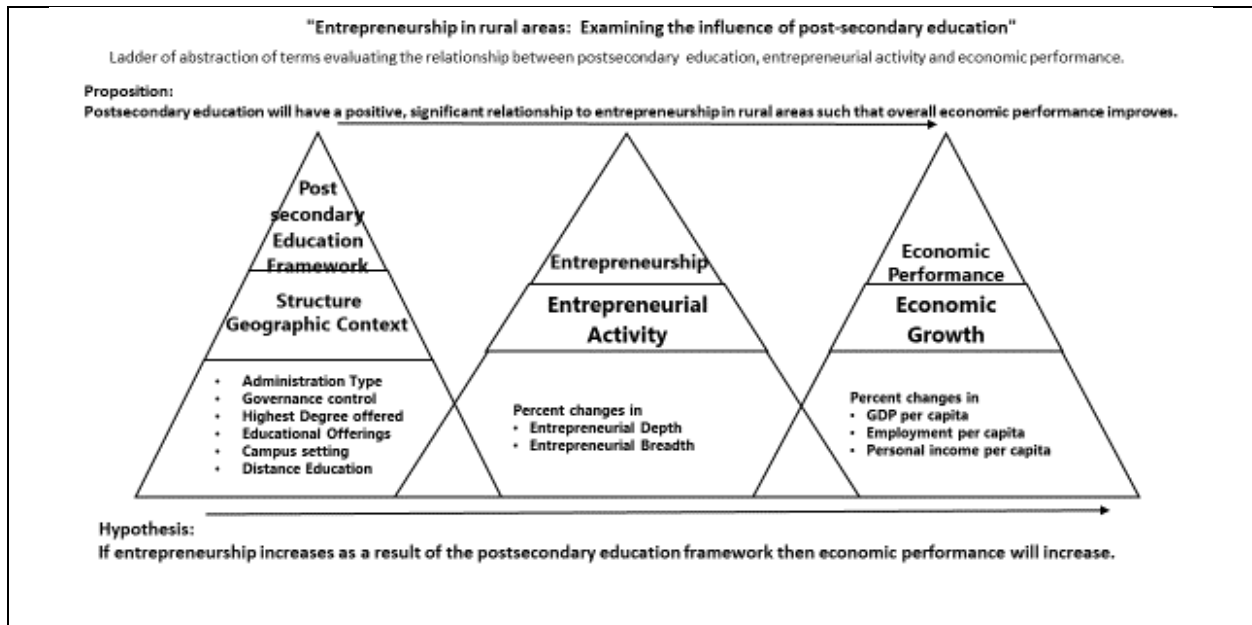


(USDA-ERS, 2019)

**III.4.6 Variables**

Figure 10 shows the ladder of abstraction of terms and introduces the measures that are used in this analysis.

**Figure 10: Ladder of abstraction of terms**



### **III.4.6.1 Independent Variables**

This study evaluates the effects of variations in postsecondary education frameworks within each of Georgia's 85 rural counties. The ladder of abstractions in Figure 10 shows the proposed relationship between the concept, constructs and measurements of independent variables for postsecondary education frameworks. In this study. Data from U.S. Department of Education National Center for Education Statistics (NCES) Integrated Postsecondary Education Data System allow us to represent the complexity of this construct with data collected under congressional mandate (NCES, 2021).

#### ***III.4.6.1.1 Geographic Context***

Geographic context provides information about school location to investigate the impact of administration location on delivery of academic programs including remote distance learning. Geographic context is represented as a summary count of measures for administration locations using data available from the National Center for Education Statistics' (NCES) core postsecondary education data collection program through the United States Department of Education's Integrated Postsecondary Education Data System (2021a). The IPEDS program's Annual Institutional Characteristics components are collected each fall from all currently operating postsecondary institutions in the United States and other jurisdictions. Geographic context uses the following characteristics: Campus setting, Degree of Urbanization, and Undergraduate Distance Education.

**Campus setting** uses twelve categories to identify and differentiate urban schools, rural schools, schools in relatively remote areas, and those located just outside an urban center. Categories are shown in Table 3.

**Table 3:** *US Department of Ed IPDES Campus Setting Categories*

Setting	Description
Rural	Census defined rural territory that ranges in distance from less than 5 miles to more than 25 miles from an urbanized area, as well as being less than 2.5 miles to more than 10 miles from an urban cluster
Town	Territory inside an urban cluster that ranges in distance of less than 10 miles to more than 35 miles from an urbanized area.
Suburban	Territory outside a principal city and inside an urbanized area with a population ranging from less than 100,000 to one of more than 250,000
City	Territory inside an urbanized area and inside a principal city with a population ranging from less than 100,000 to one of more than 250,000

(NCES, 2021)

**Degree of urbanization (Urban-centric locale)** uses Locale codes to identify the geographic status of a school on an urban continuum ranging from “large city” to “rural.” They are based on a school’s physical address. The urban-centric locale codes are assigned through a methodology developed by the U.S. Census Bureau’s Population Division in 2005 (NCES, 2021). Urban-centric locale code categories are shown in Table 4.

**Table 4:** *US Department of Ed IPDES Campus Setting Categories United Department of Ed NCES IPDES Urban-centric locale codes*

Setting	Locale	Description
City	Large	Territory inside an urbanized area and inside a principal city with population of 250,000 or more.
City	Midsize	Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000.
City	Small	Territory inside an urbanized area and inside a principal city with population less than 100,000.
Suburb	Large	Territory outside a principal city and inside an urbanized area with population of 250,000 or more.
Suburb	Midsize	Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000.
Suburb	Small	Territory outside a principal city and inside an urbanized area with population less than 100,000.
Town	Fringe	Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area.
Town	Distant	Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area.
Town	Remote	Territory inside an urban cluster that is more than 35 miles from an urbanized area.
Rural	Fringe	Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster.
Rural	Distant	Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster.
Rural	Remote	Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.
Other	Other	American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the Virgin Islands, were not assigned a locale code because the geographic and governmental structures of these entities do not fit the definitional scheme used to derive the code.

(NCES, 2021)

**Undergraduate Distance education** uses one or more technologies to deliver instruction to students who are separated from the instructor and to support regular and substantive interaction between the students and the instructor synchronously or asynchronously (NCES, 2021). Technologies used for instruction may include the following: Internet; one-way and two-way transmissions through open broadcasts, closed circuit, cable, microwave, broadband lines, fiber optics, satellite, or wireless

communication devices; audio conferencing; and video cassette, DVDs, and CD-ROMs, if the cassette, DVDs, and CD-ROMs are used in a course in conjunction with the technologies listed.

#### ***III.4.6.1.2 Institutional Structure***

Institutional Structure provides information on the governance, administration, educational offerings, and mission of postsecondary education institutions. Institutional structure is operationalized as a summary count of measures developed using data available from the National Center for Education Statistics' (NCES) core postsecondary education data collection program through the United States Department of Education's NCES Integrated Postsecondary Education Data System (2021). The IPEDS program's Annual Institutional Characteristics components are collected each fall from all currently operating postsecondary institutions in the United States and other jurisdictions. (2021a). Institutional structure is represented using the IPEDS Institutional Characteristics components below.

**Campus administration type:** A PSE institution may administer educational programs in the context of a main or branch campus. The administration type of an institution is considered to be a "main campus" if the permanent location has a separate budget, hiring authority and supervisory authority over courses leading to a degree, certificate, or other credential. A "branch" or "satellite campus" is defined as a campus or site of an educational institution that is not temporary, is located in a community beyond a reasonable commuting distance from its parent institution, and offers full programs of study, not just courses.



**Governance:** This variable is a classification of whether an institution is operated by publicly appointed or privately elected officials in addition to whether it derives its major source of funds from public versus private sources (NCES, 2021). Post-secondary institution control classifications are shown in Table 5.

**Table 5: USDOE IPDES NCES Post-secondary institution control classifications**

<b>Classification</b>	<b>Description</b>
Public institution	An educational institution whose programs and activities are operated by publicly elected or appointed school officials and which is supported primarily by public funds.
Private not-for-profit institution (no religious affiliation)	A private institution in which the individual(s) or agency in control receives no compensation, other than wages, rent, or other expenses for the assumption of risk. These include both independent not-for-profit schools and those affiliated with a religious organization.
Private for-profit institution	A private institution in which the individual(s) or agency in control receives compensation other than wages, rent, or other expenses for the assumption of risk.
Private not-for-profit (religious affiliation)	A private not-for-profit institutions in which the individual(s) or agency in control indicates that they are religiously affiliated.

(NCES, 2021)

**Highest degree offered:** If degrees are awarded at the institution, this data indicates the highest degree offered including first-professional degrees or certificates. Degree award categories are shown in Table 6.

**Table 6: USDOE NCES IPDES Post-secondary institution degree award categories**

<b>Category</b>
Non-degree granting
First-professional only
Doctoral
Doctoral and first-professional
Masters
Masters and first-professional
Bachelors
Bachelors and first-professional
Associates

(NCES, 2021)

**Types of educational offerings:** This data identifies the institution's offering of all types of postsecondary education and formal instructional programs whose curriculum is designed primarily for students beyond the compulsory age for high school. This study includes programs whose purpose is academic, vocational, and continuing professional education and excludes avocational and adult basic education programs. Educational offering categories are shown in Table 7.

**Table 7:** *USDOE NCES IPDES Post-secondary institution educational offering categories*

<b>Offering</b>	<b>Description</b>
ACADEMIC PROGRAM	Instructional program leading toward an associate's, bachelor's, master's, doctor's, or first-professional degree or resulting in credits that can be applied to one of these degrees. Academic may lead to a certificate, degree, or diploma
OCCUPATIONAL PROGRAM	A program of study consisting of one or more courses, designed to provide the student with sufficient knowledge and skills to perform in a specific occupation. Occupational, may lead to a certificate, degree, or other formal award
CONTINUING PROFESSIONAL EDUCATION	Programs and courses designed specifically for individuals who have completed a professional degree (such as law, medicine, dentistry, or social work) to obtain additional training in their particular field of study. Continuing professional includes postbaccalaureate only.
AVOCATIONAL PROGRAMS	Instructional programs in personal interest and leisure categories whose expressed intent is not to produce postsecondary credits, nor to lead to a formal award or an academic degree, nor result in occupationally specific skills. (May be referred to as Recreational or avocational)
ADULT BASIC EDUCATION	Courses designed primarily for students 16 years of age and older to improve basic skills in reading, writing, and arithmetic. These courses are not intended to be part of a program leading to a high school degree, nor are they part of any academic, occupational, or vocational program at the postsecondary level. (Adult basic or remedial instruction or high school equivalency)

(NCES, 2021)

### III.4.6.2 Mediators

Entrepreneurial Activity is identified by the dispersion of entrepreneurs and the concentration of high-value entrepreneurs within a county. The Federal Reserve Bank of Kansas City introduced Entrepreneurial Breadth and Entrepreneurial Depth as a new

way of measuring a region's entrepreneurial activity (Low, 2004). Data for Georgia was prepared by experts at the Carl Vinson Institute of Government for statewide comparison and to measure and benchmark progress in rural development at the county level.

**Entrepreneurial Breadth** is the percentage of entrepreneurs out of total employment.

**Entrepreneurial Depth** is a measure of average proprietor income. It is calculated by dividing total entrepreneur income by the number of entrepreneurs in an economy.

#### **III.4.6.3 Dependent Variables**

If the hypothesized relationship exist, then direct and indirect variations in the dependent variable will be observed associated with variations in the mediating and independent variables.

Economic performance is analyzed by using three constructs in this analysis: employment, productivity and personal income. These constructs are measured using percent changes in Employment per capita, GDP per capita, and Personal Income per capita.

**Employment level** is a highly accurate and commonly used measure of economic performance, and it is a primary focus of economic development efforts at all levels. 2010-2017 employment data was collected from the U.S. Bureau of the Census' county-level employment reports. 2010-2017 percent employment change per capita was calculated in order to account for the substantial population differences that exists in counties across Georgia.

The **gross domestic product (GDP)** is accepted throughout the world as a measure of economic activity. GDP per capita is the broadest measure of productivity and is strongly linked over time to standard of living. This data is available at the county level. 2010-2017 GDP percent change GDP per capita is used in order to account for the substantial population differences that exists in counties across Georgia.

**Personal income** is the income that a worker receives from all sources, including salary, wages, bonuses, income from self-employment, dividends from investments, and receipts from real estate investments. Total personal income is different from the average wage, as personal income takes more factors into account than just salary and compensation. Georgia is in the bottom quartile of USA states for per capita income. This study uses per capita personal income data that is available at the county level from the Carl Vinson Institute of Government at the University of Georgia. 2010-2017 personal income percent change per capita is used in order to account for the substantial population differences that exists in counties across Georgia.

#### **III.4.6.4 Other Variables of Interest**

Related studies found a positive relationship between population, entrepreneurship, and economic performance because of market size. U.S. Bureau of the Census data on population by county was collected for this study. 2010-2017 population percent change is used as a control variable in this analysis.

In addition to postsecondary education and population, other variables may be related to changes in entrepreneurship and economic performance at the local level. Related empirical research has shown that the economic factors in Table 8 may influence entrepreneurial activity and changes in employment, productivity and incomes

(Kirchhoff et al., 2007). These variables may be strongly related to changes in employment, productivity, and personal incomes however they will not be analyzed in this study.

**Table 8:** *Other variables related to entrepreneurship and economic performance*

<b>Educational attainment</b>	There is likely a relationship between the proportion of college graduates and new business operations in a county.
<b>Purchasing Power</b>	Consumers' drive the overall economy therefore purchasing power likely affects the expansion of business operations in a county.
<b>Foreign Population</b>	New firm formation rates are often higher among immigrant groups, due to their more limited potential for employment in existing firms.
<b>Period effects or Changes in Economic Environment</b>	Significant historical discontinuities called period effects may cause a similar impact on all organizations.

### **III.4.7 Interpretation of Analysis**

#### **III.4.7.1 Descriptive Statistics**

Statistical analysis is used to examine each variable individually in order to summarize distributions and look for outliers, missing data, or possible errors. Graphs and charts are used to display patterns and trends. Descriptive statistics are calculated and presented for entrepreneurial activity, productivity, employment and personal incomes to determine centrality, variation and distribution.

#### **III.4.7.2 Multiple Regression**

Multiple regression analysis is performed to evaluate the relationships between postsecondary education framework, entrepreneurial activity and each of the three dependent measures of economic performance. The regression analysis produces equations for predicting whether on average economic performance measured as percent changes in per capita GDP, per capita employment and per capita personal

income at the county level has a positive significant relationship with summary counts of postsecondary education through mediator variables for entrepreneurship while holding all other variables constant.

Geographic context and Institutional structure are modeled separately. The path models include the direct and indirect effects of each construct on the three different outcome variables for economic performance. This approach yields an estimate of each construct's direct and indirect effects on entrepreneurial activity and economic performance along with the effect of other variables excluded from the model (Hayes, 2017). This study requires at least 95% confidence that the models reflect a true relationship between independent and dependent variables. R squared for each regression is interpreted to determine the strength of relationships between variables (Burns & Burns, 2008). R-squared reflects the percent of the variance in dependent variables that is accounted for by their individual linear relationships with the independent variables and mediators. Figures 11 and 12 show the research models.

#### **III.4.7.3 Mediation Analysis**

Historically, mediation analysis would be undertaken only after a relationship is found between independent and dependent variables. There is growing awareness that this reliance on simple mediation is rudimentary and oversimplifies the complex dynamics between variables. Mediation scholars acknowledge that the underlying effect of X on Y cannot be preconditioned on evidence of simple mediation with the added limitations in data collection and research design (Hayes, 2017). If a determination can be made that a relationship between the dependent and the independent variable no longer exists and their variations are controlled by some other

variable(s), then the other variable is considered a mediator variable(s). This study used the estimation and interpretation of direct and indirect effects along with inferential test to assess the hypothesized mediational relationships.

The parallel multiple mediator model is used to illustrate the hypothesized mediating effect of entrepreneurial activity on the relationship between independent variables, mediator variables and each dependent variable. Estimating indirect effects in a parallel multiple mediator model allows for a simultaneous test of each mechanism while accounting for the association between them (Hayes, 2017). A test of the null hypothesis at a 95% confidence level is performed for the direct and indirect effects of each model. Direct effects are tested using p-value level of significance at 0.05 thus if the p-value is no larger than .05 then the null hypothesis is rejected. Rejection of the null hypothesis implies that independent and dependent variables are related while holding the covariates constant. Percentile Confidence Interval based on 5,000 bootstrap samples are used to test the indirect effects at a 95% confidence level. If the confidence interval included zero, the null hypothesis could not be rejected, thereby indicating that there is insufficient evidence in the model that independent variables affect the dependent variables through the mediator variables.

### III.4.8 Research Model

Figure 11: Research model with Geographic Context as independent variable

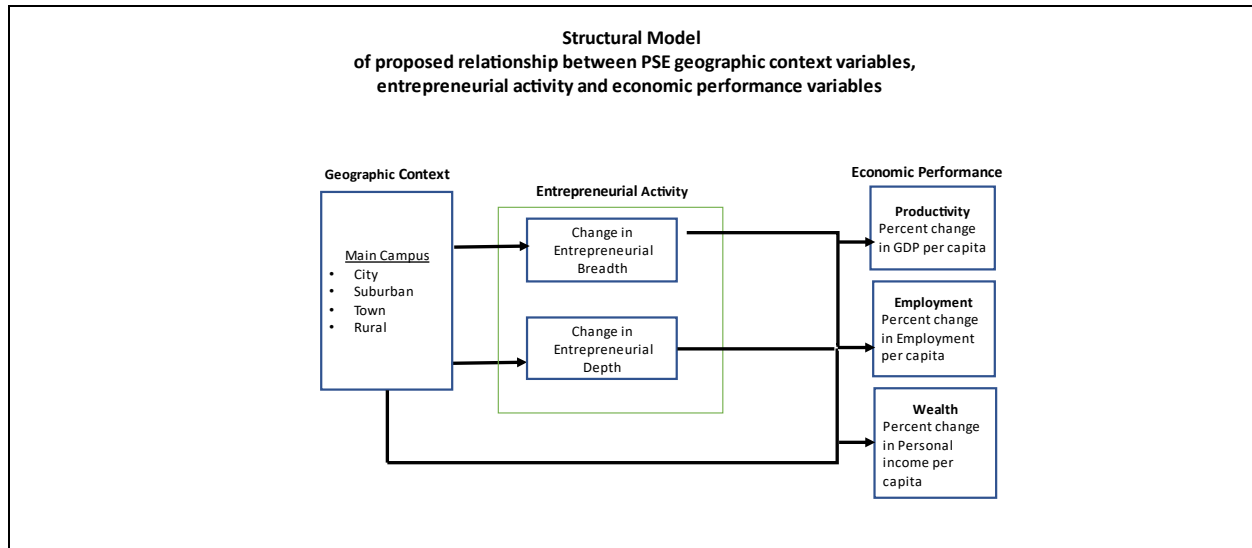
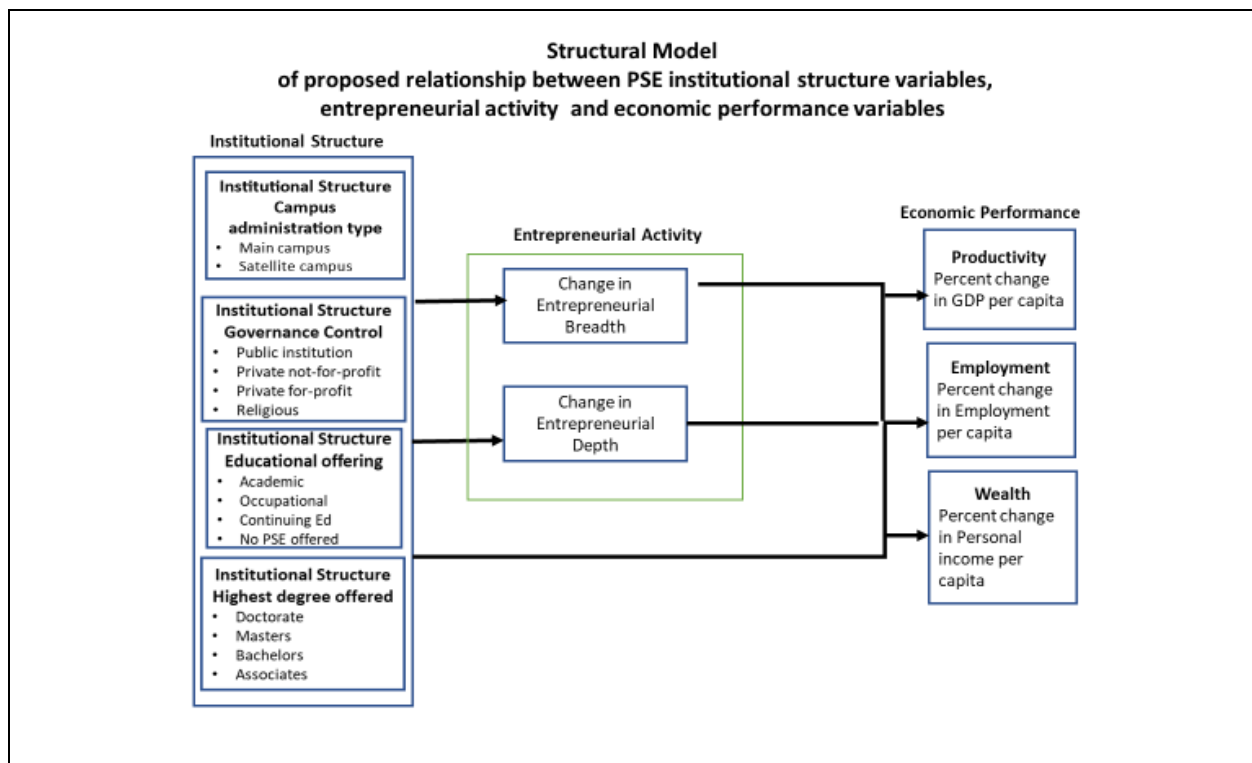


Figure 12: Research model with Institutional Structure as independent variable





### III.5 Qualitative Method - Deeper Insights

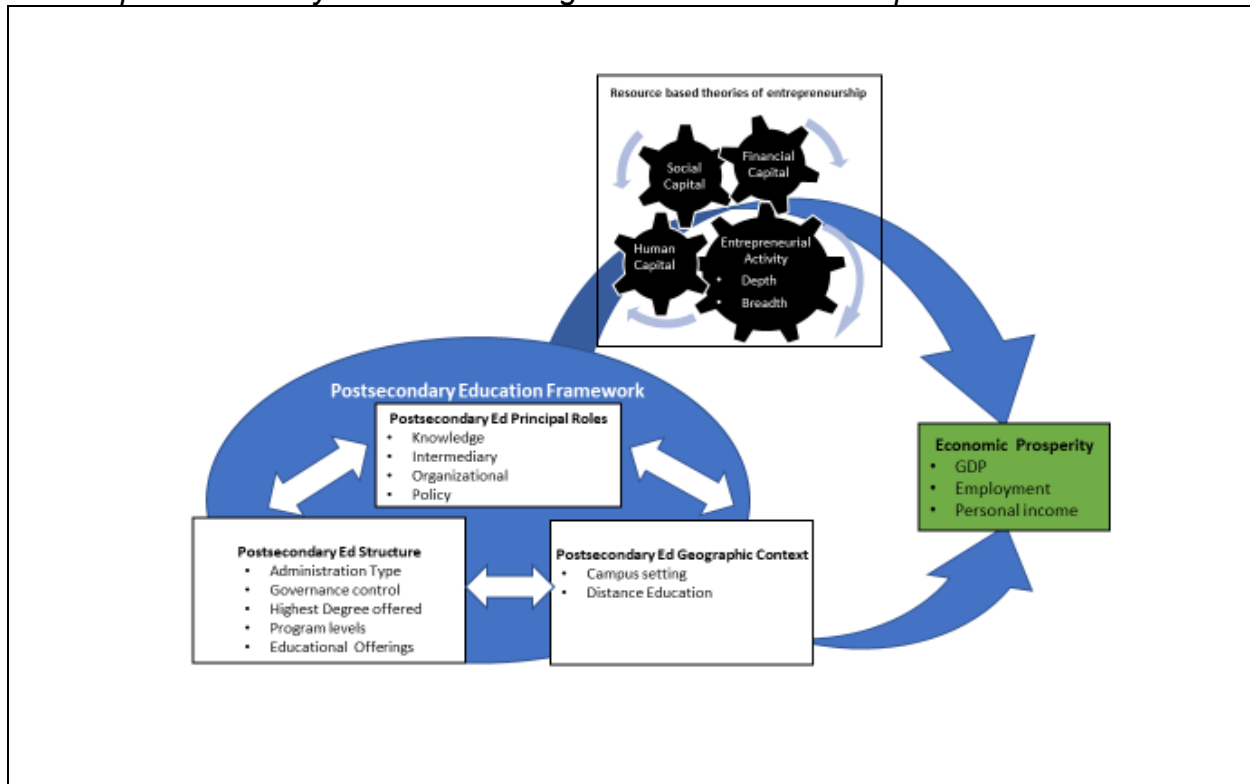
Qualitative research methods allow the study to assess variables that are best discerned through an analysis of multiple understandings and meanings held by different persons (Burns & Burns, 2008). This study offers two propositions regarding the relationship between postsecondary education, entrepreneurship, and economic performance in a rural geographic context:

**Proposition 1:** Postsecondary education will have a positive influence on entrepreneurship in rural areas such that overall economic performance improves.

**Proposition 2:** Entrepreneurship will mediate the relationship between postsecondary education and economic performance in rural context such that economic performance will increase.

With findings from quantitative analysis that support the propositions, this study continues with further examination to expand knowledge of the relationship between postsecondary education and entrepreneurship in a rural context. In-depth qualitative follow up is conducted with economic development specialist in the three (3) of the most successful rural counties based upon statistical analysis of entrepreneurial activity. The qualitative study is used to gain deeper insight regarding the study's conceptual model which integrates resource based theories and Brekke's framework of four principal roles of postsecondary education: (1) organizational (2) intermediary, (3) knowledge, and (4) policy. Figure 13 presents this study's conceptual model.

**Figure 13:** Proposed conceptual model of relationship between resource based theories of entrepreneurship and Brekke's conceptual framework of the four principal roles of postsecondary education for regional economic development



### III.5.1 Sample for Qualitative Study

Most counties in Georgia have economic development specialist who work to promote local economic growth. Quantitative analysis is followed by a review of economic development practices in three (3) top tier counties based upon statistical analysis of entrepreneurial activity. The main source of data collection is semi-structured interviews with those directly involved with entrepreneurship and economic development programs. Economic development specialist are interviewed to obtain information on policies, agencies, programs, technology, techniques, or best practices related to post-secondary education and entrepreneurial activities. Publicly available

information is used to identify economic development specialists in each county representing entities such as Economic Development Authorities, Chambers of Commerce, Small Business Development Councils, etc. A total of eight interviews are conducted with an objective of evaluating hypotheses outlined in the study's conceptual map.

The interview format applies Georgia State University IRB approved one-on-one videoconferencing interviews lasting approximately 45 minutes. All interviews are recorded with interviewees assured of the confidentiality of their responses. The interviews follow a semi-structured protocol to ensure consistency and no monetary compensation is provided. Interview recordings are transcribed and destroyed. Transcription documents are anonymized and securely stored. Findings are summarized and anonymized such that the extracts presented are not labelled or attributed to the informant.

### ***III.5.2 Interview Protocol***

The interview protocol is shown in Table 9. This protocol was pretested for understanding of questions and length of interviews.

**Table 9:** *Interview protocol for economic development specialist in the three (3) of the most successful counties based upon statistical analysis of entrepreneurial activity*

<p>1) <b>Background and Introduction:</b></p> <ul style="list-style-type: none"> <li>• Greetings and introductions</li> <li>• Description of study purpose and objectives</li> <li>• Explanation of the intended use of information provided</li> <li>• Ask if there are any questions or clarifications needed by interviewee</li> <li>• Confirm informed consent obtained</li> <li>• Request permission for recording of interview</li> <li>• Obtain name, current position, and length of service in current role</li> </ul> <p>2) <b>Question 1: Economic Development Initiatives:</b></p> <ul style="list-style-type: none"> <li>• Please describe your county's economic development initiatives.</li> </ul> <p>3) <b>Question 2: Entrepreneurship Initiatives:</b></p> <ul style="list-style-type: none"> <li>• Please describe local initiatives that support entrepreneurial activity (business start-up and growth).</li> <li>• Which entrepreneurship initiatives do you feel are most successful? Why?</li> </ul> <p>4) <b>Question 3: Postsecondary Education</b></p> <ul style="list-style-type: none"> <li>• Please describe postsecondary education initiatives in your county that support entrepreneurial activity.</li> </ul> <p>5) Thank you and Departure.</p>
---

### **III.5.3 Data Analysis**

This qualitative study is conducted to gain deeper insight regarding four principal roles of postsecondary education institutions for regional development and innovation in a rural context: (1) organizational (2) intermediary (3) knowledge and (4) policy. A content analysis of the data collected is performed using NVivo 1.6. Information collected is coded into conceptually relevant themes and queried to classify and extract meaning. The study draws insight from the data that was collected with respect to Brekke's four principal roles of postsecondary education noting where the data is consistent with the framework and where it is not.

## **IV ANALYSIS AND RESULTS**

### **IV.1 Primary Method - Quantitative Analysis and Results**

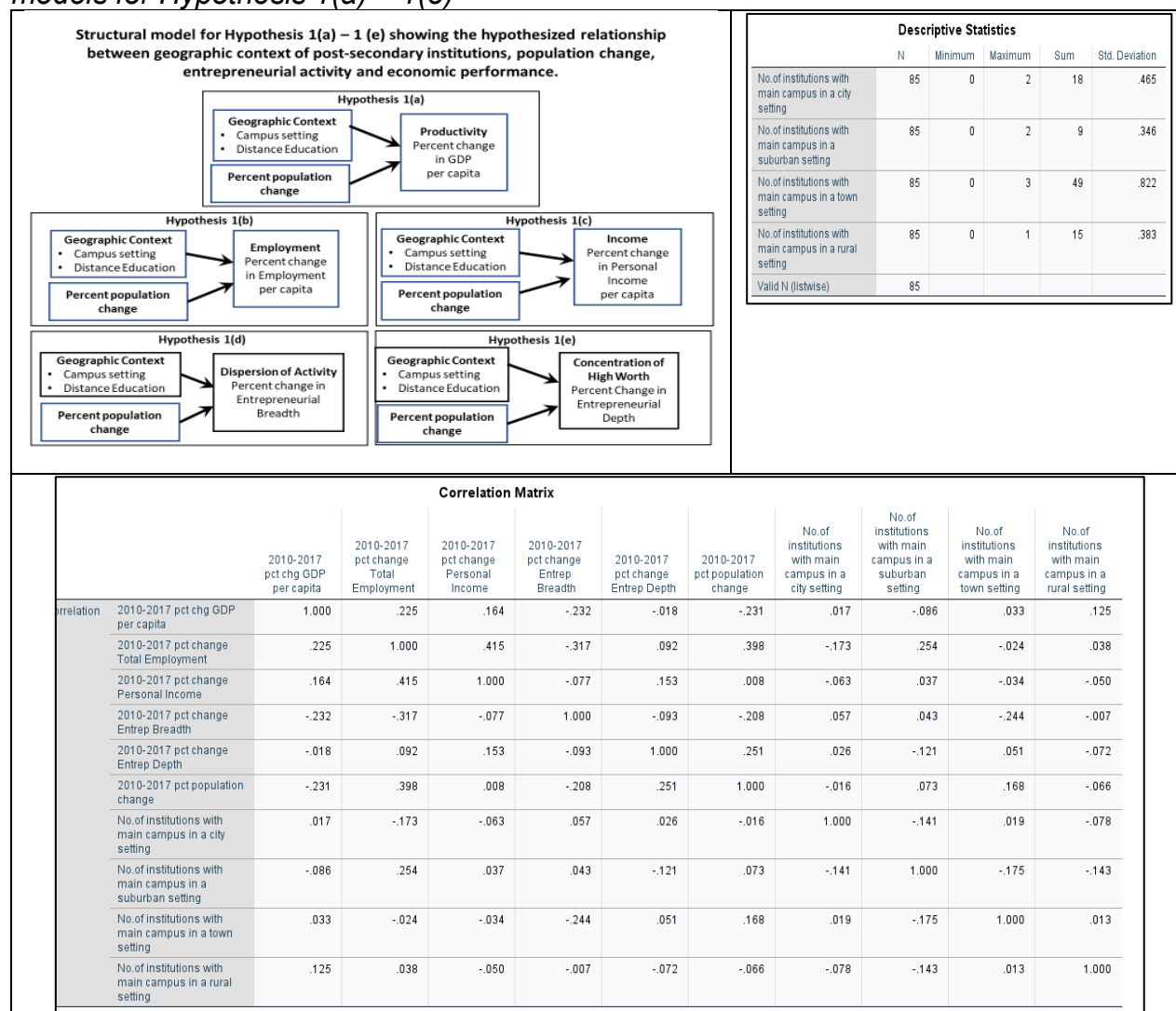
This study evaluates the effect of variations in post-secondary education institutions among Georgia's 85 rural counties. A review of 2017 IPEDS data identified 148 unique institutions of postsecondary education operating in the state of Georgia. Only thirty-seven unique postsecondary education institutions operate in rural Georgia counties.

#### ***IV.1.1 Geographic Context Analysis***

The IPEDS provides information about PSE locations to investigate the geographic context of administration locales for delivery of rural educational programs. IPEDS classifications for geographic context use the following characteristics: Campus setting, Degree of Urbanization, and Undergraduate Distance Education. Campus setting and Degree of Urbanization are combined into twelve "locale" categories that differentiate the proximity of campus locations to cities, suburban, town or rural population centers. A county level, summary count of data representing administration locales of PSE institutions was developed for each of Georgia's 85 rural counties. A review of remote distance learning found that every county has access to remote distance learning programs, therefore this predictor variable was eliminated. Twenty of the thirty-seven institutions are headquartered in settings categorized as "Distant" or "Remote" towns which is defined as more than 10 miles from an urbanized area. "Suburban" locales are outside of a principal city but inside an urbanized area. Although only three institutions are headquartered in settings categorized as suburban, they deliver postsecondary education programs in eight rural counties.

Figure 14 shows the structural models for Hypothesis 1(a) – 1(e) which posited that geographic context of post-secondary education institutions has a positive relationship with percent change in entrepreneurial activity and geographic context of post-secondary education institutions has a positive relationship with percent change in economic activity while controlling for percent change in population. Figure 14 also presents the minimum, maximum, sum and standard deviation of county level PSE geographic context variables. In addition, the correlation matrix used to examine collinearity for geographic context, percent change in population and dependent variables is included in Figure 14. Table 10 illustrates the model's R-square coefficient of multiple determination, the significance, and the effect of model relationships.

**Figure 14: Structural model, Descriptive statistics, and correlation matrix for structural models for Hypothesis 1(a) – 1(e)**



**Table 10:** Regression summary for Hypothesis 1(a) – 1 (e) showing the hypothesized relationship between geographic context of post-secondary institutions, population change, entrepreneurial activity and economic performance

<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
1(a) percent change in GDP per capita	.072	Very weak	
<b>Variable</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Main campus city	.007	.892	NO
Main campus suburb	-.026	.720	NO
Main campus town	.017	.573	NO
Main campus rural	.060	.349	NO
Percent change in pop.	-1.040	.039	YES
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
1(b) percent change in total employment per capita	.237	Moderate	
<b>Variable</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Main campus city	-.030	.198	NO
Main campus suburb	.066	.044	YES
Main campus town	-.007	.613	NO
Main campus rural	.024	.401	NO
Percent change in pop.	.867	.001	YES
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
1(c) percent change in total personal income per capita	.008	Very weak	
<b>Variable</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Main campus city	-.014	.576	NO
Main campus suburb	.004	.903	NO
Main campus town	-.004	.789	NO
Main campus rural	-.014	.647	NO
Percent change in pop.	.015	.950	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
1(d) percent change in Entrepreneurial Breadth	.092	Very weak	
<b>Variable</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Main campus city	.020	.573	NO
Main campus suburb	.011	.813	NO
Main campus town	-.038	.060	NO
Main campus rural	-.003	.946	NO
Percent change in pop.	-.530	.115	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
1(e) percent change in Entrepreneurial Depth	.089	Very weak	
<b>Variable</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Main campus city	.003	.976	NO
Main campus suburb	-.221	.173	NO
Main campus town	-.012	.863	NO
Main campus rural	-.098	.490	NO
Percent change in pop.	2.623	.020	YES

The result of multiple linear regression does not reveal a significant relationship between geographic context and percent changes in per capita GDP or per capita



Personal income. A positive and significant relationship is estimated for “percent of change in per capita employment” and PSE “suburban setting” main campus type controlling for all covariables. With this finding, the regression was rerun with only “suburban setting” and percent of change in population. The output of this multiple linear regression (shown in Table 11 ) indicates that 20.9% of the variance in percent change in per capita employment is predicted by this model. A “suburban setting” main campus has a positive and significant relationship with “percent of change in per capita employment” such that controlling for percent of change in population, an increase of one PSE unit of “suburban setting” main campus is related to a .071 (7.1%) increase in “percent of change in per capita employment” in a rural Georgia county.

**Table 11:** *Regression summary for Hypothesis 1(b) showing the hypothesized relationship between PSE institution with suburban main campus setting, percent change in population and percent change in total employment.*

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.457 <sup>a</sup>	.209	.190	.09750	

a. Predictors: (Constant), 2010-2017 pct population change, No. of institutions with main campus in a suburban setting

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.070	.011		6.151	<.001
	No. of institutions with main campus in a suburban setting	.071	.031	.226	2.295	.024
	2010-2017 pct population change	.838	.216	.381	3.870	<.001

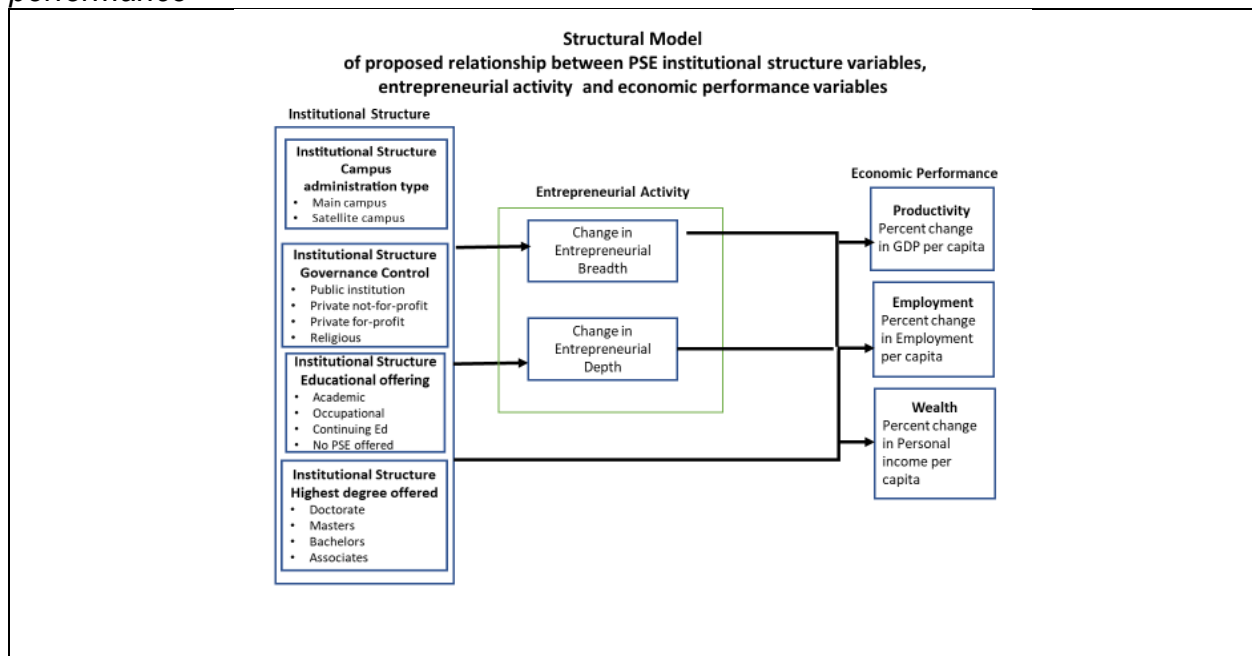
a. Dependent Variable: 2010-2017 pct change Total Employment

**pct change in Total Employment per capita = .070 + .071SubMC+ .838 PctChgPop**

### IV.1.2 Institutional Structure Analysis

The IPEDS provides data about PSE institutions to investigate the institutional structure used to deliver educational programs. Institutional structure is represented by data on the administration, governance and mission of postsecondary education institutions. IPEDS classifications for institutional structure were used to quantify the following variables: Campus administration type (main or satellite), governance control, educational offerings and highest degree offered. A summary count of data representing the institutional structure variables was developed for each of the rural Georgia counties. The structural model illustrating the relationship between institutional structure variables, percent change in population, entrepreneurial activity and economic performance is shown in Figure 15.

**Figure 15:** *Structural model illustrating relationship between institutional structure variables, percent change in population, entrepreneurial activity and economic performance*



Regression analysis was used to evaluate the relationship between each characteristic of institutional structure and entrepreneurial activity in addition to evaluating the relationship between each characteristic of institutional structure and economic performance. Factor analysis was also used to determine if institutional structure variables could be explained by common, underlying factors. Factor analysis is a major technique in multivariate statistics and makes a very important contribution by demonstrating which variables align to form super-ordinate variables called principal components (Burns & Burns, 2008). Five principal components were identified that predict 81% of the variation among the institutional structure variables. Regression analysis was used to analyze the relationship between the five principal components derived from factor analysis and entrepreneurial activity in addition to evaluating the relationship between these same principal components of institutional structure and economic performance.

**Campus administration type (main or satellite):** There are ninety-one separate PSE campuses operating in rural Georgia counties. Sixty-seven of these campuses operate as branch or satellite campuses in rural counties.

**Governance control:** Governance control of PSE institutions operating in Georgia is classified as: Public, Private for-profit, Private not-for-profit and Private not-for-profit with religious affiliation. Twenty-five of the thirty-seven PSE institutions operating in rural counties are governed by publicly elected or appointed officials. Approximately one-third of postsecondary education institutions with campuses in rural counties derive their funding from private sources and are governed by privately selected officials. Nine

of the privately controlled PSE institutions in rural counties are governed by religious institutions.

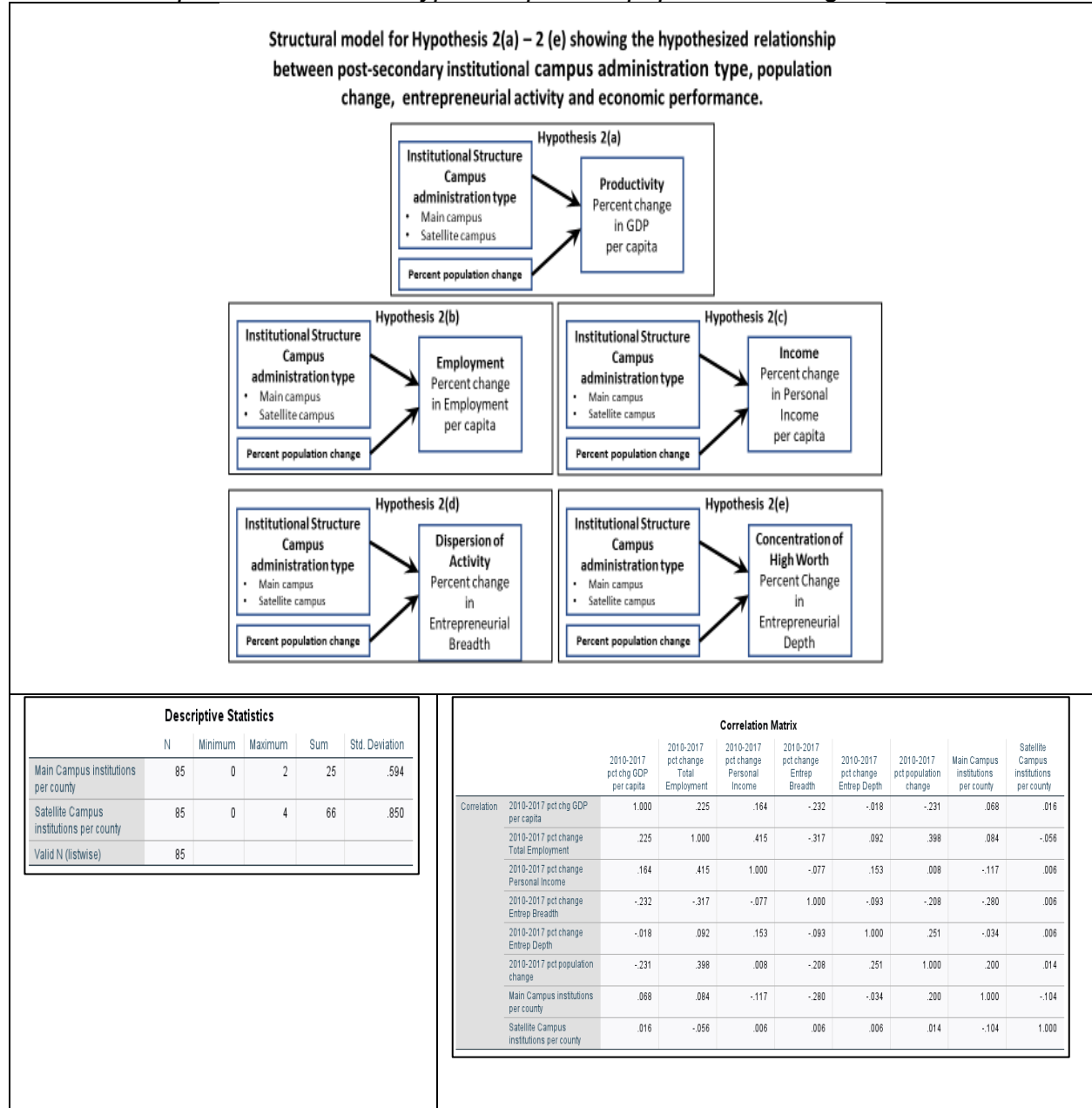
**Educational offerings:** PSE institutions offer educational programs whose purpose may be occupational, Academic or Continuing education. Programs are offered at seventy-eight separate PSE campuses in forty-eight rural Georgia counties. Twenty-seven rural Georgia counties do not have campuses offering a PSE program of any type.

**Highest Degree offered:** Thirty-four PSE campuses in rural Georgia offer a bachelor's degree or higher. Eighteen PSE campuses deliver vocational programs with the highest degree offered as the Associates degree.

#### **IV.1.2.1 Campus Administration Type**

Figure 16 shows the structural models for Hypothesis 2(a) – 2(f) which posited that institutional structure campus administration type is related to percent change in entrepreneurial activity and in economic performance while controlling for percent change in population. Minimum, maximum, sum and standard deviation of county level institutional structure campus administration type variables are also presented in Figure 16. In addition, the correlation matrix for institutional structure campus administration type and percent population changes variables which was analyzed to examine collinearity is included in Figure 16. Table 12 illustrates the models' R-square coefficient of multiple determination, the significance, and the effect of model relationships.

**Figure 16: Structural model, descriptive statistics, and correlation matrix for institutional structure campus administration type and percent population change variables**



The results of multiple linear regression does not reveal a significant relationship between institutional structure campus administration type of post-secondary institutions and percent changes in GDP, Employment, Personal income or Entrepreneurial Depth. A negative and significant relationship is estimated between percent of change in

Entrepreneurial Breadth and PSE institutional structure “main campus” administration type controlling for all covariables. With this finding, the regression was rerun with Independent variable = institutional structure “main campus” administration type and Dependent variable = percent of change in Entrepreneurial Breadth.

**Table 12:** *Regression summary for Hypothesis 2(a) – 2 (e) showing the hypothesized relationship between institutional structure campus administration type, population change, entrepreneurial activity, and economic performance.*

<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(a) percent change in GDP per capita	.068	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	-1.149	.022	YES
Main campus administration institutions	.046	.269	NO
Satellite campus administration institutions	.008	.769	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(b) percent change in Total Employment per capita	.162	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	.877	<.001	YES
Main campus administration institutions	0.000	.983	NO
Satellite campus administration institutions	-.008	.550	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(c) percent change in Personal Income per capita	.015	Very weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	.069	.774	NO
Main campus administration institutions	-.022	.277	NO
Satellite campus administration institutions	0.001	.950	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(d) percent change in Entrepreneurial Breadth	.103	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	-.480	.145	NO
Main campus administration institutions	-.063	.023	YES
Satellite campus administration institutions	-.0003	.863	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(e) percent change in Entrepreneurial Depth	.070	Very weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	2.707	.016	YES
Main campus administration institutions	-.074	.421	NO
Satellite campus administration institutions	-.004	.948	NO

The output of this simple linear regression (shown in Table 15 (a)) indicated that 7.6% of the variance in “percent of change in Entrepreneurial Breadth” is predicted by this model. Institutional structure “main campus” administration type has a negative and significant relationship with “percent of change in Entrepreneurial breadth” such that in a rural county, an increase of one unit of “main campus” administration type in a rural Georgia county is related to a -.017 (1.7% decrease) in “percent of change in entrepreneurial breadth”. Table 13 illustrates the model’s coefficient of multiple determination, the significance, and the effect of model relationships.

**Table 13: Model’s coefficient of multiple determination, the significance, and the effect of model relationships**

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.275 <sup>a</sup>	.076	.065	.034627	
a. Predictors: (Constant), Main Campus institutions per county					

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.024	.004		5.684	<.001
	Main Campus institutions per county	-.017	.006	-.275	-2.608	.011
a. Dependent Variable: Entrepreneurial Breadth Change 2010-2017						

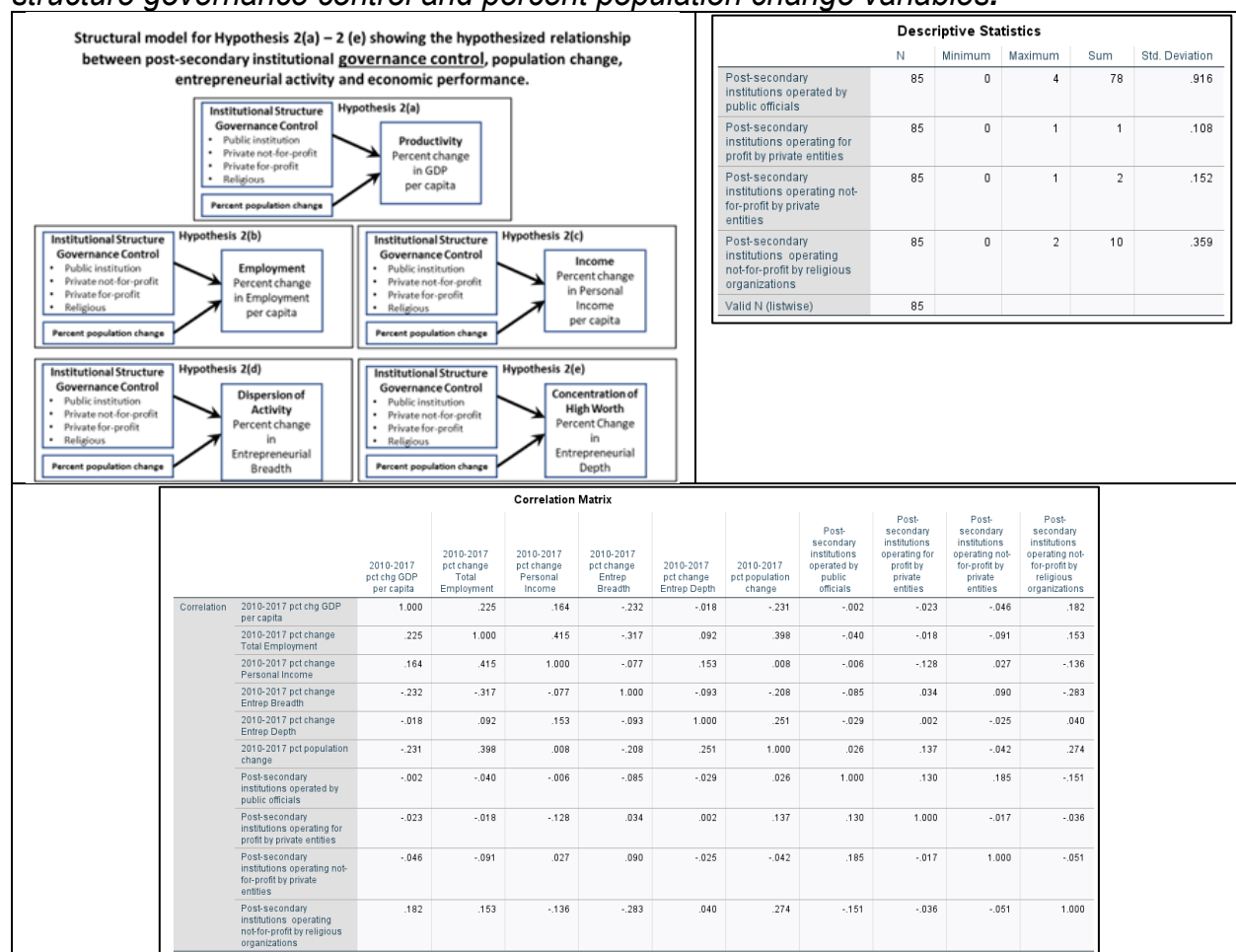
**pct change in Entrepreneurial breadth = .024 - .017MainCamp**

#### IV.1.2.2 Governance

Figure 17 shows the structural models for Hypothesis 2(a) – 2(f) which posited that institutional structure governance is related to percent of change in entrepreneurial activity and in economic performance while controlling for percent change in population. Minimum, maximum, sum and standard deviation of institutional structure governance data is presented in Figure 17. The correlation matrix for institutional structure

governance and percent population change variables which was analyzed to examine collinearity is included in Figure 17. Table 14 illustrates the model's R-square coefficient of multiple determination, the significance, and the effect of model relationships.

**Figure 17: Structural model, descriptive statistics, and correlation matrix for institutional structure governance control and percent population change variables.**



The result of multiple linear regression does not predict a significant relationship between PSE institutional structure governance control and percent changes in Employment, Personal Income or Entrepreneurial Depth. A positive and significant relationship is estimated between “percent of change in GDP per capita” and PSE not-for-profit



“religious governance” controlling for covariables. A negative and significant relationship is estimated between “percent of change in Entrepreneurial Breadth” and PSE not-for-profit “religious governance” controlling for covariables. A negative and significant relationship is estimated between “percent of change in Entrepreneurial Breadth” and PSE “not-for-profit religious governance” controlling for covariables.

With this finding, two regression analysis were rerun with (1) Independent variables = institutional structure “religious governance” and percent change in population with Dependent variable = percent of change in GDP per capita AND (2) Independent variable = institutional structure “religious governance” with Dependent variable = percent of change in Entrepreneurial Breadth. The output of these linear regressions (shown in Table 15) indicates that 11.9 % of the variance in “percent of change in GDP per capita” and 8.0 % of the variance in “percent of change in Entrepreneurial Breadth” are predicted by these models. Institutional structure “religious governance” has a positive and significant relationship with “percent of change in GDP per capita” such that an increase of one unit of religious governance is related to a .163 (16.3% increase) in “percent of change in GDP per capita” in rural Georgia counties. Institutional structure “religious governance” has a negative and significant relationship with “percent of change in Entrepreneurial breadth” such that an increase of one unit of “religious governance” is related to a - .118 (11.8% decrease) in “percent of change in entrepreneurial breadth” in rural Georgia counties. Table 15 illustrates the models’ R-square coefficient of multiple determination, the significance, and the effect of model relationships.

**Table 14:** Regression summary for Hypothesis 2(a) – 2 (e) showing the hypothesized relationship between institutional structure governance control, population change, entrepreneurial activity, and economic performance.

<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(a) percent change in GDP per capita	.124	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	-1.404	.006	YES
Public institution	.013	.620	NO
Private for-profit	.045	.836	NO
Private not-for-profit with no religious affiliation	-.080	.609	NO
Private not-for-profit with religious affiliation	.169	.016	YES
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(b) percent change in Total Employment per capita	.171	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	.868	<.001	YES
Public institution	-.003	.827	NO
Private for-profit	-.069	.510	NO
Private not-for-profit with no religious affiliation	-.049	.511	NO
Private not-for-profit with religious affiliation	.011	.741	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(c) percent change in Personal Income per capita	.041	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	.155	.532	NO
Public institution	-.002	.875	NO
Private for-profit	-.136	.213	NO
Private not-for-profit with no religious affiliation	.015	.841	NO
Private not-for-profit with religious affiliation	-.047	.166	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(d) percent change in Entrepreneurial Breadth	.126	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	-.419	.217	NO
Public institution	-.024	.182	NO
Private for-profit	.089	.550	NO
Private not-for-profit with no religious affiliation	.097	.358	NO
Private not-for-profit with religious affiliation	-.108	.022	YES
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(e) percent change in Entrepreneurial Depth	.067	Very weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	2.686	.023	YES
Public institution	-.019	.753	NO
Private for-profit	-.145	.776	NO
Private not-for-profit with no religious affiliation	-.033	.927	NO
Private not-for-profit with religious affiliation	-.055	.729	NO

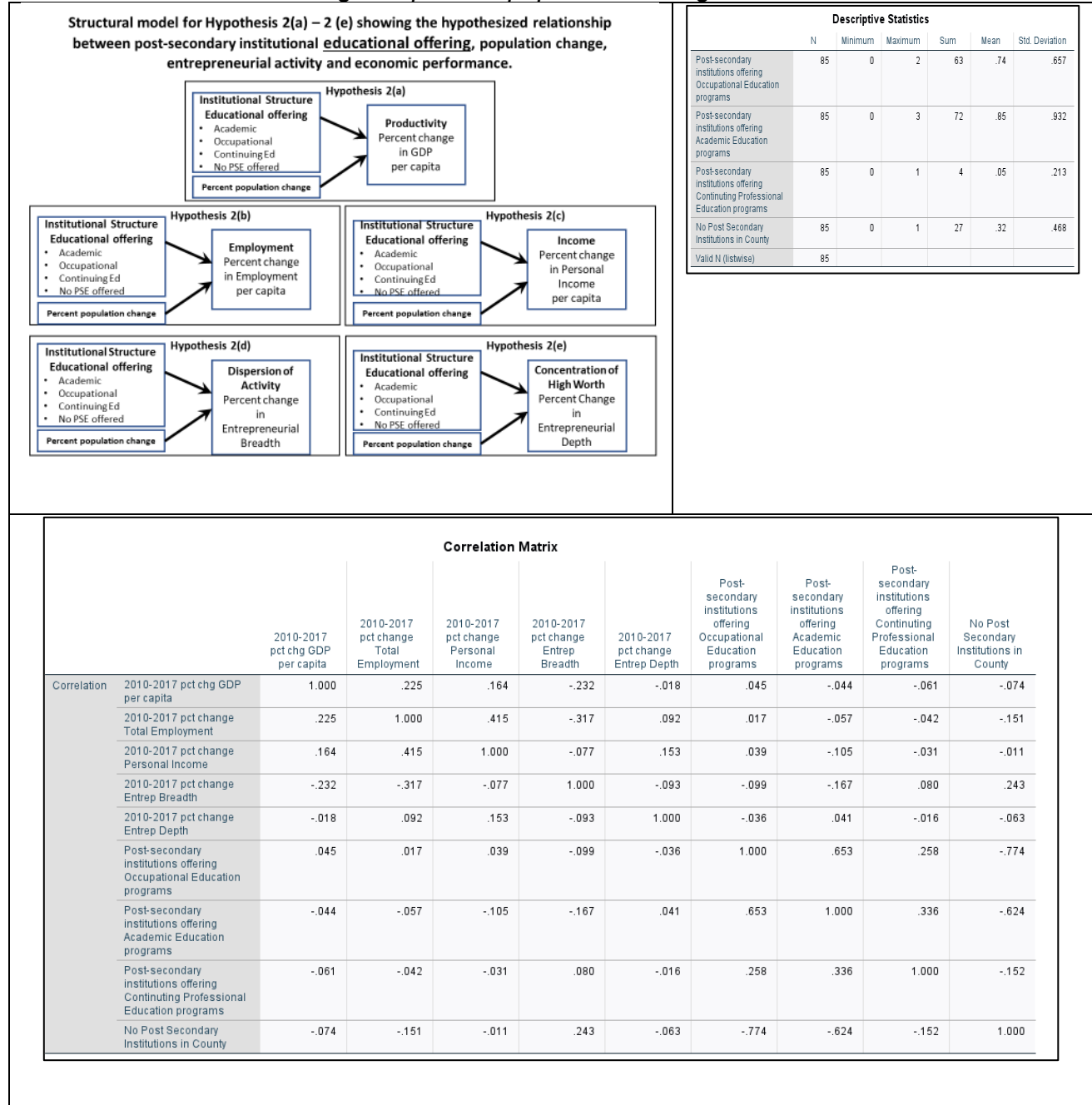
**Table 15: R-square coefficient of multiple determination, the significance, and the effect of model relationships.**

<b>Regression summary of model relationship between religious governance control, percent population change, and percent GDP per capita change</b>							
<b>Model Summary</b>					<b>Coefficients<sup>a</sup></b>		
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Unstandardized Coefficients		
					B	Std. Error	
1	.344 <sup>a</sup>	.119	.097	.21001	Standardized Coefficients		
					Beta	t	
						Sig.	
a. Predictors: (Constant), Post-secondary institutions operating not-for-profit by religious organizations, 2010-2017 pct population change							
1	(Constant)	.210	.025			8.346	<.001
	2010-2017 pct population change	-1.363	.483		-.304	-2.820	.006
	Post-secondary institutions operating not-for-profit by religious organizations	.163	.066		.265	2.462	.016
a. Dependent Variable: 2010-2017 pct chg GDP per capita							
<b>pct change in GDP per capita = .210 + .163 Religious – 1.363 PctChgPop</b>							
<b>Regression summary of model relationship between religious governance control and percent change in Entrepreneurial breadth</b>							
<b>Model Summary</b>					<b>Coefficients<sup>a</sup></b>		
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Unstandardized Coefficients		
					B	Std. Error	
1	.283 <sup>a</sup>	.080	.069	.14442	Standardized Coefficients		
					Beta	t	
						Sig.	
a. Predictors: (Constant), Post-secondary institutions operating not-for-profit by religious organizations							
1	(Constant)	.098	.016			5.913	<.001
	Post-secondary institutions operating not-for-profit by religious organizations	-.118	.044		-.283	-2.687	.009
a. Dependent Variable: 2010-2017 pct change Entrep Breadth							
<b>pct change in Entrepreneurial breadth = .098 - .118 Religious</b>							

#### IV.1.2.3 Educational Offering

Figure 18 shows the structural models for Hypothesis 2(a) – 2(f) which posited that institutional structure educational offering is related to percent change in entrepreneurial activity and in economic performance while controlling for percent change in population. Minimum, maximum, sum and standard deviation of county level institutional structure educational offering variables is also presented in Figure 18. In addition, the correlation matrix for institutional structure educational offering and percent population change variables which was analyzed to examine collinearity is included in Figure 18. Table 16 illustrates the model's R-square coefficient of multiple determination, the significance, and the effect of model relationships.

**Figure 18: Structural model, descriptive statistics, and correlation matrix for institutional structure educational offering and percent population change variables.**



**Table 16:** Regression summary for Hypothesis 2(a) – 2 (e) showing the hypothesized relationship between institutional structure educational offering, population change, entrepreneurial activity, and economic performance.

<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(a) percent change in GDP per capita	.076	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent Population change	-1.088	.032	YES
Occupational Education	-.003	.958	NO
Academic Education	-.025	.493	NO
Continuing Education	-.030	.806	NO
No Postsecondary Institutions in County	-.091	.286	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(b) percent change in Total Employment per capita	.219	Moderate	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent Population change	.877	<.001	YES
Occupational Education	-.011	.685	NO
Academic Education	-.031	.064	NO
Continuing Education	-.010	.850	NO
No Postsecondary Institutions in County	-.070	.070	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(c) percent change in Personal Income per capita	.032	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent Population change	.072	.767	NO
Occupational Education	.029	.338	NO
Academic Education	-.027	.136	NO
Continuing Education	-.002	.976	NO
No Postsecondary Institutions in County	-.003	.951	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(d) percent change in Entrepreneurial Breadth	.121	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent Population change	-.489	.143	NO
Occupational Education	.046	.270	NO
Academic Education	-.018	.446	NO
Continuing Education	.092	.251	NO
No Postsecondary Institutions in County	.102	.073	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(e) percent change in Entrepreneurial Depth	.077	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent Population change	2.372	.038	YES
Occupational Education	-.139	.324	NO
Academic Education	.021	.796	NO
Continuing Education	-.063	.817	NO
No Postsecondary Institutions in County	-.152	.428	NO

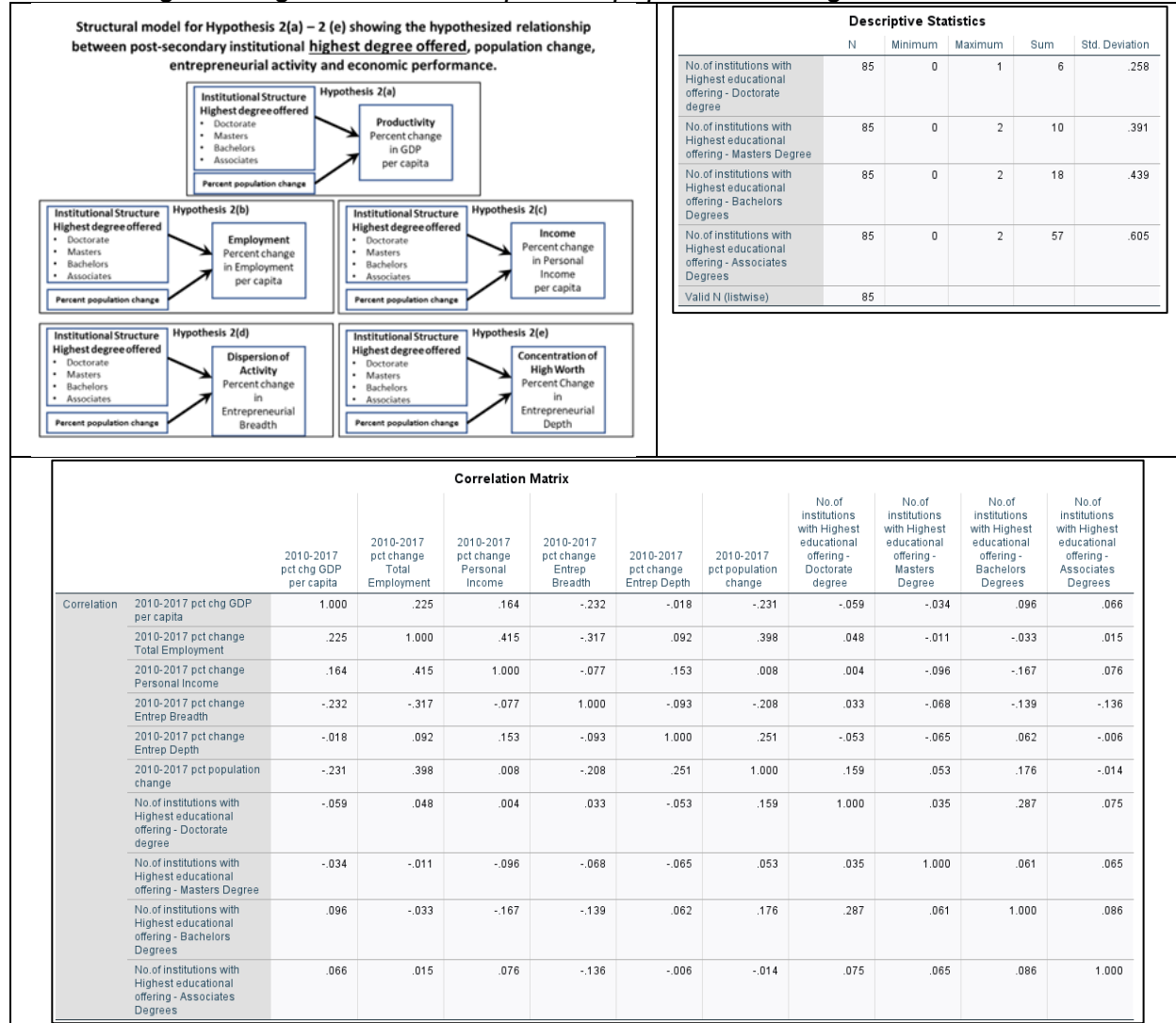
The result of multiple linear regression does not estimate a significant relationship between institutional structure educational offerings of post-secondary institutions and percent changes with GDP, Employment, Personal income, Entrepreneurial Breadth or Entrepreneurial Depth.

#### **IV.1.2.4 Highest Degree Offered**

Figure 19 shows the structural models for Hypothesis 2(a) – 2(f) which posited that institutional structure highest degree offered is related to percent change in entrepreneurial activity and in economic performance while controlling for percent change in population. Minimum, maximum, sum and standard deviation of county level institutional structure highest degree offered variables is also presented in Figure 19. In addition, the correlation matrix for institutional structure highest degree offered and percent population change variables which was analyzed to examine collinearity is included in Figure 19. Table 17 illustrates the models' R-square coefficient of multiple determination, the significance, and the effect of model relationships.

The result of multiple linear regression does not predict a significant relationship between institutional structure highest degree offered at post-secondary institutions and percent changes in GDP, Employment, Personal income, Entrepreneurial Breadth or Entrepreneurial Depth.

**Figure 19: Structural model, descriptive statistics, and correlation matrix for institutional structure highest degree offered and percent population change variables.**



**Table 17:** *Regression summary for Hypothesis 2(a) – 2 (e) showing the hypothesized relationship between institutional structure highest degree offered, population change, entrepreneurial activity, and economic performance.*

<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(a) percent change in GDP per capita	.080	Very weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	-1.100	.029	YES
Highest degree offered - Doctorate	-.058	.552	NO
Highest degree offered - Masters	-.018	.772	NO
Highest degree offered - Bachelors	.078	.177	NO
Highest degree offered - Associates	.021	.605	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(b) percent change in Total Employment per capita	.171	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	.917	<.001	YES
Highest degree offered - Doctorate	.005	.911	NO
Highest degree offered - Masters	-.008	.780	NO
Highest degree offered - Bachelors	-.027	.310	NO
Highest degree offered - Associates	.006	.763	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(c) percent change in Personal Income per capita	.049	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	.085	.724	NO
Highest degree offered - Doctorate	.020	.679	NO
Highest degree offered - Masters	-.025	.395	NO
Highest degree offered - Bachelors	-.045	.105	NO
Highest degree offered - Associates	.017	.389	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(d) percent change in Entrepreneurial Breadth	.085	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	-.621	.067	NO
Highest degree offered - Doctorate	.065	.325	NO
Highest degree offered - Masters	-.017	.676	NO
Highest degree offered - Bachelors	-.041	.293	NO
Highest degree offered - Associates	-.033	.219	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(e) percent change in Entrepreneurial Depth	.080	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	2.653	.020	YES
Highest degree offered - Doctorate	-.206	.350	NO
Highest degree offered - Masters	-.100	.469	NO
Highest degree offered - Bachelors	.057	.659	NO
Highest degree offered - Associates	.005	.953	NO

#### IV.1.2.5 Principal Component Analysis

Five principal components were identified using factor analysis that explained 81% of the variation among the variables. A Principal Component Analysis (PCA) with



subsequent rotation (Varimax) was conducted on 16 variables of the IPEDS classifications for institutional structure. Communalities varied from .954 to .457. Applying Kaiser's Rule and the scree test, five factors were deemed important.

Following rotation, Factor 1 was loaded on 8 items that reflected Occupational Core and accounted for 41.8% of the variance exemplified by the two highest loading items, "Number of institutions with highest educational offering – Associates degree" and "PSE institutions offering occupational education programs". Factor 2 was loaded on 6 items and accounted for 13.8% of the variance. It was labelled Religious Core and was represented by "Main campus" administration type institutions per county" and "PSE institutions operating not-for-profit by religious organizations". Factor 3 accounted for 9.9% of the variance and was loaded on 6 items suggesting it was measuring academic core. "Number of institutions with highest degree offering – Doctorate degree" and "Post-secondary institutions operating "not-for-profit by private entities" were the two highest loading items for Factor 3. Factor 3 aligns closely with "state universities" in the state of Georgia. The core focus of state universities is described by the state's Board of Regents as teaching and applied research. Factor 4 was loaded on 4 items and accounted for 8.8% of the variance. It was labelled for-profit core and was represented by "PSE institutions operating for profit by private entities" and "Number of institutions with highest educational offering – Bachelors degrees". Lastly, Factor 5 accounted for 6.8% of the variance. It was labelled service core and was loaded on 2 items: "Number of institutions with highest educational offering – Masters degrees" and "PSE institutions offering continuing education programs". Factor 5 aligns closely with "state colleges" in the state of Georgia. The state's Board of Regents describes the emphasis at these state colleges

as teaching and service with limited focus on basic or applied research activity. Table 18 shows the results of principal component analysis for institutional structure. The structural model illustrating the relationship between institutional structure principal component variables, percent change in population, entrepreneurial activity and economic performance is shown in Figure 20.

**Table 18: Principal Component Analysis Summary**

Factor No.	Label	Loading	Variance
1	Occupational Core	<ul style="list-style-type: none"> <li>• Number of institutions with highest educational offering – Associates degree</li> <li>• PSE institutions offering occupational education programs</li> </ul>	41.8%
2	Religious core	<ul style="list-style-type: none"> <li>• Main campus administration type institutions per county</li> <li>• PSE institutions operating not-for-profit by religious organizations</li> </ul>	13.8%
3	Academic core	<ul style="list-style-type: none"> <li>• Number of institutions with highest degree offering – Doctorate degree</li> <li>• Post-secondary institutions operating not-for-profit by private entities</li> </ul>	9.9%
4	For-profit core	<ul style="list-style-type: none"> <li>• PSE institutions operating for profit by private entities</li> <li>• Number of institutions with highest educational offering – Bachelors degrees</li> </ul>	8.8%
5	Service core	<ul style="list-style-type: none"> <li>• Number of institutions with highest educational offering – Masters degrees</li> <li>• PSE institutions offering continuing education programs</li> </ul>	6.8%

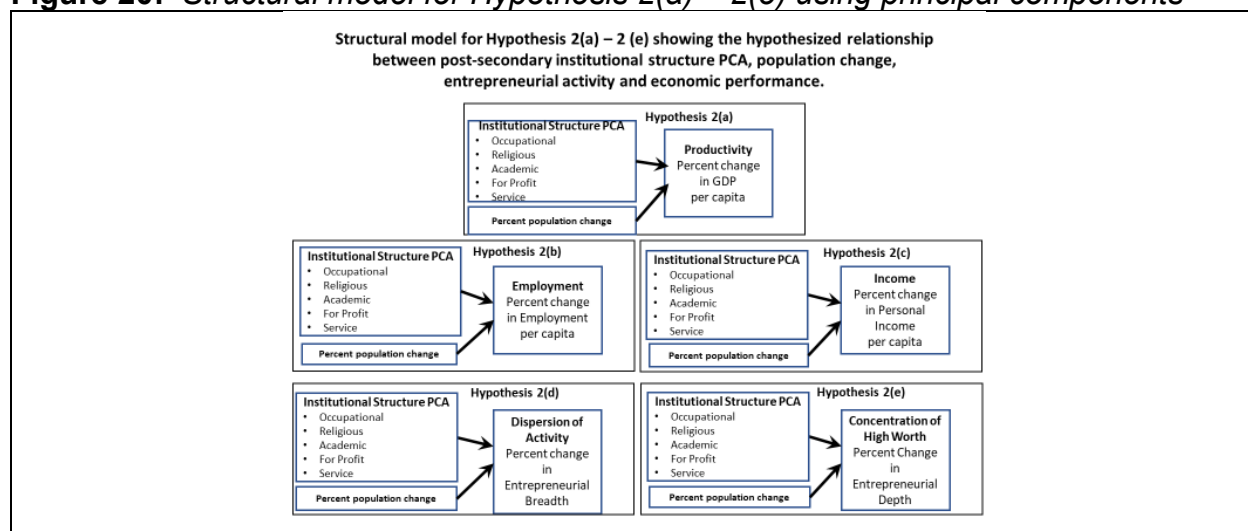
#### IV.1.2.6 Principal Components of Institutional Structure

Figure 20 shows the structural models for Hypothesis 2(a) – 2(e) which posited that PSE institutional structure principal components have a positive relationship with percent change in entrepreneurial activity and principal components of post-secondary institutions have a positive relationship with percent change in economic performance while controlling for percent change in population. Table 19 illustrates the model's R-

square coefficient of multiple determination, the significance, and the effect of model relationships.

The result of multiple linear regression does not estimate a significant relationship between PSE Institutional structure principal components and percent changes in GDP, Employment, Personal income or Entrepreneurial Depth. A negative and significant relationship is estimated between percent change in Entrepreneurial Breadth and Factor 2 – Religious Core controlling for covariables. With this finding, regression analysis was rerun with (1) Independent variable = Factor 2 (Religious Core) and Dependent variable = percent change in Entrepreneurial Breadth. The output of this linear regression (shown in Table 20) estimates that 12.0 % of the variance in “percent of change in change in Entrepreneurial Breadth” is predicted by this model. Religious Core has a negative significant relationship with “percent of change in Entrepreneurial Breadth” such that an increase of one unit of Religious Core is related to a -.052 (5.2% decrease) in “percent of change in Entrepreneurial Breadth” in rural Georgia counties.

**Figure 20:** *Structural model for Hypothesis 2(a) – 2(e) using principal components*



**Table 19:** Regression summary for Hypothesis 2(a) – 2(e) with principal components of postsecondary institutions, population change, entrepreneurial activity and economic performance

<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(a) percent change in GDP per capita	.109	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	-1.312	.011	YES
Occupational Core	.006	.812	NO
Religious core	.047	.057	NO
Academic core	-.011	.644	NO
For-profit core	.014	.559	NO
Service core	-.017	.472	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(b) percent change in total employment per capita	.183	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	.895	<.001	YES
Occupational Core	.000	.990	NO
Religious core	.004	.698	NO
Academic core	-.007	.546	NO
For-profit core	-.012	.292	NO
Service core	-.009	.423	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2© percent change in total personal income per capita	.060	Very weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	.158	.521	NO
Occupational Core	.004	.714	NO
Religious core	-.017	.160	NO
Academic core	.003	.779	NO
For-profit core	-.018	.135	NO
Service core	-.009	.437	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2(d) percent change in Entrepreneurial Breadth	.174	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	-.404	.222	NO
Occupational Core	-.021	.169	NO
Religious core	-.047	.004	YES
Academic core	.017	.268	NO
For-profit core	.005	.768	NO
Service core	.009	.551	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
2€ percent change in Entrepreneurial Depth	.070	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Percent population change	2.659	.024	YES
Occupational Core	-.010	.857	NO
Religious core	-.021	.716	NO
Academic core	-.017	.749	NO
For-profit core	.005	.929	NO
Service core	-.029	.598	NO

**Table 20:** *R-square coefficient of multiple determination, the significance, and the effect of model relationship between Religious Core principal component and Entrepreneurial Breadth.*

Model Summary					Coefficients <sup>a</sup>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
1	.347 <sup>a</sup>	.120	.110	.14121	B	Std. Error	Beta	t	Sig.	
a. Predictors: (Constant), REGR factor score 2 Religious core					1					
					(Constant)	.084	.015	5.461	<.001	
					REGR factor score 2 Religious core	-.052	.015	-.347	-.3370	.001
a. Dependent Variable: 2010-2017 pct change Entrep Breadth										

**pct change in Entrepreneurial Breadth = .084 - .052 Religious Core**

### IV.1.3 Entrepreneurial Breadth Analysis

Entrepreneurial breadth is a measure that sheds valuable light on the viability of regional entrepreneurial activity. As previously stated, entrepreneurial activity has been shown to have positive long-run economic influence on wealth, productivity, and growth. Entrepreneurial breadth is a subset of economic performance because it is determined by the ratio of self-employment to total employment. This relationship violates the independence assumption of regression analysis and subsequently reduces the accuracy of the estimation (Hayes, 2017). Two things are assumed to be independent if information about one gives no information about the other. In order to resolve the non-independence, economic performance data was modified to remove the entrepreneur employment. The modified economic performance measure is percent change in non-entrepreneur employment per capita.

Figure 21 shows the structural models for Hypothesis 3(a) – 3(c) which posited that percent change in entrepreneurial breadth is related to percent change in economic performance while controlling for percent change in population. Mean and standard deviation of percent change in entrepreneurial breadth variables is also presented in

Figure 21. In addition, the correlation matrix for percent change in entrepreneurial breadth, percent change in population and economic performance variables that was analyzed to examine collinearity is included in Figure 21.

Table 21 illustrates the models' R-square coefficient of multiple determination, the significance, and the effect of model relationships. A negative and significant relationship is estimated between percent change in Entrepreneurial Breadth and percent change in GDP per capita controlling for percent change in population. Regression analysis estimates that 13.6 % of the variance in percent of change in GDP per capita is predicted by the percent of change in Entrepreneurial Breadth controlled for percent change in population. Percent change in GDP per capita has a negative and significant relationship with percent of change in Entrepreneurial Breadth such that controlling for percent change in population, a one unit change in "percent of change in Entrepreneurial Breadth" is associated with a -.433 (43.3% decrease) in "percent of change in GDP per capita" in rural Georgia counties. The output of this linear regression is shown in Table 22.

A negative and significant relationship is also estimated between percent change in Entrepreneurial Breadth and percent change in non-entrepreneur employment per capita controlling for population. The regression analysis estimated that 37.7 % of the variance in percent change in non-entrepreneur employment per capita is predicted by the percent of change in Entrepreneurial Breadth controlled for percent change in population model. Percent change in non-entrepreneur employment per capita has a negative and significant relationship with percent of change in Entrepreneurial Breadth such that controlling for percent change in population, a one unit change in "percent of

change in Entrepreneurial Breadth” is related to a  $-.507$  (50.7% decrease) in percent of change in non-entrepreneur employment per capita in rural Georgia counties.

**Figure 21:** Structural model, descriptive statistics, and correlation matrix for entrepreneurial breadth, population change and economic performance change variables.

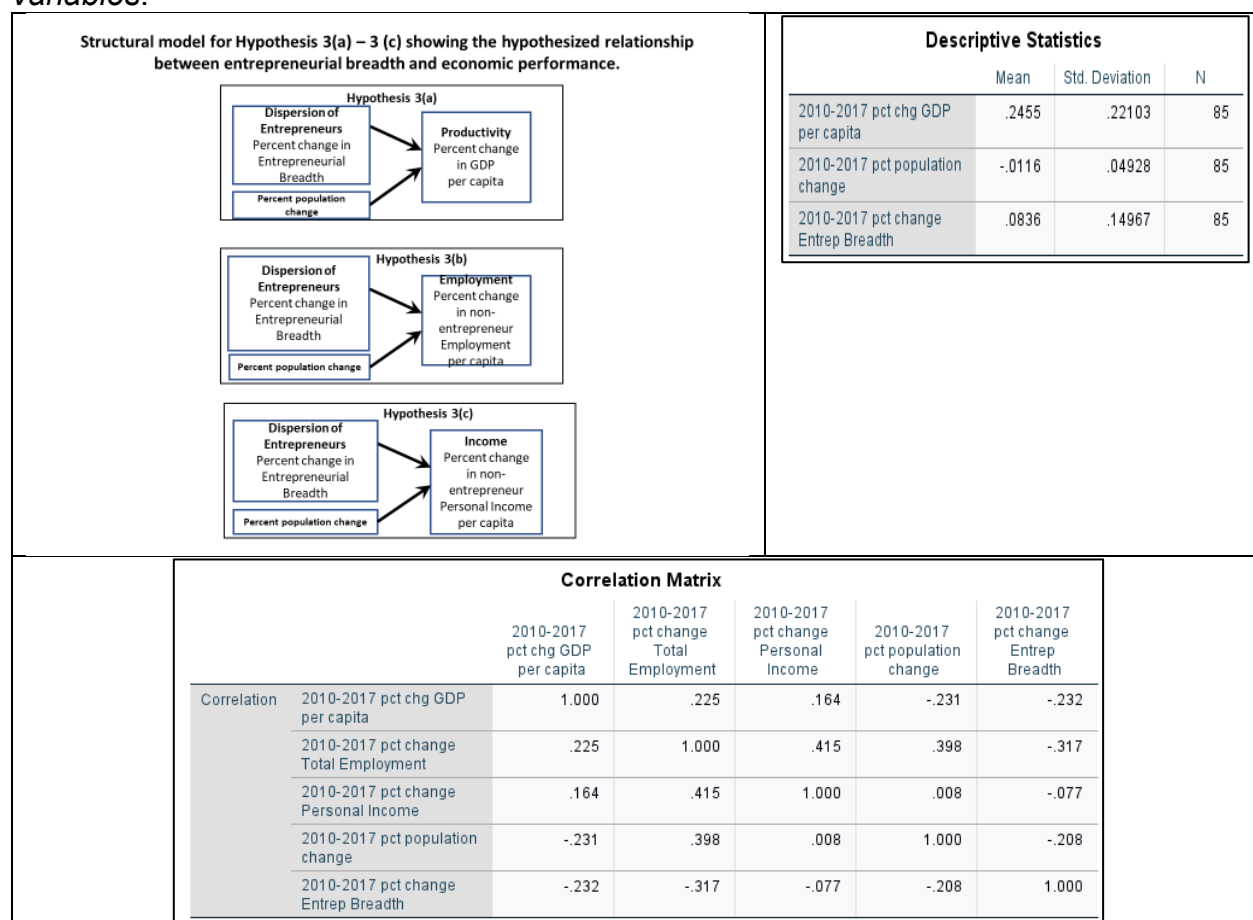


Table 21 illustrates the negative and significant relationship between percent change in Entrepreneurial Breadth and percent change in non-entrepreneur Employment controlling for percent change in population. Because percent change in population was not significant at the 95% confidence level in this model, the regression analysis was rerun with (1) Independent variable = percent change in Entrepreneurial Breadth and Dependent variable = percent change in non-entrepreneur Employment

**Table 21:** *Regression summary for Hypothesis 3(a) – 3 (c) showing the hypothesized relationship between percent change in entrepreneurial breadth and percent change in economic performance while controlling for percent change in population.*

<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
3(a) percent change in GDP per capita	.136	Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	-1.312	.007	YES
Change in Entrepreneurial breadth	-.433	.006	YES
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
3(b) percent change in non-entrepreneur employment per capita	.377	Moderate	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	-.311	.159	NO
Change in Entrepreneurial breadth	-.507	<.001	YES
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
3(c) percent change in non-entrepreneur Personal Income per capita	.008	Very weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	-.112	.654	NO
Change in Entrepreneurial breadth	-.062	.452	NO

per capita. The output of this linear regression (shown in Table 22 ) estimates that 36.2 % of the variance in percent change in non-Entrepreneur Employment per capita is predicted by the percent change in Entrepreneurial Breadth model. Percent change in Entrepreneurial Breadth has a negative and significant relationship with percent change in non-Entrepreneur Employment per capita such that a one unit change in percent of change in Entrepreneurial Breadth is associated with a -.486 (48.6% decrease) in “percent of change in non-Entrepreneur Employment per capita” in rural Georgia counties.



**Table 22: Model coefficient of multiple determination, the significance and the effect of model relationships between entrepreneurial breadth, population change, GDP and non-entrepreneur Employment**

Model Summary <sup>b</sup>					Coefficients <sup>a</sup>										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics		
					B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF	
1	.369 <sup>a</sup>	.136	.115	.20796				10.239	<.001						
a. Predictors: (Constant), 2010-2017 pct change Entrep Breadth, 2010-2017 pct population change					(Constant)	.266	.026								
b. Dependent Variable: 2010-2017 pct chg GDP per capita					2010-2017 pct population change	-1.312	.471	-.292	-2.786	.007	-.231	-.294	-.286	.957	1.045
					2010-2017 pct change Entrep Breadth	-.433	.155	-.293	-2.795	.006	-.232	-.295	-.287	.957	1.045
					a. Dependent Variable: 2010-2017 pct chg GDP per capita										
<b>pct change in GDP per capita = .266 -1.312 pct Pop chg - .433 pct change Entrepreneurial Breadth</b>															
Model Summary					Coefficients <sup>a</sup>										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Unstandardized Coefficients		Standardized Coefficients	t	Sig.						
					B	Std. Error	Beta								
1	.601 <sup>a</sup>	.362	.354	.09722				7.883	<.001						
a. Predictors: (Constant), 2010-2017 pct change Entrep Breadth					(Constant)	.095	.012								
					2010-2017 pct change Entrep Breadth	-.486	.071	-.601	-6.857	<.001					
					a. Dependent Variable: 2010-2017 pct change Non Entrep Emp per capita										
<b>pct change in non-entrepreneur Employment per capita = .095 - .486 pct change Entrepreneurial Breadth</b>															

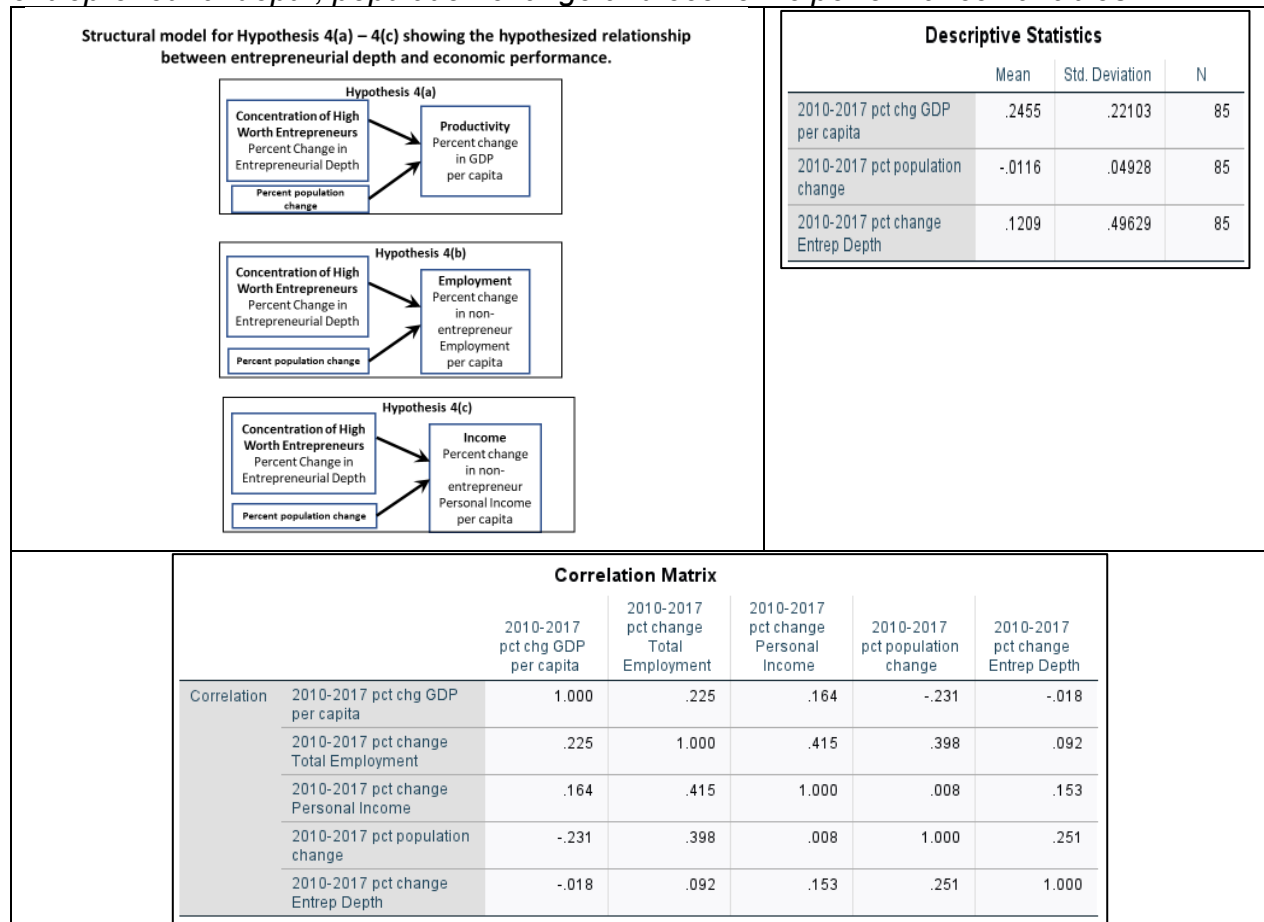
#### IV.1.4 Entrepreneurial Depth Analysis

Entrepreneurial depth conveys the value of entrepreneurial activities. As previously stated, entrepreneurial activity has been shown to have positive long-run economic influence on wealth, productivity, and growth. Entrepreneurial depth is also a subset of economic performance because it is determined by the ratio of self-employment local personal income to number of entrepreneurs within the county. This relationship violates the independence assumption of regression analysis which would in-turn affect the accuracy of the estimation (Hayes, 2017). In order to resolve the non-independence, the personal income data was modified to remove the entrepreneur personal income from the measure. The modified economic performance measure is percent change in non-entrepreneur employment per capita. Figure 22 shows the structural models for Hypothesis 4(a) – 4(c) which posited that percent change in

entrepreneurial depth is related to percent change in economic performance while controlling for percent change in population. Mean and standard deviation of percent change in entrepreneurial depth variables is also presented in Figure 22.

In addition, the correlation matrix for percent change in entrepreneurial depth, percent population change and economic performance variables which was analyzed to examine collinearity is included in Figure 22. Table 23 illustrates the models' R-square coefficient of multiple determination, the significance, and the effect of model relationships. No significant relationship was found between percent of change in Entrepreneurial Depth and the economic performance variables.

**Figure 22:** *Structural model, descriptive statistics, and correlation matrix for entrepreneurial depth, population change and economic performance variables.*



T

**able 23:** *Regression summary for Hypothesis 4(a) – 4(c) showing the hypothesized relationship between percent change in entrepreneurial depth and percent change in economic performance while controlling for percent change in population.*

<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
3(a) percent change in GDP per capita	.055	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	
Population change	-1.086	.032	YES
Change in Entrepreneurial depth	.019	.698	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
3(b) percent change in non-entrepreneur employment per capita	.000	None	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	.007	.979	NO
Change in Entrepreneurial depth	.001	.971	NO
<b>Hypothesis</b>	<b>R Square</b>	<b>Predictive Power</b>	
3(c) percent change in non-entrepreneur Personal Income per capita	.005	Very Weak	
<b>Independent Variables</b>	<b>Coefficient</b>	<b>P-value</b>	<b>Significant</b>
Population change	-.039	.878	NO
Change in Entrepreneurial depth	-.013	.593	NO

#### **IV.1.5 Mediation Analysis**

SPSS and PROCESS tool for SPSS were used for estimating direct and indirect effects of the mediation hypothesis as well as for statistical inference. The parallel multiple mediator model was used to illustrate the hypothesized mediating effect of entrepreneurial activity on the relationship between postsecondary education variables and each economic performance variable. Estimating indirect effects in a parallel multiple mediator model allows for a simultaneous test of each mechanism while accounting for the association between them (Hayes, 2017). A test of the null hypothesis at a 95% confidence level was performed for the direct and indirect effects of each model. Direct effects were tested using p-value level of significance at 0.05 thus if

the p-value was no larger than .05 then the null hypothesis was rejected. Rejection of the null hypothesis implies that independent and dependent variables are related while holding the covariates constant. Percentile Confidence Interval based on 5,000 bootstrap samples are used to test the indirect effects at a 95% confidence level. If the confidence interval included zero, the null hypothesis could not be rejected, thereby indicating that there is insufficient evidence in the model that independent variables affect the dependent variables through the mediator variables. The indirect effect is quantified as the product of constituent components of the path with (-) or (+) sign providing insight into the process at work in the model. The concern for non-independence of entrepreneurial breadth, entrepreneurial depth and economic performance measures was resolved for assurance of accuracy in the mediation analysis by using the modified economic performance measures percent change in non-entrepreneur employment per capita and percent change in non-entrepreneur personal income.

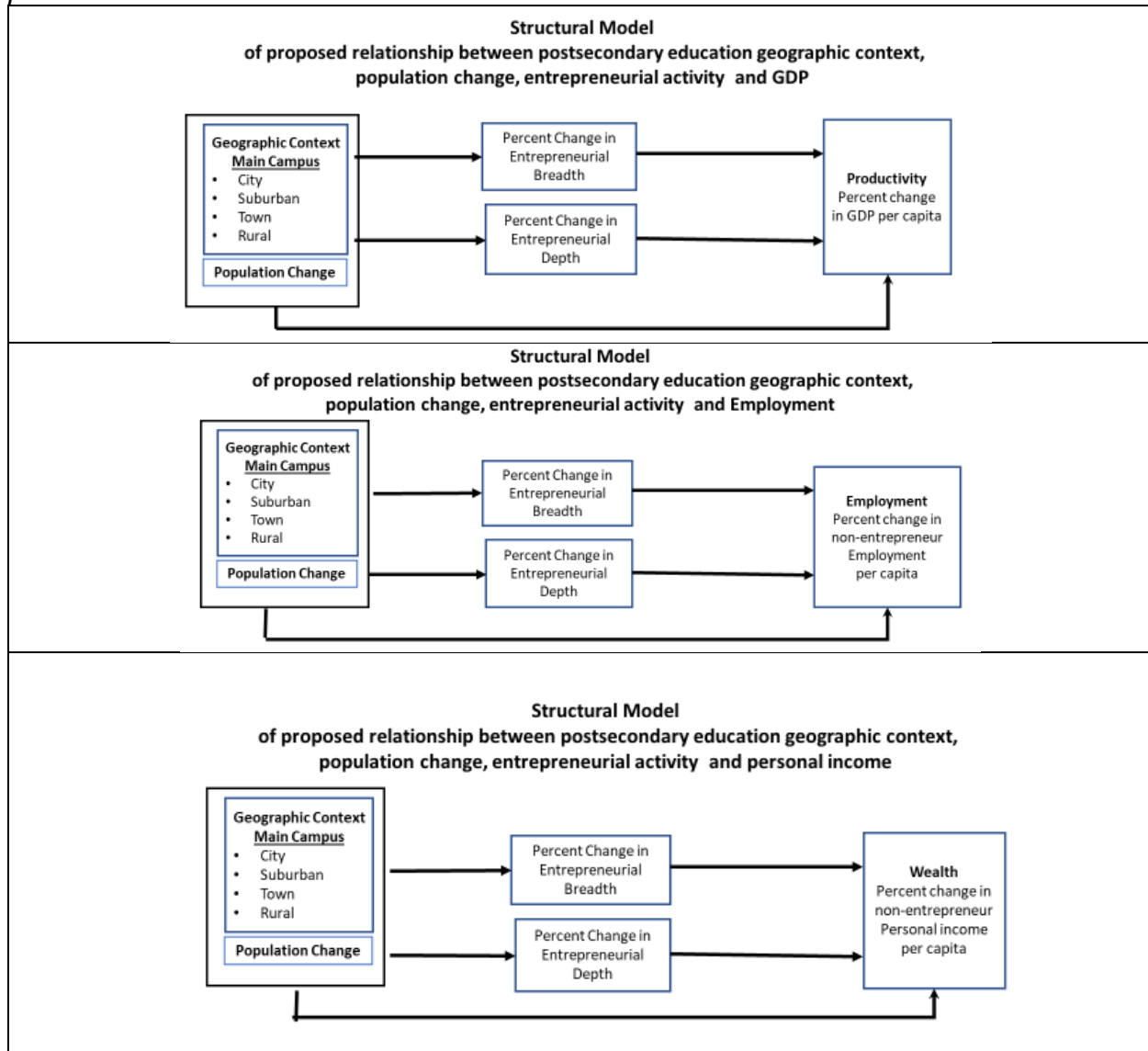
#### **IV.1.5.1 Geographic context**

The parallel multiple mediator model was used to illustrate the hypothesized effect of entrepreneurial activity (mediator variable) on the relationship between geographic context (independent variables), population change (control variable), and each economic performance variable (dependent variables). Campus setting is the variable used in this analysis to evaluate geographic context. The county level, summary counts of IPEDS data representing campus setting locales within each of Georgia's 85 rural counties were used to assess the mediating effect of entrepreneurial activity on the relationship between PSE geographic context and economic

performance. Figure 23 shows the structural model for Hypothesis 5 (a) – 5(c) and 6(a) - 6(c) which posited that entrepreneurial activity will mediate the relationship between PSE geographic context and economic performance while controlling for population change and co-variants. The results of parallel mediator analysis predicting percent change in GDP, non-entrepreneur employment per capita and non-entrepreneur personal income per capita through entrepreneurial activity are presented in Table 24 illustrating the significance and the effect of model relationships derived from the SPSS PROCESS analysis.

Hypothesis 6(a) – 6(c) predicted that concentration of high worth entrepreneurial activity would mediate the relationship between geographic context and productivity, employment and wealth. Table 24 shows the estimated direct effects and results of statistical inference test at the 95% confidence level. As these results show, the specific indirect effects of all geographic context variables on percent change in per capita GDP, non-entrepreneur employment and non-entrepreneur Personal Income through percent change in Entrepreneurial Depth are not statistically significant at the 95% confidence level. Therefore, the null hypothesis cannot be rejected and hypothesis 6(a) – 6(c) are not supported.

**Figure 23: Structural Models for Hypothesis 5 (a) – 5(c) and 6(a) - 6(c) PSE geographic context, population change, entrepreneurial activity and economic performance**



Hypothesis 5(a)- 5(c) posited that geographic context would have a positive indirect effect on productivity, employment, and wealth through dispersion of entrepreneurial activity. As these results in Table 24 show, the specific indirect effects of geographic context “Town main campus setting” on percent change in per capita GDP and non-entrepreneur employment through percent change in Entrepreneurial Breadth are statistically significant at the 95% confidence level. These results are sufficient to reject the null hypothesis such that hypothesis 5(a) and 5(b) are supported.

**Table 24:** Regression summary for Hypothesis 5 (a) – 5(c) and 6(a) - 6(c) showing the hypothesized relationship between postsecondary geographic context, entrepreneurship and economic performance while controlling for percent change in population, co-variants and the second mediator.

Hypothesis Main campus setting	Percent change in GDP per capita				Percent change in non- Entrepreneur Employment per capita				Percent change in non- Entrepreneur Personal Income per capita			
	Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test		Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test		Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test	
			Breadth	Depth			Breadth	Depth			Breadth	Depth
5 (a) – 5 (c) and 6(a) – 6(c) controlled for population change and co-variants												
City	.0155	.7607	NO	NO	-.0217	.3386	NO	NO	-	.6070	NO	NO
Suburban	-	.8004	NO	NO	.0694	.0303	NO	NO	.0092	.8079	NO	NO
Town	.0008	.9781	YES	NO	-.0123	.3544	YES	NO	-	.5920	NO	NO
Rural	.0599	.3351	NO	NO	.0218	.4283	NO	NO	-	.6251	NO	NO

The specific indirect effects of all geographic context variables on percent change in non-entrepreneur Personal Income through percent change in Entrepreneurial Breadth are not statistically significant at the 95% confidence level. Therefore, this null hypothesis cannot be rejected and hypothesis 5(c) is not supported. With these statistically significant findings, mediation analysis was rerun with only the statistically significant geographic context variable “Town main campus setting” (independent variable), percent change in Entrepreneurial Breadth (mediator variable), percent change in per capita GDP (dependent variable), non-entrepreneur employment (dependent variable) and percent change in population (control variable). The results of parallel mediator analysis are presented in Table 27 for the variables with statistically significant estimates of indirect effects. These results show the coefficient estimates of the indirect effects, percentile confidence intervals based on 5,000 bootstrap samples and constituent effects indicating that mediation occurs through a negative process.

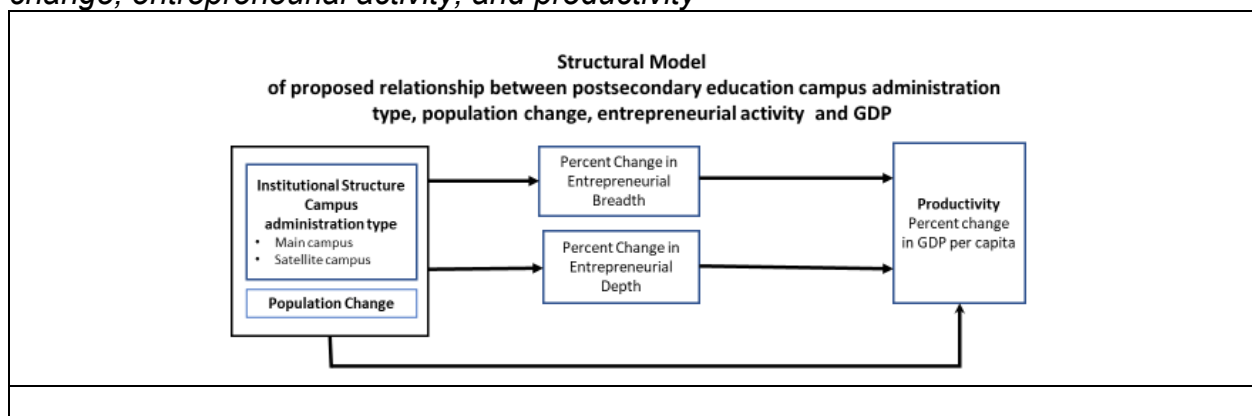
### IV.1.5.2 Institutional Structure

The parallel multiple mediator model is used to illustrate the hypothesized relationship between institutional structure (independent variables), population change (control variable) entrepreneurial activity (mediator variables) and each economic performance variable (dependent variable). Campus administration type (main or satellite), highest degree offered, educational offerings and governance were used to operationalize PSE institutional structure. Population change is a control variable. County level summary counts of each characteristic were analyzed in the mediation analysis.

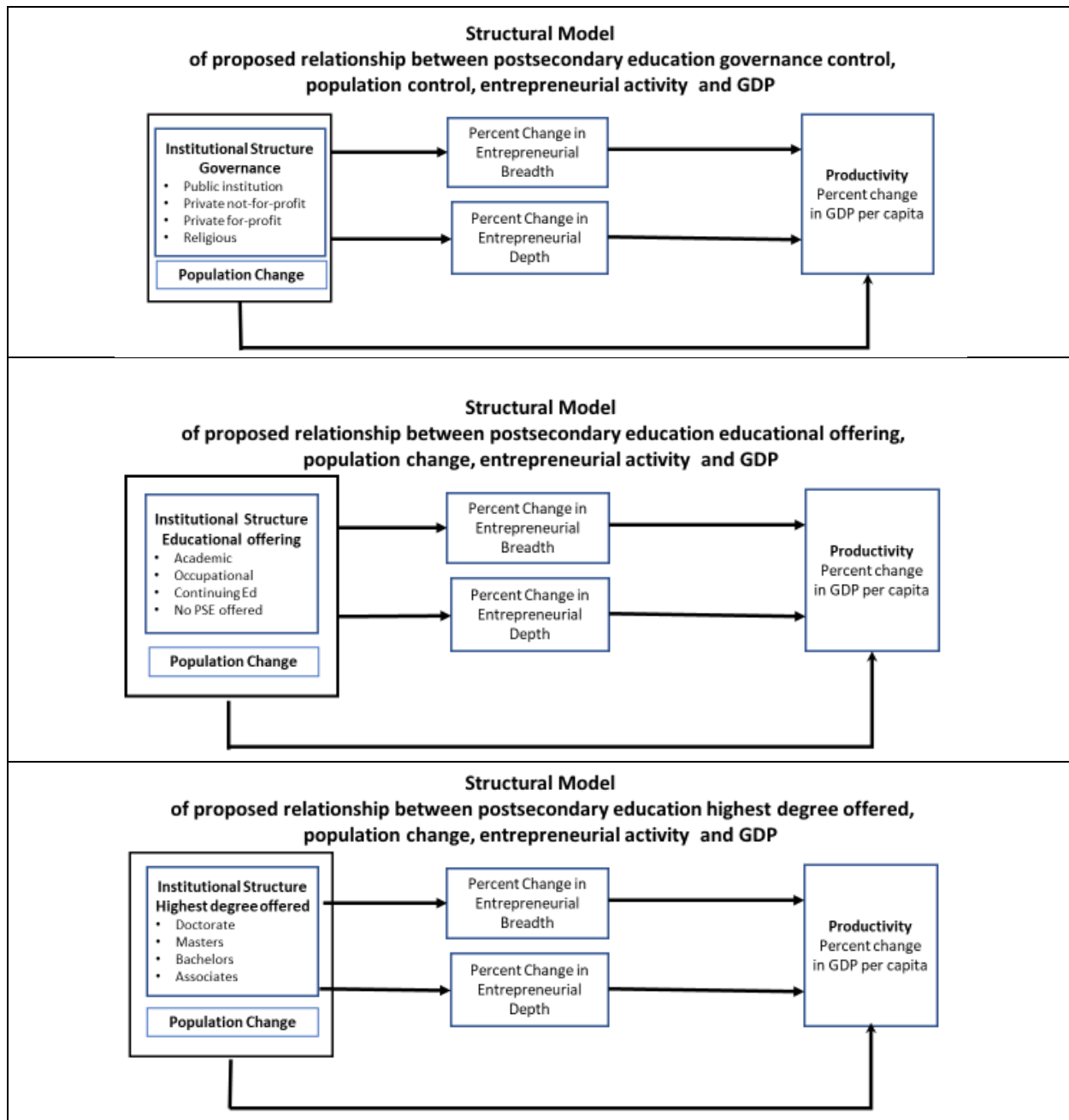
#### IV.1.5.2.1 Institutional structure and GDP

Figure 24 shows the structural models for Hypothesis 5 (d) and 6(d) which posited that entrepreneurial activity would mediate the relationship between PSE institutional structure and productivity while controlling for population change and co-variants.

**Figure 24:** *Structural Models for hypothesis 5 (d) and 6(d) showing proposed relationship between postsecondary education institutional structure, population change, entrepreneurial activity, and productivity*





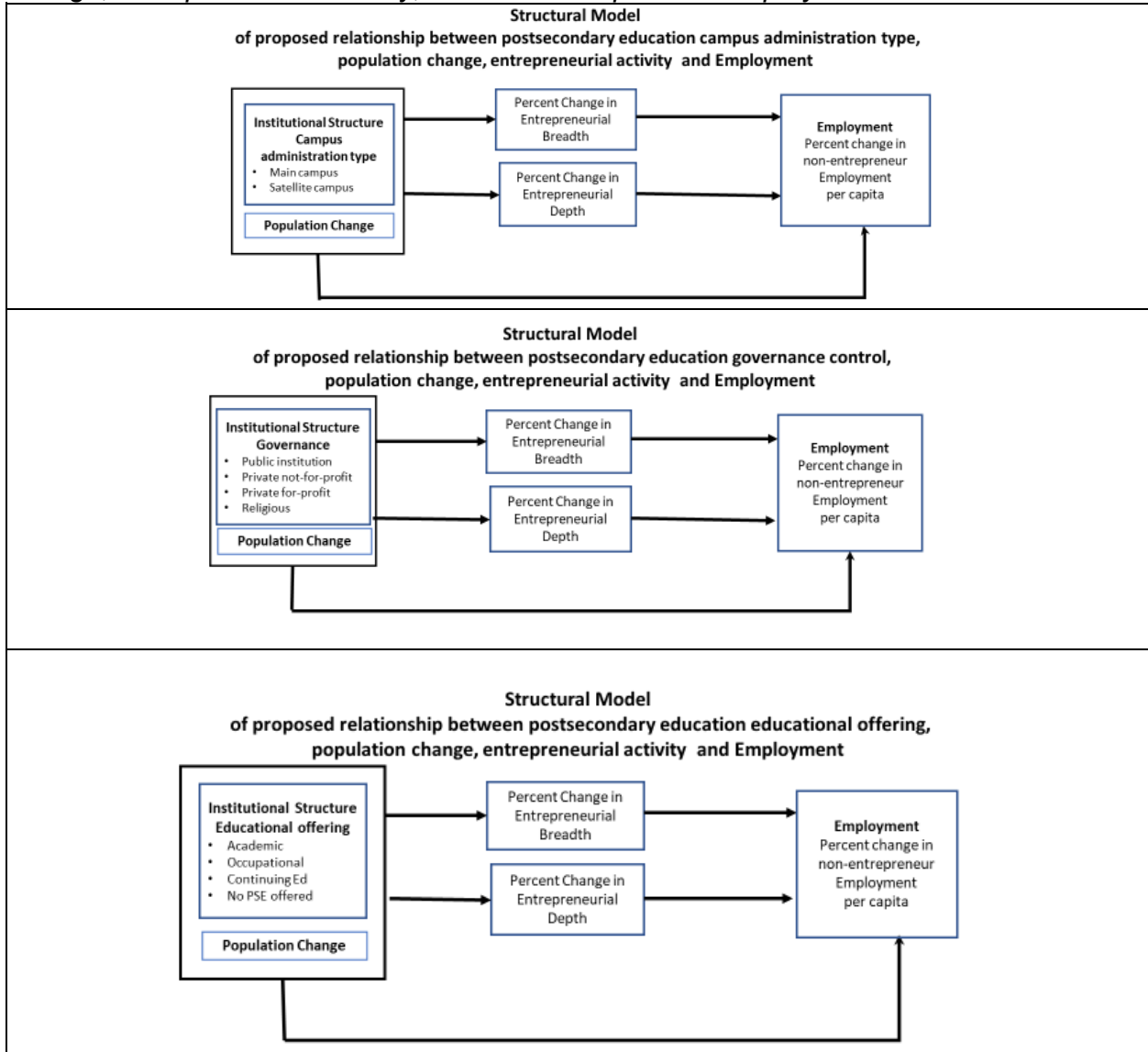


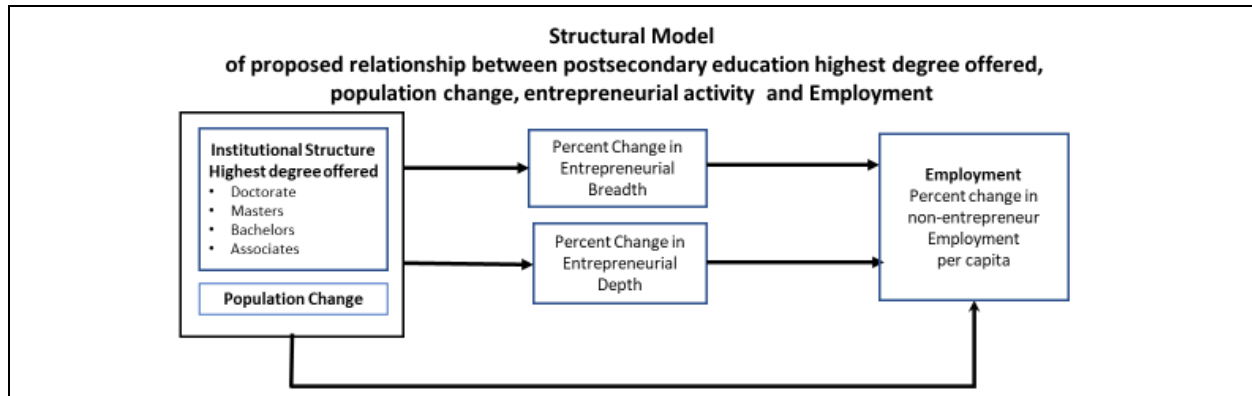
#### IV.1.5.2.2 Institutional structure and Employment

Figure 25 shows the structural models for Hypothesis 5 (e) and 6(e) which posited that entrepreneurial activity will mediate the relationship between PSE

institutional structure and employment while controlling for population change and co-variants.

**Figure 25:** *Structural Models for hypothesis 5 (e) and 6(e) showing proposed relationship between postsecondary education institutional structure, population change, entrepreneurial activity, and non-entrepreneur employment*

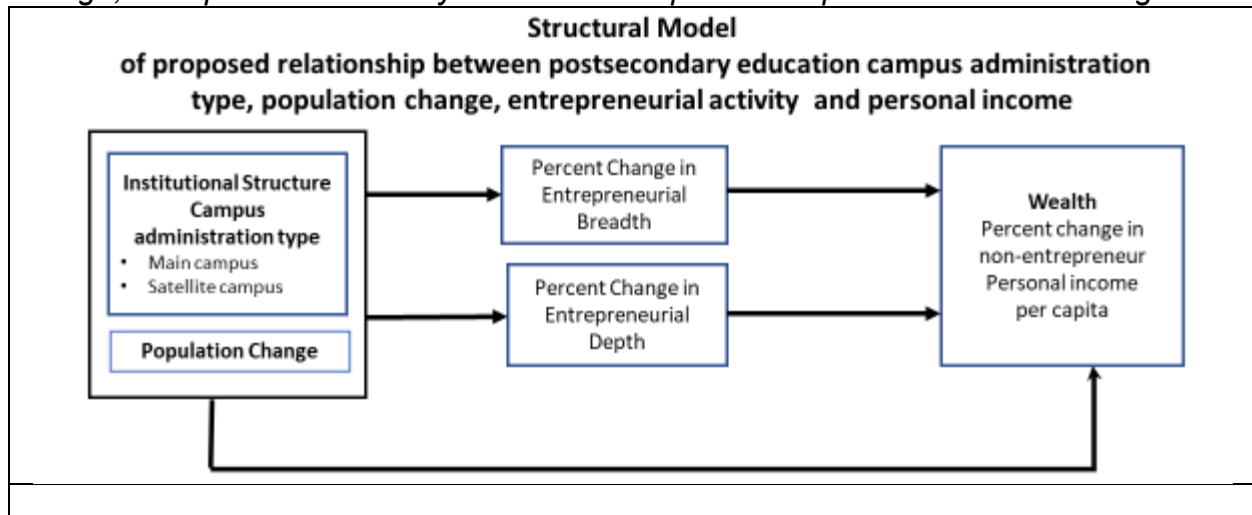


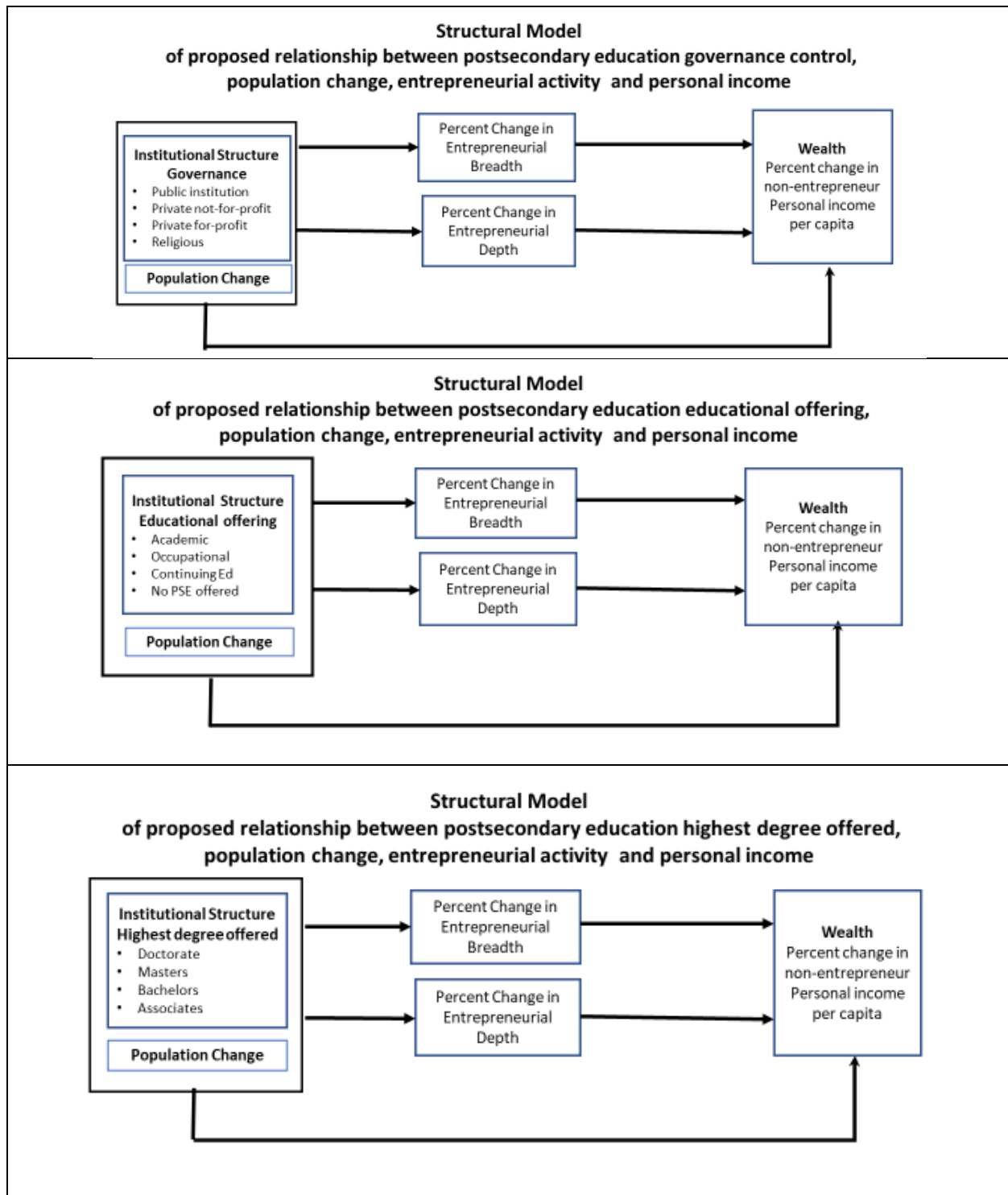


#### IV.1.5.2.3 Institutional structure and Personal Income

Figure 26 shows the structural models for Hypothesis 5 (f) and 6(f) which posited that entrepreneurial activity will mediate the relationship between PSE institutional structure and economic performance while controlling for population change and co-variants.

**Figure 26:** Structural Models for hypothesis 5 (f) and 6(f) showing proposed relationship between postsecondary education institutional structure, population change, entrepreneurial activity and non-entrepreneurial personal income change





#### IV.1.5.2.4 Institutional Structure Mediation Analysis Summary

Hypothesis 6(d) – 6(f) posited that concentration of high worth entrepreneurial activity would mediate the relationship between PSE institutional structure and

productivity, employment and wealth respectively. Table 25 shows the estimated direct effects and results of statistical inference test at the 95% confidence level derived from SPSS PROCESS analysis. As these results show, the specific indirect effects of all PSE institutional structure variables on percent change in per capita GDP, non-entrepreneur employment and non-entrepreneur Personal Income through percent change in Entrepreneurial Depth are not statistically significant at the 95% confidence level. Therefore, the null hypothesis cannot be rejected and hypothesis 6(d) – 6(f) are not supported.

Hypothesis 5(d) posited that PSE institutional structure would have a positive indirect effect on productivity through dispersion of entrepreneurial activity. As the results in Table 25 show, the specific indirect effects of PSE institutional structure variables “Main campus administration type” and “Private not-for-profit Religious governance” on “percent change in per capita GDP” through percent change in Entrepreneurial Breadth are positive and statistically significant at the 95% confidence level. The results in Table 25 also show that the specific indirect effects of PSE institutional structure variables “Private-for-profit governance” and “No post-secondary educational offering” on “percent change in per capita GDP” through percent change in Entrepreneurial Breadth are negative and statistically significant at the 95% confidence level. These results are sufficient to reject the null hypothesis such that hypothesis 5(d) is supported.

Hypothesis 5(e) posited that PSE institutional structure would have a positive indirect effect on employment through dispersion of entrepreneurial activity. As the results in Table 25 show, the specific indirect effects of PSE institutional structure

variables “Main campus administration type” and “Private not-for-profit Religious governance” on “percent change in non-entrepreneur employment per capita” through “percent change in Entrepreneurial Breadth” are positive and statistically significant at the 95% confidence level. The results in Table 25 also show that the specific indirect effects of PSE institutional structure variables “Private-for-profit governance” and “No post-secondary educational offering” on “percent change in non-entrepreneur employment per capita” through percent change in Entrepreneurial Breadth are negative and statistically significant at the 95% confidence level. These results are sufficient to reject the null hypothesis such that hypothesis 5(e) is supported.

The specific indirect effects of all PSE institutional structure variables on percent change in non-entrepreneur Personal Income through percent change in Entrepreneurial Breadth are not statistically significant at the 95% confidence level. Therefore, this null hypothesis cannot be rejected and hypothesis 5(f) is not supported.

**Table 25:** Regression summary for Hypothesis 5 (d) - 5 (f) and 6(d) - 6(f) showing the hypothesized relationship between postsecondary institutional structure, entrepreneurial activity and economic performance variables while controlling for percent change in population, co-variants and the second mediator.

Hypothesis	Percent change in GDP per capita				Percent change in non-Entrepreneur Employment per capita				Percent change in non-Entrepreneur Personal Income per capita			
	Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test		Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test		Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test	
			Breadth	Depth			Breadth	Depth			Breadth	Depth
5 (d) - 5 (f) and 6(d) - 6(f) controlled for co-variants												
Main Campus	.0209	.6144	YES	NO	-.0137	.4760	YES	NO	-.0258	.2391	NO	NO
Satellite Campus	.0070	.7978	NO	NO	-.0054	.6729	NO	NO	-.0040	.7809	NO	NO
Public institution	.0050	.8493	NO	NO	-.0057	.6463	NO	NO	-.0065	.6439	NO	NO
Private for-profit	.0793	.7138	YES	NO	-.0403	.6946	YES	NO	.1243	.2799	NO	NO
Private not-for-profit	-.0450	.7704	NO	NO	-.0255	.7271	NO	NO	.0281	.7310	NO	NO
Private not-for-profit - religious	.1315	.0626	YES	NO	-.0085	.7972	YES	NO	-.0571	.1259	NO	NO
Occupational Education	.0180	.7706	NO	NO	-.0054	.8476	NO	NO	.0407	.2080	NO	NO
Academic Education	-.0331	.3535	NO	NO	-.0321	.0494*	NO	NO	-.0302	.1075	NO	NO
Continuing Education	.0102	.9315	NO	NO	.0153	.7765	NO	NO	.0023	.9708	NO	NO
No PSE	-.0460	.5882	YES	NO	-.0554	.1524	YES	NO	.0172	.6976	NO	NO
Doctorate	-.0326	.7375	NO	NO	.0134	.7631	NO	NO	.0273	.5897	NO	NO
Masters	-.0287	.6450	NO	NO	-.0195	.6866	NO	NO	-.0253	.4348	NO	NO
Bachelors	.0543	.3706	NO	NO	-.0452	.1055	NO	NO	-.0489	.1229	NO	NO
Associates	-.0093	.8849	NO	NO	-.0343	.2435	NO	NO	.0194	.5609	NO	NO

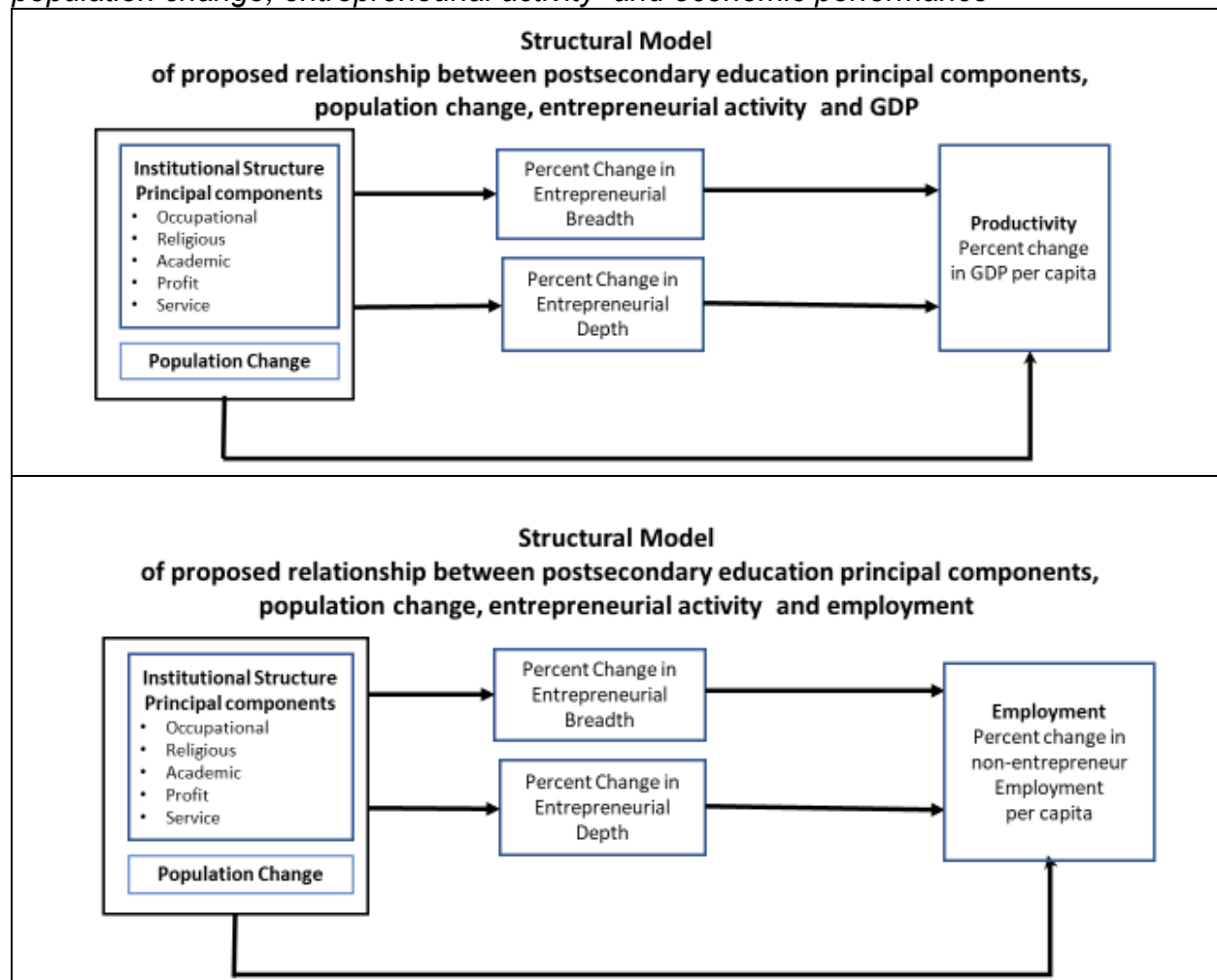
With these statistically significant findings, mediation analysis was rerun with only the statistically significant PSE institutional structure (independent variables), percent change in Entrepreneurial Breadth (mediator variable), percent change in per capita GDP (dependent variable), non-entrepreneur employment (dependent variable) and percent change in population (control variable). The results of parallel mediator analysis are presented in Table 27 for the variables with statistically significant estimates of indirect effects. These results show the coefficient estimates of the indirect

effects, percentile confidence intervals based on 5,000 bootstrap samples and constituent effects indicating that mediation occurs through a negative process.

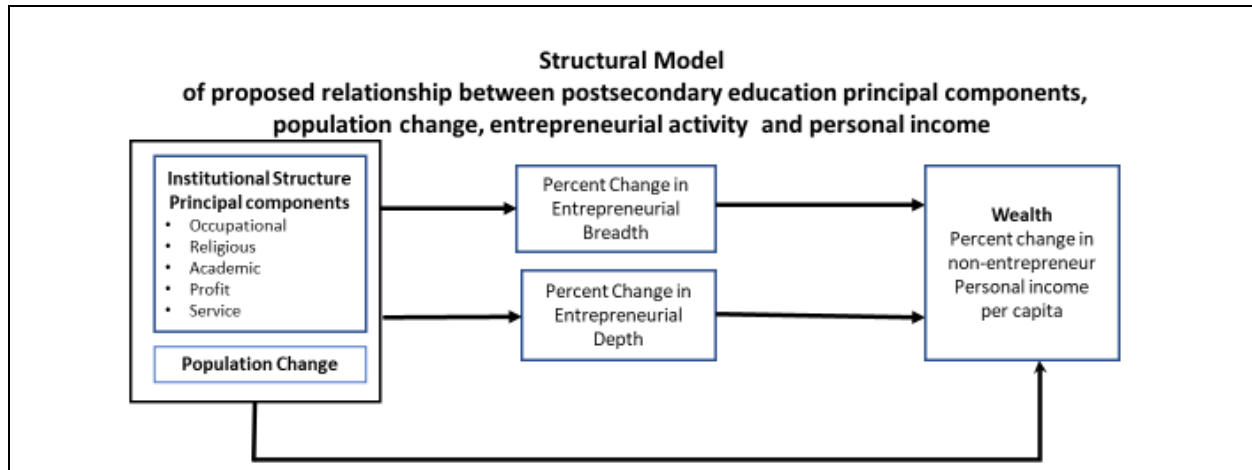
#### IV.1.5.2.5 *Principal Components Structure Models*

Five principal components were identified using factor analysis that explained 81% of the variation among the institutional structure variables. Figure 27 shows the structural models with the principal component variables in Hypothesis 5 (d) – (f) and 6(d) - 6(f) which posited that entrepreneurial activity will mediate the relationship between PSE institutional structure and economic performance while controlling for population change and co-variants.

**Figure 27:** *Structural Models for hypothesis 5 (d) - 5(f) and 6(d) - 6(f) showing proposed relationship between PSE institutional structure principal components, population change, entrepreneurial activity and economic performance*







#### **IV.1.5.2.6 Principal Components Mediation Analysis**

Table 26 shows the estimated direct effects and results of statistical inference test at the 95% confidence level derived from SPSS PROCESS analysis. As these results show, the specific indirect effects of all principal component variables on percent change in per capita GDP, non-entrepreneur employment and non-entrepreneur Personal Income through percent change in Entrepreneurial Depth are not statistically significant at the 95% confidence level. Therefore, the null hypothesis cannot be rejected and hypothesis 6(d) – 6(f) are not supported. The results in Table 26 also show that the specific indirect effects of Factor two” Religious Core” on percent change in “GDP per capita” and “non-entrepreneur employment per capita” through percent change in Entrepreneurial Breadth are statistically significant at the 95% confidence level. These results are sufficient to reject the null hypothesis such that hypotheses 5(d) and 5(e) are supported.

**Table 26:** Regression summary for Hypothesis 5 (d) - 5 (f) and 6(d) - 6(f) using principal components showing the hypothesized relationship between postsecondary institutional structure, entrepreneurial activity and economic performance variables while controlling for population, all co-variants and second mediator

Hypothesis	Percent change in GDP per capita			Percent change in non-Entrepreneur Employment per capita			Percent change in non-Entrepreneur Personal Income per capita		
	Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test	Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test	Direct Effect	Direct effect p-value test	Indirect effect - Confidence Interval test
Principal components 5 (d)-5(f) and 6(d)-6(f) controlled for co-variants									
Occupational	- .0020	.9308	NO	- .0027	.8098	NO	.0007	.9517	NO
Religious	.0305	.2340	YES	.0050	.6779	YES	.0210	.1151	NO
Academic	- .0044	.8509	NO	- .0026	.8153	NO	.0047	.7020	NO
For Profit	.0156	.5076	NO	.0088	.4246	NO	.0183	.1387	NO
Service	- .0133	.5702	NO	- .0055	.6130	NO	.0086	.4777	NO

The specific indirect effects of all principal component variables on percent change in non-entrepreneur Personal Income through percent change in Entrepreneurial Breadth are not statistically significant at the 95% confidence level. Therefore, this null hypothesis cannot be rejected and hypothesis 5(f) is not supported.

With these statistically significant findings, mediation analysis was rerun with only Factor two “Religious Core” (independent variables), percent change in Entrepreneurial Breadth (mediator variable), percent change in per capita GDP (dependent variable), non-entrepreneur employment (dependent variable) and percent change in population (control variable). The results of parallel mediator analysis are presented in Table 27 for the variables with statistically significant estimates of indirect effects. These results show the coefficient estimates of the indirect effects, percentile confidence intervals based on 5,000 bootstrap samples and constituent effects indicating that mediation occurs through a negative process.

**Table 27: Results of parallel mediator analysis for variables with statistically significant estimates of specific indirect effects showing coefficient estimates of the indirect effects and constituent effects.**

Specific Indirect Effect Results of Parallel Mediator Analysis predicting percent change in GDP per capita						
Independent Variable (IV)	Mediator	Specific indirect effect	Bootstrap confidence interval for indirect effect		Constituent Components of indirect effect	
			Lower	Upper	X->M	M->Y
Town "main campus setting"	Entrepreneurial Breadth	.0168 (.01)	.0021	.0393	-.0391	-.4294
Main campus "administration type"	Entrepreneurial Breadth	.0260 (.01)	.0069	.0582	-.0625	-.4151
"Private for-profit" governance	Entrepreneurial Breadth	-.0384 (.017)	-.0767	-.0122	.0880	-.4359
"Not-for-profit Religious" governance	Entrepreneurial Breadth	.0368 (.02)	.0081	.0737	-.1018	-.3615
Religious Core	Entrepreneurial Breadth	.0175 (.01)	.0055	.0348	-.0470	-.3731
Notes:	1. Percentile Confidence Interval based on 5,000 bootstrap samples 3. Percent change in population is control entered as covariates. 4. Standard errors are shown in parentheses. 5. 95% confidence interval 6. * Not statistically significant at 95% CI					

Specific Indirect Effect Results of Multiple Mediator Analysis predicting percent change in non-Entrepreneur Employment per capita						
Independent Variable (IV)	Mediator	Specific indirect effect	Bootstrap confidence interval for indirect effect		Constituent Components of indirect effect	
			Lower	Upper	X->M	M->Y
Town main campus setting	Entrepreneurial Breadth	.0207 (.01)	.0036	.0397	-.0391	-.5290
Main campus "administration type"	Entrepreneurial Breadth	.0325 (.01)	.0134	.0616	-.0625	-.5194
Private for profit	Entrepreneurial Breadth	-.0445 (.01)	-.0741	-.0197	.0880	-.5053
Private not- for-profit Religious	Entrepreneurial Breadth	.0519 (.02)	.0204	.0926	-.1018	-.5096
Religious Core	Entrepreneurial Breadth	.0243 (.01)	.0116	.0412	-.0470	-.5165
Notes:	1. Percentile Confidence Interval based on 5,000 bootstrap samples 3. Percent change in population is control entered as covariates. 4. Standard errors are shown in parentheses. 5. 95% confidence interval 6. * Not statistically significant at 95% CI					

#### IV.1.6 Quantitative Analysis Summary

This study proposed that there should be a positive relationship between postsecondary education and entrepreneurship in rural areas such that overall

economic performance improves. IPEDS data was used to evaluate multiple hypothesis proposing that PSE variables within counties are related to entrepreneurial activity and economic performance. Regression analysis results estimate that geographic context, campus administration type, governance and Religious Core (derived from factor analysis) are related to entrepreneurial activity and economic performance in rural areas. Educational offerings and degree offerings have no significant relationship to entrepreneurial activity or economic performance variables. In addition, this study proposed that entrepreneurial activity exerts a positive and significant mediating effect on the relationship between postsecondary education and economic performance. Results of parallel mediator analysis found the relationship between geographic setting, administration type, governance, a principal component factor and economic performance do have statistically significant relationships through entrepreneurial breadth. Most hypothesis were supported as a result of this analysis.

There are eight rural counties that host a satellite campus of a PSE institution with a “suburban setting” main campus. Regression analysis results estimated a positive significant relationship between “suburban setting” main campus and percent employment per capita change as the dependent variable. This model indicates that an increase of one unit in “suburban setting” main campus in a rural county is associated with a 7.1% increase in “percent of change in employment per capita”. Figure 28 shows the structural model including effect size for this relationship along with a graphical representation of the predicted effect on employment per capita. Although causality could not be determined, the strength and nature of the relationship between

“suburban setting” main campus and “percent change in per capita employment” was definitively assessed.

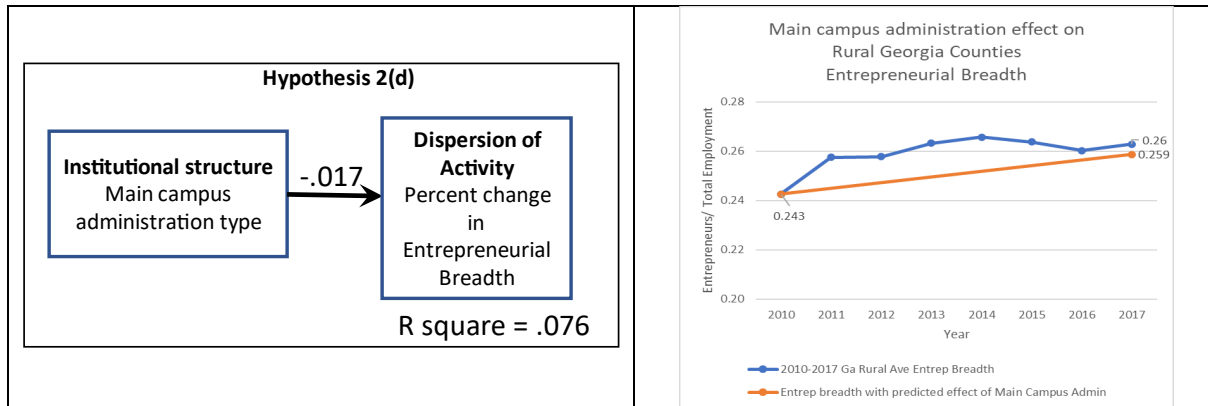
**Figure 28:** Structural model with effect size for suburban main campus and employment along with graphical representation of predicted employment per capita



There are 19 rural counties with one or more PSE “main campus” administration type institutions located within their boundaries. Findings from regression analysis estimate a negative significant relationship between PSE “main campus” administration type institutions and percent change in “Entrepreneurial breadth” as the dependent variable. Figure 29 shows the structural model including effect size for this relationship along with a graphical representation of the predicted effect on entrepreneurial breadth. Although causality could not be determined, the strength and nature of the relationship between “main campus” administration type institutions and “entrepreneurial breadth” was definitively assessed. This model indicates that an increase of one unit of PSE “main campus” administration type in a rural county is associated with a 1.7% decrease in “percent of change in entrepreneurial breadth”. Higher concentrations of entrepreneurs are often associated with distressed rural communities where businesses are started because of lacking employment opportunities. For this reason, a decrease in entrepreneurial breadth is likely associated with better economic performance from

an increase in non-entrepreneurial employment opportunities without significant population changes.

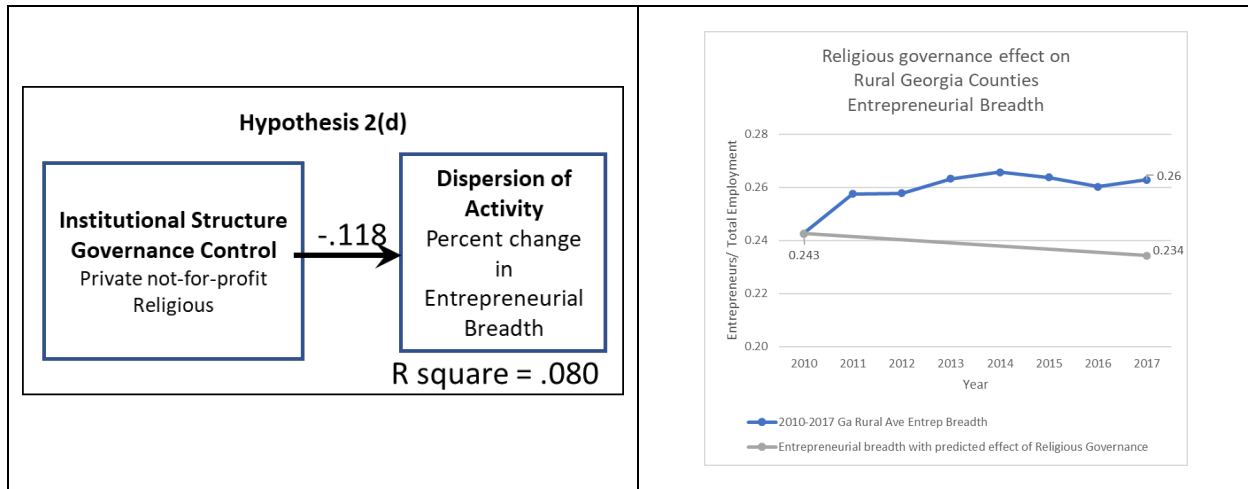
**Figure 29:** Structural model with effect size for PSE “main campus” administration type and entrepreneurial breadth with graphical representation of predicted entrepreneurial breadth



Nine rural counties host PSEs with “religious governance”. Results of regression analysis estimate a negative significant relationship between PSE “religious governance” and “percent of change in Entrepreneurial breadth” as the dependent variable. Figure 30 shows the structural model including effect size for this relationship along with a graphical representation of the predicted effect on entrepreneurial breadth. Although causality could not be determined, the strength and nature of the relationship between PSE “religious governance” and “entrepreneurial breadth were definitively assessed. This model indicates that an increase of one unit of PSE “religious governance” in a rural county is associated with a 11.8% decrease in percent of change in “entrepreneurial breadth” holding all other variables constant. As noted earlier, higher representations of entrepreneurs are often associated with a lack of employment opportunities. For this reason, a decrease in entrepreneurial breadth is likely

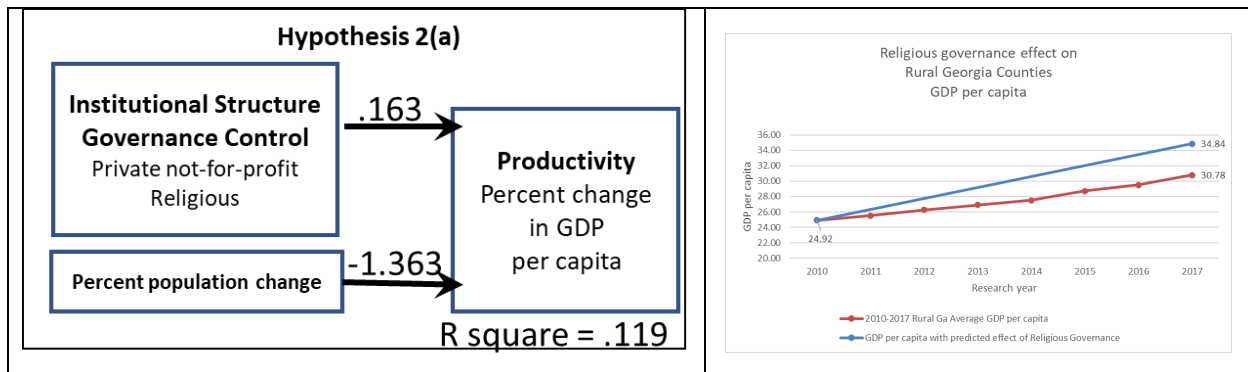
associated with better economic performance from an increase in non-entrepreneurial employment opportunities without significant population changes.

**Figure 30:** Structural model with effect size for religious governance and entrepreneurial breadth with graphical representation of predicted entrepreneurial breadth



Regression analysis also estimate a positive significant relationship between PSE “religious governance” and percent change in GDP as the dependent variable. Figure 31 shows the structural model including effect size for this relationship along with a graphical representation of the predicted effect on GDP per capita. Although causality could not be determined, the strength and nature of the relationship between PSE “religious governance” and percent change in GDP were definitively assessed. This relationship estimates an increase of one unit of PSE “religious governance” in a rural county is associated with a 16.3 percent increase in percent of change in GDP holding all other variables constant. GDP growth is an important measure of economic performance that is strongly linked over time to standard of living.

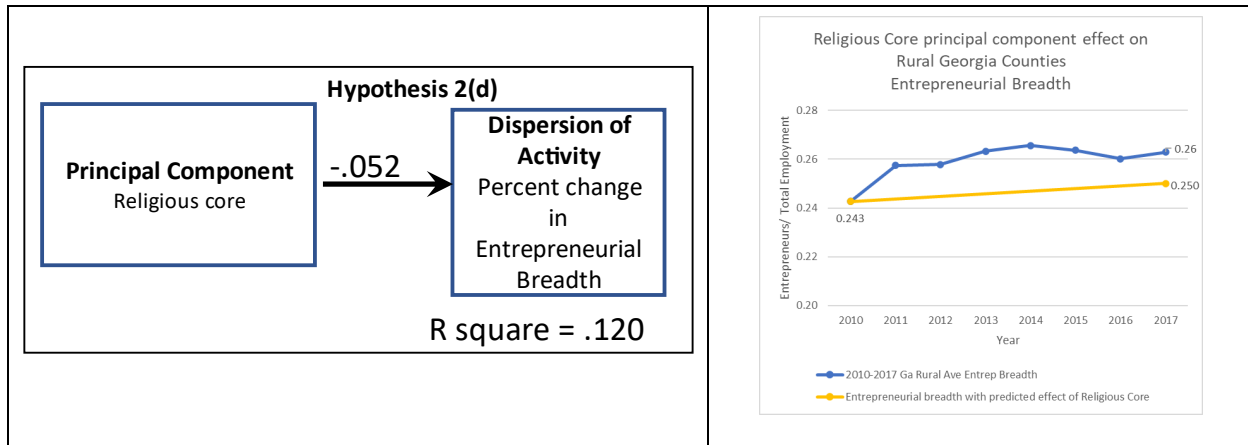
**Figure 31:** Structural model with effect size for religious governance and GDP with graphical representation of predicted GDP per capita



Factor analysis was used to derive principal components of PSE institutional structure. Religious Core was one of five factors derived. Religious Core accounted for 13.8% of the variance in independent variables and was most heavily loaded from “main campus” administration type and “religious governance” variables. Regression analysis estimate that Religious Core has a negative significant relationship with percent change in Entrepreneurial Breadth such that an increase of one unit Religious Core is associated with a  $-.052$  (5.2% decrease) in “percent of change in Entrepreneurial Breadth” in rural Georgia counties. Figure 32 shows the structural model including effect size for this relationship along with a graphical representation of the predicted effect on entrepreneurial breadth.

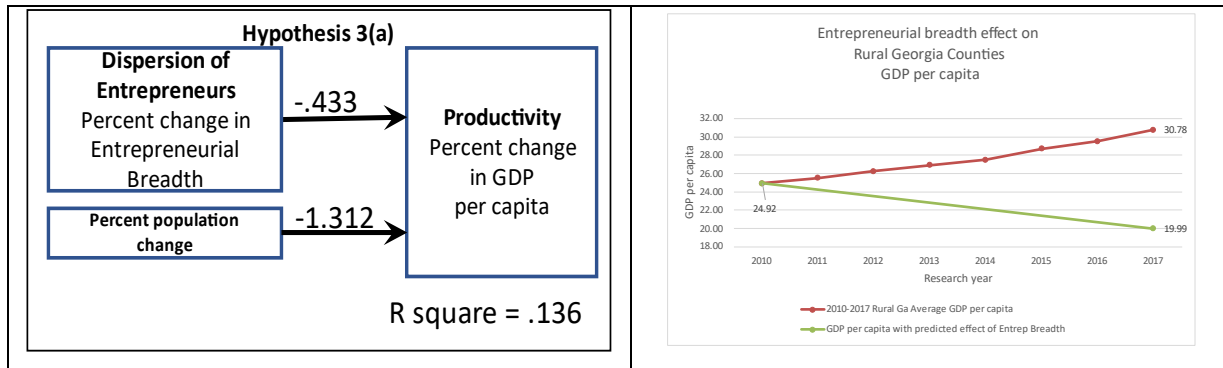


**Figure 32:** Structural model with effect size for Religious Core principal component and Entrepreneurial Breadth with graphical representation of predicted entrepreneurial breadth



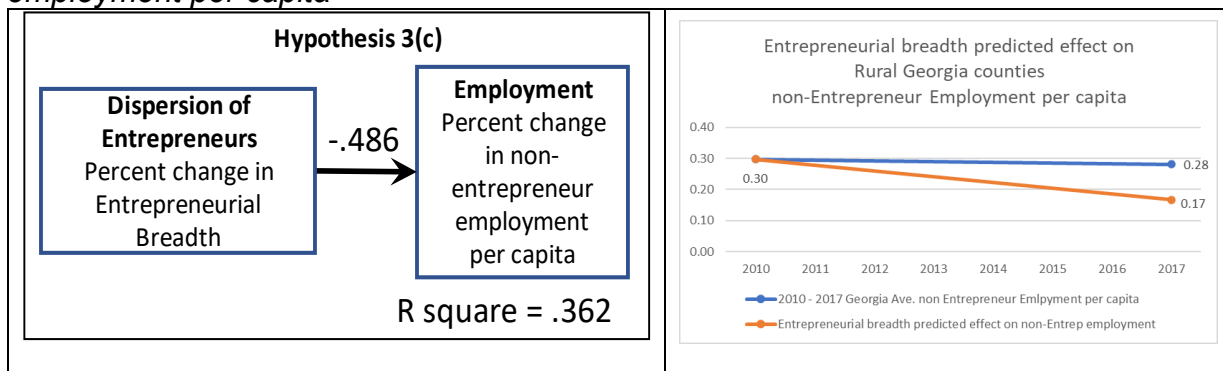
Regression analysis estimate that percent change in Entrepreneurial Breadth has a negative significant relationship with “percent change in GDP per capita” such that a one unit change in “percent of change in Entrepreneurial Breadth” is related to a -.433 (43.3% decrease) in “percent of change in GDP per capita” in rural Georgia counties holding percent population change constant. Figure 33 shows the structural model including effect size for this relationship along with a graphical representation of the predicted effect on GDP per capita. Higher concentrations of entrepreneurs are often associated with distressed rural communities where businesses are started because of lacking employment opportunities. For this reason, a decrease in entrepreneurial breadth is associated with higher GDP when there is no change in population which suggest that the self-employed transition to higher wage non-entrepreneurial employment.

**Figure 33 :** *Structural model with effect size for Entrepreneurial breadth and GDP and graphical representation of predicted GDP per capita*



Regression analysis estimate that “percent change in Entrepreneurial Breadth” has a negative significant relationship with “percent of change in non-Entrepreneur Employment per capita” such that a one unit change in “percent of change in Entrepreneurial Breadth” is associated with a -.486 (48.6% decrease) “percent of change in non-Entrepreneur Employment per capita” in rural Georgia counties. Figure 34 shows the structural model including effect size for this relationship along with a graphical representation of the predicted effect on non-Entrepreneur employment per capita. This suggest that an increase in entrepreneurial breadth will be associated with a decrease in all alternative employment options.

**Figure 34:** *Structural model with effect size for Entrepreneurial breadth and non-entrepreneur Employment with graphical representation of predicted non-Entrepreneur employment per capita*



Parallel mediation analysis estimated a significant, positive, specific indirect effect of campus setting, administration, governance, and principal component on percent change in GDP per capita and percent change in non-entrepreneur employment per capita through entrepreneurial breadth. The constituent components for these mediating relationships were found to have negative significant relationships such that as the independent variables increase, the rate of change in entrepreneurial breadth will decrease and in turn GDP per capita and non-entrepreneur employment per capita will increase. The “private for-profit governance” independent variable provided the only exception to this finding as its effect on entrepreneurial breadth was positive.

These findings provide support for the hypotheses that PSE institution’s geographic context and institutional structure influence entrepreneurial activity and economic performance in rural areas. These findings also support the hypothesis that entrepreneurial activity has a mediating effect on the influence of postsecondary education’s relationship with economic performance.

#### **IV.2 Secondary Analysis & Results - Deeper Insights**

Beyond the primary quantitative analysis, additional examination was performed to obtain deeper understanding of the relationship between postsecondary education, entrepreneurship and economic development in rural areas. To this end, in-depth interviews were conducted with economic development specialist in three top tier counties based upon statistical analysis of entrepreneurial activity. Semi-structured interview were conduct via ZOOM video conferencing. Interviews were transcribed, anonymized, and analyzed using NVivo 1.6.1 thematic and auto coding.

This study designated top tier counties as those having the highest percent change in Entrepreneurial Depth defined as concentration of high value entrepreneurs. Entrepreneurial Depth was used for this designation because studies have found that high value entrepreneurs enhance regional growth and prosperity. Three counties were targeted from among the top 10% of rural counties in the study sample. Eight actively serving economic development specialist from these three top tier counties were identified with the assistance of state level economic development organizations. An overview of the three counties and the eight economic development specialist is shown in Table 28.

The eight economic development specialists were asked to provide information on economic development, entrepreneurship, and postsecondary education, using three questions:

1. Please describe economic development initiatives.
2. Please describe local initiatives that support entrepreneurial activity and identify those you feel are most successful.
3. What role does postsecondary education play in the initiatives that support entrepreneurial activity?

With all identities anonymized, the composition of the sample group represented governmental department managers, chamber of commerce executives and locally appointed business leaders from within the county.

**Table 28: County and Economic Development Specialist Overview**

Rural County	PSE Institutions	Entrepreneurial Activity (2010-2017 % change)		Economic Development Experience (Interviewees Total Years)		Staffing levels Economic Development and Chamber of Commerce Main Street or DDA
		Depth	Breadth	Min	Max	(FTE – full time equivalent)
1	1	1.28	.04	1.3	24	3
2	0	1.62	.15	1.5	30	2
3	1	1.60	-.04	0.3	6	2
<b>Georgia Rural Mean</b>	1	.12	.08			
<b>Georgia Rural Std Deviation</b>	1	.50	.15			

Information on economic development and entrepreneurial initiatives was obtained to establish context for postsecondary education data derived from the interviews. Economic development specialist provided data on policies, agencies, programs, technology, techniques, and typical practices related to postsecondary education activities supporting entrepreneurial activities. Transcripts of the interviews were analyzed using NVIVO auto coding and also coded according to economic development, entrepreneurship, and postsecondary education themes. Interview responses to the question regarding postsecondary education was then further analyzed and coded according to four principal roles of postsecondary education: organizational, intermediary, knowledge dynamic, and policy.

### ***IV.2.1 Economic Development Context***

**Interview Question 1: “Describe economic development initiatives in your respective counties”.**

Eight economic development specialist who work to promote economic growth in three top tier counties were asked to “Describe economic development initiatives in their respective counties”.

A content analysis of the transcribed responses to this question was performed using matrix coding and word frequency queries. Matrix coding queries identified coding intersections between economic development thematic codes and NVivo’s automatically identified pattern based codes for each county. Word frequency queries identified the most frequently occurring words in the combined interview responses to question one. The word frequency query setup is a grouping of “with stemmed words”, a minimum word length of five, display words of 100 most frequent and results are filtered for stop words. The output of the word frequency query is presented in a word cloud and the output of the matrix coding query is presented in a 100 percent stacked bar graph. Figure 35 displays results of content analysis performed using these techniques.

The industry base across the three top tier counties is heavily influenced by geographic context in the form of natural resources and access to major transportation corridors. Metal fabrication, plastics, forestry, wood products, agriculture, food processors, food packaging, and tourism were the top industries. Economic development incentives primarily consist of lease purchase arrangements, tax



Each county collaborates with state economic development partners to market large acreage sites and vacant buildings with hopes of recruiting industry prospects by using financial incentives, however, it was acknowledged that efforts to recruit large industry with state partners have been largely unsuccessful. Most of the success in these rural areas has been achieved by personal relationships stemming from city, county and development authority collaboration. Recruitment of large employers can be very expensive and involve a significant level of risk for small counties as noted by this comment:

“We often will tailor our incentives in terms of how aggressive we are based on the quality of the jobs and the investment that a prospective company may be bringing to the table. We have one of the lowest millage rates in Georgia, and we try to keep it that way. It helps those industries put more people to work. The more they pay in taxes, the less they can pay their people or the fewer people they can hire. We do everything imaginable to help them to stay in business in our county. So those are two real, I guess, key fundamental principles that guide us in our economic development initiatives.”

The practicality of rural economic development is best represented by this comment:

“The successes have been people knew people, and they knew they have a need, and they sort of came. And our county has always been known to work together. So the city, the county, and the development authority, as three different government entities have always worked very well together and supported each other. And I think that was probably our biggest strength in the day.”



Economic development strategies have now begun to focus on existing industry and diversifying the economic base. For this reason, in recent years increased resources have been directed to industry retention and expansion as noted by this comment:

“...our goal now in economic development is really maintaining what can we do in a support role to keep the industries, their needs met, that maybe we can help with to make sure that they either grow internally, but definitely stay in our county, but really what can we do to help them with continued growth. And we've been fortunate all those industries have had continuous growth expansions in the county and so for that sample we've been very fortunate.”

Economic development specialist were also very aware of local factors that hinder their ability to attract outside industry. The proximity to valuable natural resources has created limitations in the availability of developable land because of large private or governmental land owners. This creates concerns with limited workforce housing and conveniences as compared to nearby suburban population centers that have greater ability to attract franchise establishments. Stagnant or decreasing population growth then follows and it is accentuated by difficulty with attracting new educators for local school systems. The reality of population losses was expressed in the following comments:

“The thing that hinders us from getting it (larger employers) might be one of your next questions, I get ahead, but that's where probably our biggest limitation is, population. We just have not grown from the standpoint of housing.”

“Well, everybody sort of rooted into the fact that they can drive 20 minutes to come to work here. Why uproot from where I'm at and coming from when, unfortunately, rural counties have not grown on the services side as far as a great variety of restaurants and tons of things to do and those kind of things.”

The value and opportunities attainable through entrepreneurship were acknowledged by all economic development specialist. One county had its primary economic development strategies geared toward entrepreneurship. They described this strategy as one that gives their county economic resilience which is the capacity of a local economy to recover or bounce back from an “economic shock.”

#### ***IV.2.2 Entrepreneurship Context***

**Interview question 2: Please describe local initiatives that support entrepreneurial activity and identify those you feel are most successful.**

A content analysis of the transcribed responses to this question was performed using matrix coding and word frequency queries. Matrix coding queries identified coding intersections between entrepreneurship thematic codes and NVivo's automatically identified pattern based codes for each county. Word frequency queries identified the most frequently occurring words in the combined interview responses to question two. The word frequency query setup is a grouping of “with stemmed words”, a minimum word length of five, display words of 100 most frequent and results are filtered for stop words. The output of word frequency query is presented in a word cloud and the output of matrix coding query is presented in a 100 percent stacked bar graph. Figure 36 displays results of content analysis performed using these techniques.

**Leadership:** Educating civic and governmental leaders on the value of entrepreneurship was identified by several individuals as an important foundation for building an ecosystem. Leadership programs and training programs organized in collaboration with chambers of commerce were frequently mentioned in statements such as:

“We have just recently started a leadership program, we had one years ago when I first came but leadership class or I think they're calling it Leadership Academy, where we're trying to get a great diverse range of young folks or people that are involved that really they want to be involved but they really don't understand how to be involved. So this is going to be a good training tool to try to encourage more volunteerism and support to the community and maybe even lead entrepreneurship because there's gonna be a section I think in the academy on entrepreneurship, economic, about those type things.”

**Buy local:** A common initiative employed in all counties to promote entrepreneurship involved “Buy local” promotions to support local retail businesses. A few representative responses are shown below:

“Buy any kind of local, we have a local hardware store, we have local fuel. So definitely that industry, retail fuel, retail hardware, that's definitely a big support and even the restaurant industry because if you've got over a thousand jobs that are here every day. And they're eating somewhere and buying gas somewhere because they spend most of their day here. And so that definitely helps us from that standpoint.”

**Tourism:** Each county described aspirations to increase tourism as a destination by leveraging proximity to a significant natural resource. Two counties had

cities that have invested heavily into downtown development or Main Street Program certifications. High traffic volumes provide an opportunity to attract travelers into downtown areas however there was realism regarding the challenges of growing tourism through this strategy as exemplified by the following response:

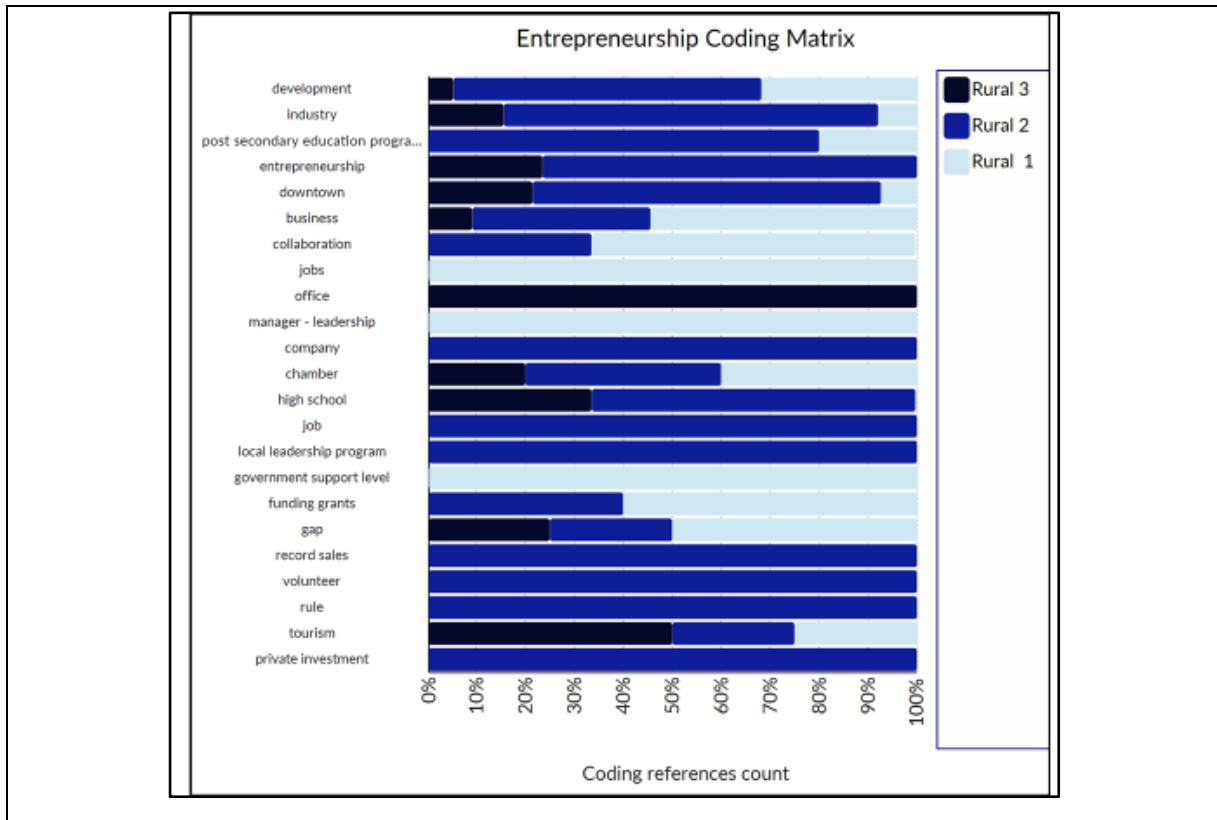
“We got to create that niche. It's got to be a niche, and we understand that. But it's going to take some major investment in the downtown area to build.... do that..... to get those people to stop.”

**Downtown revitalization:** Each of the counties described entrepreneurship initiatives related to revitalizing downtown areas with productive workspaces and retail that serves local citizens and tourist. Façade grant programs were being offered to property owners in one county to create an aesthetically attractive environment that could be appealing to regional commuter traffic. Two of the counties have accredited Main Street Programs that maintain emphasis on historic preservation and economic development to create vibrant downtown environments.

**Small business support networks:** Chambers of commerce are important partners who performed varying support functions for small businesses in top tier counties however their primary role in entrepreneurship consist of networking events, information sessions and policy advocates for business operations as described in the following comments:

“So really, a lot of that (entrepreneurship initiatives), I believe, is actually maybe managed more through the chamber level than at the county level. The chamber connects those resources to their directories. If somebody asked me, how can I find





**Business start-up support:** Each county recognized that entrepreneurs often need assistance in understanding the requirements for starting businesses. Each of the three counties referred to services available from local chambers of commerce for networking support that connected new businesses to needed resources or professional services. The University of Georgia Small Business Development Centers are an important resource for technical expertise. One county described a heavy reliance on volunteers for entrepreneurship initiatives: “We have representatives here from SCORE, we have a SCORE representative through SBA, and then we can also connect with the free resources at the Small Business Development Center. And these entrepreneurs really love that that support, so we oftentimes act as liaisons. And we also have a large population of retired entrepreneurs in this community, who can act as resources as well.”

In two of the top tier counties there are designated local representatives who are responsible for supporting start-ups on the path to success. These representatives worked to support new businesses in navigating local regulations and finding needed resources. The third county recognized the value of start-up support but had not established a “one-stop shop” referencing funding shortfalls. Comments such as the following indicate that these counties consider it beneficial to provide support for local start-ups.

“ We also have a how to start a business guide that tells them where to go to get this permit. And our Main Street Director works closely and make sure she's on top of everybody that even if it's a rumor, they want to start a business, make sure that they don't start building out a kitchen without getting the health department to come in first, because building permits and make sure that they're not spending money that they'll have to spend again to undo. I would say one of the most valuable things we offer is the Main Street Director 's one on one go-to, she's the go-to person and she's quickly established a reputation for being able to help, how do you get a trash can moved? How do you get a dumpster? If you're renovating, all that kind of stuff. That one-on-one consulting is priceless. We're not capturing some of that but we know, even we don't realize all entrepreneurial problems going on. And so if you could just talk to those folks, realize where this could lead”.

“We feel like in supporting the local industries and the local businesses the way that we do, we extend that to anybody that's even looking to start up, but a lot of times, they just need help. They just need guidance. So we provide them any bit of help we can, facilitation, guidance, in that regard, if they are trying to convert some building, then we

help them with that process. We don't look at it from a regulatory perspective. We're not going to try to go in and make it difficult and stack up barriers. We try to facilitate them. If there are programs that we are aware of, we direct them to those, whether a small business administration, really sort of the go-to for some of the small businesses.”

**Governmental funding assistance:** Two of the counties have garnered valuable funding from governmental programs or private foundations to develop long term strategies that emphasize entrepreneurship in strengthening local economies. Private or publicly funded incentive programs are important tools used by rural counties. U.S. Dept of Labor WORC Grants ("Workforce Opportunity for Rural Communities (WORC) Initiative," 2022), Georgia Department of Community Affairs "Rural Zones" designation ("Rural Zones," 2022) and Georgia Department of Community Affairs "Local Revolving Loan Funds"("Revolving Loan Fund," 2022) were mentioned. Tax credits are available for job creation activities, investment in downtown properties, and renovation of properties to make them functional. The significance of funding assistance is expressed in these comments”.

“And as a city, we've worked really hard to have privatized dollars to be able to incentivize folks who own property or who are leasing property in the downtown area. So we had a private entity give so that we could provide a facade improvement program.”

“The revolving loan fund is managed through the DCA (Dept of Community Affairs). It's monies that are available to city and county entities and it's a low interest loan that different people can use. There's a minimum requirement for job creation. But there's great benefits to that for the city and also for private individuals to use.”



“.....and the “Rural Zone” designation is specifically for rural entrepreneurs and so it's for communities, 15,000 or less population. And it's specific to the central business district. So that's your historic core..... which we like to say the DDA. And the main street, to say that downtown is our industrial park for small business. It has the highest concentration of infrastructure and should be managed like an industrial park. So we're proud to have a Main Street Program.”

**Common resource gaps:** The most referenced gap in each top tier county was funding or financial management knowledge. These comments captured the sentiment expressed by all.

“common gaps for entrepreneurs is financing is one. And for, more nontraditional businesses that banks typically wouldn't give money to. So gap financing, I would say needs for affordable office space, which were trying to bridge the gap, their advisement on managing financials. So I think the dynamic of a thriving downtown. Many people want to open up a shop or restaurant, but may not have the business background. And then there are a lot of creatives in our community that may not have the business background, so like a need for bookkeeping stuff.”

#### ***IV.2.3 Postsecondary Education Principal Roles***

**Question 3: What role does postsecondary education play in the initiatives that support entrepreneurial activity?**

A content analysis of the transcribed responses to this question was performed using matrix coding and word frequency queries. A matrix coding query identified coding intersections between postsecondary education thematic codes and NVivo's

automatically identified pattern based codes for each county. The word frequency query setup is a grouping of “with stemmed words”, a minimum word length of five, display words of 100 most frequent and results are filtered for stop words. Word frequency queries identified the most frequently occurring words in the combined interview responses to question three. The output of word frequency query is presented in a word cloud and the output of matrix coding query is presented in a 100 percent stacked bar graph. Figure 37 displays results of content analysis performed using these techniques.

Figure 38 contains the results of matrix queries designed to examine four principal roles of postsecondary education: organizational, intermediary, knowledge dynamic, and policy. The first of these matrix coding queries identified coding intersections between NVivo’s automatically identified pattern-based codes for all counties and four thematic codes for postsecondary education principal roles. A second matrix coding query identified coding intersections between thematically coded Education Initiatives and the four thematic codes for postsecondary education principal roles. Figure 39 displays results of these content analysis techniques using: 3D column graph, 3D bar graph and a 3D stacked column graph.

Content analysis of these NVivo coding queries provide insight into how the principal roles of post-secondary education are being performed in top tier counties. Four significant insights are highlighted.

**Insight #1:** Postsecondary education primarily functions in an Organizational role centered on internal efforts to deliver standardized curriculum and training in rural areas. This includes efforts related to facilities, degree or certificate offerings, staffing

levels and staffing requirements for delivering programs in a variety of settings. The emphasis on organizational capacity is consistent across all top tier counties based on query results for all counties.

**Insight #2:** The second most frequently observed role for postsecondary education is Knowledge Dynamics which stimulates innovation by introducing new knowledge resources into a region. This role is valued by economic development specialist, however it intersects in a much smaller number of initiatives namely high school career readiness programs and targeted industry partnerships. The top tier counties in these studies were able to draw postsecondary education into this role with the leverage of private, local or state funding that allowed them to influence decisions made by administration and governance of postsecondary education institutions. This suggest that postsecondary education in rural areas typically does not have an institutional structure (governance, administration, educational offerings and degree offerings) that equips them with the capacity to introduce new knowledge resources into rural areas that desperately need innovation.

**Insight #3:** Postsecondary education's role as an Intermediary has been performed on a limited basis for rural industry, high schools and entrepreneurs, however, the impact has been substantial as measured by the number of coding references. This impact is further substantiated by interviews with economic development specialist. The Intermediary role emphasizes collaboration and connections to financial, human and social capital. Postsecondary education's limited emphasis on this high yielding role further suggest that their institutional structure (governance, administration, educational

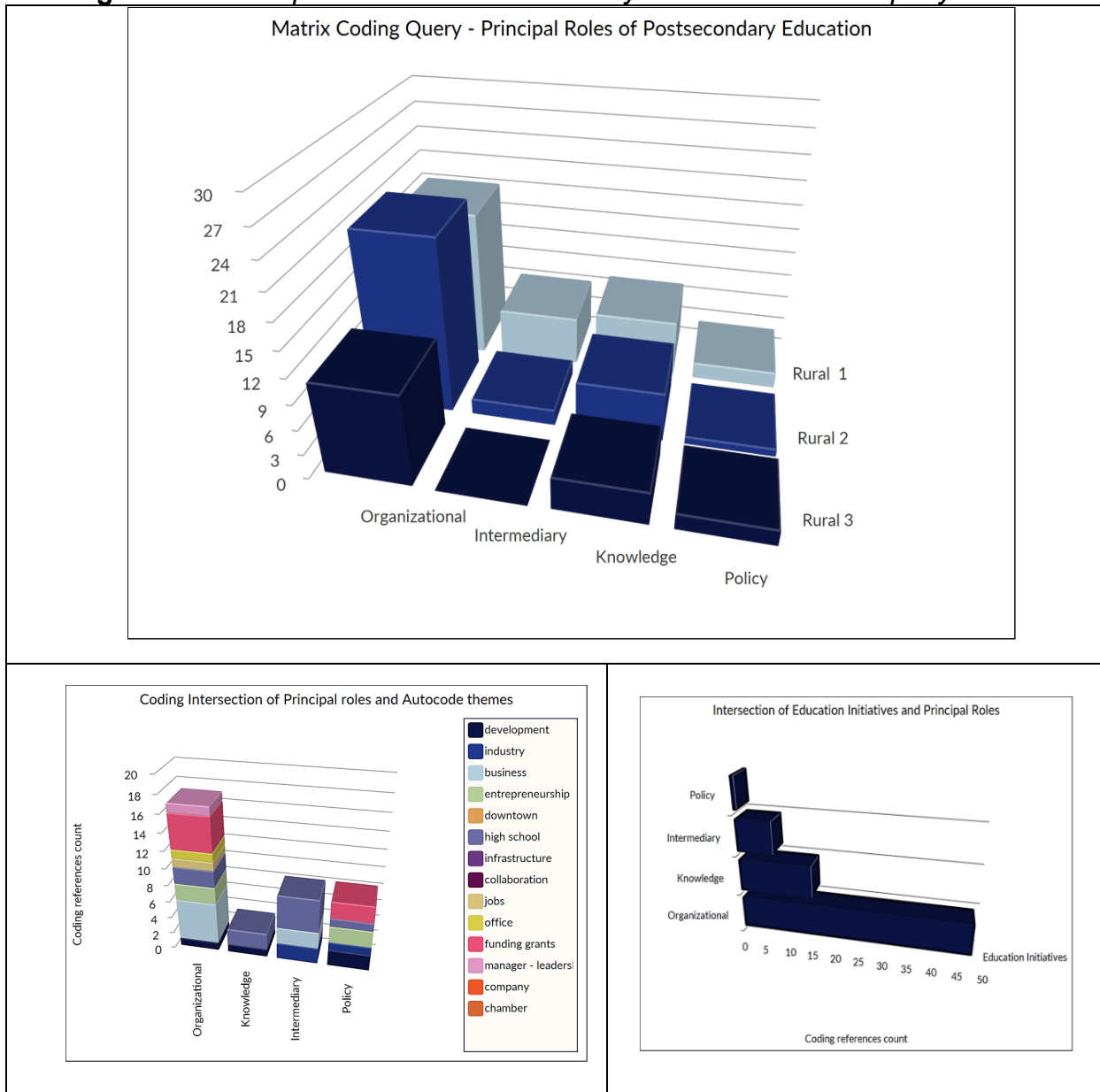
offerings and degree offerings) is not aligned to connect rural areas with valuable resources.

**Insight #4:** Funding for strategic education, entrepreneurship, and economic development initiatives is established upon sound research that undergirds policy. This important policy framework role is the most scarce resource for rural areas as indicated by the number of coding references and substantiated by economic development specialist. When top tier rural counties in this study gained access to this scarce resource it unlocked investment funds This study found that the policy framework role was performed only by the University System Georgia's research universities who otherwise had no ongoing connection to these rural counties.

Economic development specialist had significant observations regarding the principal roles that postsecondary education institutions are playing in regards to the county's economic development strategies with a lens on entrepreneurship. Although PSE institutions are engaged in workforce development functions through their core mission of delivering educational programs, their contribution to entrepreneurship in these rural counties varies significantly. The responses from interviewees were organized and summarized using this study's conceptual framework of the principal roles of postsecondary education: organizational, intermediary, knowledge, and policy.



**Figure 38: Principal Roles of Postsecondary Education - Matrix query results**



### IV.2.3.1 Organizational

Organizational capacity is centered on the university’s internal organizational structure or readiness. Internal organizational readiness can promote or hamper the university’s opportunities to interact with and transfer knowledge to entrepreneurial

firms. The Small Business Development Corporation was recognized as a valuable resource connected with local colleges to provide tools, training and resources including consulting and delivery of customized training programs. Although economic development experts identify with SBDC as an educational program, the Small Business Development Center is actually a public service and outreach program funded in part by the University System of Georgia and the U.S. Small Business Administration (SBA) to support entrepreneurs and innovators. A small number of the 18 SBDC offices are housed on PSE campuses and although none of the SBDC offices are physically located in rural areas every region of the state is assigned to a SBDC with consultants who have considerable business experience. One economic development specialist remarked:

“I feel like the Small Business Development Center is probably the most underutilized, but most successful resource that businesses throughout this state have available.”

“And so they start a business and they start making money, but they really don't know about business. And they know how to make really good barbecue, but they don't know about bookkeeping, or cash management or staffing, handling employees, inventory management, taxes, sales taxes, a variety of things that go along with running a business. And I believe the USG College Small Business Development Center, they provide a lot of education in that area, very helpful. ”

#### **IV.2.3.2 Intermediary**

The intermediary role of postsecondary education emphasizes collaboration and connections among academia, industry, and the public sector. Universities use a wide range of mechanisms to contribute to regional economic development. Some economic

development specialist referred to extensive efforts to collaborate with postsecondary education institutions to provide mobile training labs, lab equipment, and apprenticeship programs. SBDC was also applauded for its ability to connect small businesses to university resources as described by the case example and comments shared by interviewees.

“So [SBDC] worked with her for a few months ..... on connecting here with the USG College's Food Science Department. She had already developed packaging for her product and was selling it at local markets on the weekends. Very good product. And to get her product into retail stores, she needed to extend the shelf life so it would last longer. So [SBDC] worked with her on a little project on looking for an all-natural additive. So [SBDC] connected her with the local college's Science Department and working on that to get the proper formulation to help extend the life of her product, so she can get it into some of the retail stores. And also she took a food manufacturing and processing class at the college.”

“the local College was awarded a WORC grant. So it was Workforce Opportunities for Rural Communities. And within that grant, were able to hire someone to help be a liaison between industry and local school system. And that person is a partner with economic development.”

“And one of the things that SBDC did was economic development, the local College person, and a local entrepreneur went into the middle school, to work with middle school students, 6/7, and eighth grade on creating businesses. So we did a business plan with middle school students; each middle school student within their STEM classes, created a business. And we also brought in entrepreneurship speakers so they



could hear the success stories from speakers. And next week we along with entrepreneurs within the community are educating our CTAE high school teachers, will be about 12 to 15 teachers, about integrating entrepreneurship opportunities into their classes. So part of what that will entail is I'm giving them a cheat sheet for your student who wants to create their own business. Here is a cheat sheet for them to get started, who they need to talk to, maybe local attorneys. Don't forget to go get a business permit. Have you done a business plan? So a cheat sheet for a young college person to get a business started. Because many of them don't even know where to begin. So educating the educators last year and I have to reference my notes on this one too.”

#### **IV.2.3.3 Knowledge**

The institution's role in knowledge dynamics requires stimulating innovation by identifying new knowledge resources and diffusing new knowledge into a region's business life. One economic development specialist noted their preference for a “suburban setting” college because this led to a greater diversity of educational offerings and support services from the college. The indication was that rural technical colleges have limited their focus to delivery of traditional skills training in areas such as cosmetology, nursing, air conditioning and construction. The “suburban setting” colleges have been able to provide faculty with industry expertise capable of offering higher caliber training programs and the ability to consult with industry partners. This observation was expressed very pointedly in his comments.

“The “suburban setting” college tends to have more industrial maintenance track educational programs and those type things that fit a lot of our industries over here. And they've been very, very aggressive. Actually, right now, we've already gone through

one round of training, where they've come into our plant, and we did some basic refresher courses for some of our technical people. And now they've actually come over and they're doing some shadowing, to try to create, add to the programs we already have, but target some of our needs for the kind of machinery that we run, that we can better we can better train.”

PSE institutions have also been valuable partners in implementing economic development strategies aimed at exposing high school students to postsecondary education and career options including entrepreneurship. For example: Georgia has rigorous CTAE Career Clusters that allow students to take business start up classes. The Business Management & Administration Career Cluster is designed to prepare students for owning and operating a successful business.(Education, 2022) When matched programs that offer scholarship funding such as REACH to students from underserved communities, there is hope that they will return to the community as knowledgeable and engaged professionals after college competition. One economic development specialist described a program of notable value in this area.

“They have more recently engaged themselves with our College and Career Academy, which, of course comes out of the same system of the State Technical College System, and have offered a good bit of dual enrollment opportunities for students at the high school to be able to take classes that they could also transfer into their post-secondary careers via post-secondary education. So they've done a lot of that through our college and career academy.”

#### **IV.2.3.4 Policy**

A PSE institution's role in policy framework is a valuable form of engagement in economic development that allows the institution to identify and collaborate on policies needed for regional innovation. This role is heavily reliant on the institutions research practices and therefore occurs on a much more limited basis. Economic development specialist from rural areas identified only a few examples of PSE institutions that have contributed to policy design by conducting studies that are incorporated into strategic plans or that become the basis for assistance grants. This role in policy framework has been primarily conducted by research universities in the state as described in economic development expert's comments.

"We're also having a master plan done through Carl Vinson Institute of Government at UGA."

"So .... the development authority in partnership with Georgia Tech Enterprise Innovation Institute did an innovation ecosystem assessment with a focus on entrepreneurship and ....., we did a study with the same group, Georgia Tech Enterprise innovation system. A labor market study."

#### ***IV.2.4 Qualitative Analysis Summary***

This mixed method study proposed that postsecondary education influences economic development in rural areas through four principal roles. The four principal roles proposed are: organizational, knowledge, intermediary and policy. Information retrieved through videoconference interviews was analyzed to extract information about the policies, agencies, programs, technology, techniques, and typical practices used by

economic development specialist in three top tier rural Georgia counties. With these principal roles of postsecondary education as the focus of the qualitative analysis, there is ample evidence to support the proposition that postsecondary education does influence economic development and entrepreneurship in rural areas. The vast majority of postsecondary education functions are realized through its organizational role which is directed toward efficiently delivering standardized curriculum and training. The study points to exceptions that have been achieved as a result of assertive county leadership, proximity to "suburban setting" and access to strategic funding resources. These exceptions provide examples of practices that can become models for revitalizing rural economies.

## V DISCUSSION

### V.1 Key Findings & Implications

The purpose of this study is to answer the following research questions:

1. Does postsecondary education influence economic performance through entrepreneurship in rural areas?
2. What contributes to post-secondary education's influence on entrepreneurship in rural areas?

In response to these research questions, I detail key findings and discuss the implications based on the study results.

### V.2 Research Question 1

Does Postsecondary Education influence Economic Performance through entrepreneurship in rural areas?

#### V.2.1 *Finding #1: Mediating effects*

Entrepreneurship in rural areas mediate the relationship between postsecondary education and economic performance through negative constituent component processes. Economic performance, entrepreneurship and postsecondary education are unquestionably related. Deciphering their complex interaction has been a continuing pursuit of scholars. This study advances the understanding of these relationships in a rural context determining that entrepreneurship in rural areas does influence the relationship between postsecondary education and economic performance. The parallel mediation analysis estimated that several postsecondary education variables have positive, significant, indirect relationships with percent change in GDP and non-

entrepreneur employment per capita through entrepreneurial activity. These positive indirect effects result from two negative constituent effects. The rate of growth in GDP and non-entrepreneur employment increased because the growth rate of entrepreneurial breadth decreased as a result of postsecondary town setting, main campus administration, religious governance and religious core principal component.

**IMPLICATIONS:** Economic development specialist shared information regarding policies, agencies, programs, technology, techniques, and practices related to post-secondary education and economic development activities, however, there were relatively fewer PSE resources directed toward entrepreneurship. This is consistent with the regression analysis findings that postsecondary education in rural areas has a positive significant relationship with economic performance as measured by percent changes in GDP per capita and total employment per capita. In the same time period, the relationship was found to be negative and significant between postsecondary education and entrepreneurial breadth. These inverse relationships indicate a decrease in the growth rate of entrepreneurial activity while the growth rate of non-entrepreneur employment increased. Economic development specialist have acknowledged the contribution that postsecondary institutions make to the success of surrounding industry. Preparing a qualified workforce for the existing industry base has been the primary mission of PSE in rural areas. This mission focuses the majority of PSE resources toward the needs of existing firms and the exploitation of sparse resources in rural areas. Unfortunately, this narrowly focused mission may result in stagnation in the organizational capacity role of the PSE and economic performance of the region.

While postsecondary education in rural areas has adopted frameworks that align with its mission of supporting regional industry, there is room for improvement in achieving its mission to improve regional innovation.

### **V.3 Research Question 2**

What contributes to post-secondary education's influence on entrepreneurship in rural areas? The second research question pushes the study's examination of postsecondary forward by asking "What contributes to postsecondary education's influence on entrepreneurship in rural areas? This study applied a conceptual framework for postsecondary education in rural areas based upon geographic context, institutional structure and four principal roles: organizational, knowledge, intermediary and policy. This study used regression analysis to examine the relationship between two constructs of the PSE framework (geographic context and institutional structure) and economic performance including entrepreneurship. Qualitative methods were also used to gain additional insight on geographic context, institutional structure and the four principal PSE functions. The remaining findings summarize the outcomes from the study's examination of the PSE framework to answer research question two.

#### ***V.3.1 Finding #2: Geographic context***

Geographic context is the largest predictor of impact on economic performance. Geographic context refers to the human and physical characteristics of places and environments. Top tier rural counties in this study were found to be situated in environments with physical characteristics rich in natural resources such as lakes, agriculture, and forestry. This research also examined environment from the

perspective of human characteristics such as socioeconomic factors that influence postsecondary education. In the quantitative analysis, geographic context was analyzed by measures for main campus settings: city, suburban, town and rural. The results of regression analysis found that “suburban setting” main campus locales ranked as the top predictor of economic performance as measured by percent change in employment per capita. This outcome was substantiated by findings from the qualitative assessment. Economic development specialist from counties in the top tier shared experiences and results achieved through collaboration with postsecondary education institutions that are in a “suburban setting”. The strategic collaborative efforts exemplified postsecondary education institutions performing intermediary and knowledge roles that have long term strategic value.

**IMPLICATIONS:** The implications of geographic context align with resource based theories which argue that access to resources is an important predictor of economic growth. Geographic context highlights the value of financial and human capital which are important resources for both new and existing firms. The review of research showed that founding of new firms is more common when people have access to financial capital whether it is in the form of liquidity or in the form of raw materials. Likewise, education and experience represent human capital resources that increase firm success. Rural areas have various physical characteristics that are fixed; however the human characteristics can adapt through education, work experience and knowledge dynamics that increase human capital which in turn influences entrepreneurial success. Suburban main campuses inject knowledge variation into rural areas that results in higher levels of human capital.



### **V.3.2 Finding #3: Ecosystem leadership**

Ecosystem leadership is related to entrepreneurship. Collaborative networks, funding sources, educational institutions and policy makers are the pillars of entrepreneurial ecosystems. These entities are interdependent actors who work to create environments supportive of new firms. The relationship between entrepreneurship and leadership of postsecondary education was examined using regression analysis for two predictors: campus administration type and governance control. Governing boards are responsible for oversight, long-term strategic plans, financial planning, and core policies that provide guidelines for an organization's administration. The administration is responsible for management of daily operations in a manner that accomplishes the goals of an organization following guidelines defined by the governing board. Regression analysis found that "main campus" administration type and "not-for-profit private with religious affiliation" governance are related to entrepreneurial breadth, however they have a negative significant effect. This study does not conclude that the negative or inverse nature of this relationship means that the number of self-employed has decreased. However, this relationship likely suggest that total employment grows at a faster rate than self-employment. This is consistent with experiences shared by top tier economic development specialist who emphasized leadership initiatives and investments in educational programs that support expansion of existing businesses at a much more significant level than entrepreneurship.

Leadership is critical to each of the four principal PSE roles: organizational, knowledge, intermediary and policy. This study also examined the nature of leadership and collaboration across the ecosystem of top tier counties through

qualitative methods. Economic development specialist described collaboration between governmental and PSE leaders that resulted in construction of educational facilities that expanded postsecondary education's organizational role. PSE collaborated with business leaders to develop educational programs that leveraged their knowledge role. By collaborating with industry leaders, PSE served in an intermediary role to connect students with needed laboratory equipment and career exposure. Rural leaders also leveraged postsecondary education research developed in its policy role to secure valuable funding for redevelopment of historic downtown districts.

**IMPLICATIONS:** Resource based theories are once again brought to the forefront by the benefits of engaged and effective leadership. Postsecondary education can provide resources that infuse human and financial capital into rural counties when the leaders are aligned on economic development goals. Engaged leaders have social networks with ties that provide information, resources or reputational credibility. Top tier counties described business, governmental and postsecondary education leaders who collaborate to strategically deploy resources for educational programs, industry expansion and grant funding that supports entrepreneurship initiatives.

### ***V.3.3 Finding #4: Educational and degree offerings***

"Educational offering" and "Highest degree offered" standing alone do not have significant influence on entrepreneurship. Postsecondary educational institutions provide society with education, research and broader engagement in regional development. An interesting finding from regression analysis in this study is that standing alone neither educational offering nor highest degree offered are related to entrepreneurship or economic performance in rural areas. This leads us to consider

what combination of the 16 PSE institutional structure measures does have a significant relationship with entrepreneurship or economic performance in rural areas. Exploratory factor analysis allowed us to derive five combinations or principal components of institutional structure. Religious core which is one of the five combinations was found to have a significant negative relationship with entrepreneurial activity as measured by entrepreneurial breadth. Religious core is composed of variable that are a measure of “academic” educational offering, “main campus” administration type, “not-for-profit private with religious affiliation” governance in addition to “Bachelors” and “Masters” degree offerings. Because the relationship between religious and entrepreneurial breadth is significant and negative, it suggest that influence causes total employment to grow at a faster rate than entrepreneurship.

**IMPLICATIONS:** The mere presence of a postsecondary education institution is not sufficient to influence entrepreneurship in a positive manner. A mismatch of educational offerings, degree levels, programs of study and economic drivers ultimately results in wasted resources. These findings suggest that the addition of governance and administration who are engaged appropriately with business and governmental leaders introduces decision makers who can develop strategic plans and garner resources for a winning combination of educational programs and services leading to positive economic outcomes. This consideration also highlights resource-based value theories which are established on an understanding of the firm’s needs. Resources have no value if they are not needed by the firm. In rural areas, PSE institutions are of no value if they do not provide resources that are needed.

### **V.3.4 Other findings**

The geographic context, institutional structure and principal roles of postsecondary education are not related to concentration of high wealth entrepreneurs or personal income in rural counties. This finding adds to the varying research outcomes that have been observed in recent years from studies analyzing the effect of postsecondary education on regional income. Although educational attainment is consistently found to have a major influence on individual earnings and wealth, studies on postsecondary education characteristics have had varying results. Other regional characteristics such as industry mix, population changes, macro-regional location and macroeconomic factors tend to be more influential determinants of earnings and wealth.

### **V.4 Limitations & Future Research**

This research presents many relevant findings and implications, regarding the influence of postsecondary education on entrepreneurship and economic performance in rural areas. With the contributions made by economic development specialist from top tier counties in Georgia, this study was able to provide insight into different growth strategies that are being pursued by rural communities.

There are opportunities for future study in the area of geographic context, leadership and microeconomics.

**Geographic context:** This study is established soundly on theory and accepted conceptual models while being situated for contribution to practice. Like all research, there are limitations in generalization based on geography, time period and sample limitations. This study is limited by the geographic footprint which consisted of only rural counties in the state of Georgia. While this limited geographic area likely moderated for market, institutional and policy factors, it simultaneously added validity by reducing possible geography related variables

that influence economic activity. Recommendations for future study include analyzing the relationships between postsecondary education, entrepreneurship and economic performance over a broader geographic context..

**Leadership:** Entrepreneurship strategies in rural counties are primarily service-industry focused with ambitions of leveraging natural resources and transportation corridors to attract sporting events, vacationers and retirees. Entrepreneurial support initiatives have attempted to offset financial burdens with tax incentives or grants; guide new start-ups through local regulatory requirements; support acquisition of local resources; and provide training for development of business management skills. Postsecondary education institutions and outreach programs like Small Business Development Centers are well equipped to fulfill this organizational role. Recommendations for future study include analyzing how the organizational role of postsecondary education institutions effects the level of resources and time commitments of rural economic development specialist.

There is a growing need for high-growth entrepreneurial strategies in rural areas to create and sustain a level of innovation that creates long term wealth. This will require that postsecondary education institutions develop the ability to serve in intermediary, knowledge, and policy roles. A future study could examine how PSE leaders serve in intermediary roles to bridge network ties to social, business, and strategic resources beyond the academic community.

The study was limited in not being able to “control for” postsecondary education policies specific to the state of Georgia. Regulation and oversight of postsecondary institutions varies among state governmental bodies. Governance

of a significant portion of Georgia's postsecondary education system rest with the University System of Georgia (USG)USG Board of Regents and the State Board of the Technical College System of Georgia. In 2011, USG Board of Regents began a consolidation process with the objective of "ensuring the System has a 21st century structure with the right network of institutions offering the proper range of degrees." From 2011 thru 2017, the number of colleges and universities decreased from 35 to 26 colleges and universities. The number of campuses was not affected however 9 local trustee boards and 9 administrations were eliminated. Likewise in 2008, TCSG began a process of administrative mergers with the objective "to create greater operational efficiencies that will assure that the service level that the TCSG provides to our students can remain strong on every campus." From 2008 – 2011, the number of technical colleges decreased from 29 to 22. The number of campuses was not affected however 7 governing boards and 7 administrations were eliminated. In light of findings from this study, future research can shed light on how rural communities respond to changes in postsecondary education governance and administration that impact access to resources.

### **Macroeconomics**

This study is limited by the research period which used economic data from the time period ranging from 2010 – 2017. Macroeconomic factors related to the time period ranging from 2010 – 2017 may be influenced by the Great Recession. Although this timeframe was selected based on available data to minimize exposure to the extreme recessionary pressures, it is generally

acknowledged that the recession and recovery period spanned from 2007-2011. A future study could use a comparative analysis to explore whether areas with “Religious Core” institutions responded more favorably following recessionary periods.

### **In-depth analysis of study variables**

- This study derived a principle component “Religious Core” that is loaded with “main campus” administration type and “religious governance”. Future study could explore the dimensions of this variable and explore additional relationships between “religious governance” and economic performance variables.
- This study identified a relationship between “suburban setting” campus locale and employment change. Future study could examine the socioeconomic nature of the relationship between “suburban setting” main campus and percent change in employment.
- This study found inverse relationships between Entrepreneurial Breadth and economic performance as measured by GDP and non-entrepreneur employment. Future studies should examine the dynamics of this negative significant relationship.

## **V.5 Contributions**

The introduction for this study established that many rural areas in the United States are characterized by high levels of poverty, low education levels, and insufficient

infrastructure that generally leads to underperformance as compared to economies in metropolitan areas. Historically rural economies relied on low cost land and labor however this strategy is no longer practical. Innovative, entrepreneurial solutions are now being pursued to create opportunities for prosperity. Believed to require low investment cost and produce high job creation potential, rural entrepreneurship has gained prominence as a local economic development strategy. This study contributes to knowledge of postsecondary education's influence on economic performance and entrepreneurial activity in rural areas.

### ***V.5.1 Contributions to Theory***

This study rest in the academic realm of resource based value theories. A conceptual model is used to affirm that postsecondary education produces financial, human and social capital that can be exploited by entrepreneurs in a rural context to for new ventures.

### ***V.5.2 Contributions to Practice***

This study contributes to practice in the context of economic development professionals, postsecondary education leadership and entrepreneurship ecosystem builders.

#### **V.5.2.1 Economic Development Specialist**

This study encourages economic development specialist to consider postsecondary education institutions as a viable partner for progressing initiatives and programs that support entrepreneurial activity. Insight is gained into geographic context, structure, and principal roles that influence the alignment of postsecondary education offerings and outreach services with entrepreneurship and economic development strategies. Insight is also provided into what economic performance metrics will respond to investments in postsecondary education and entrepreneurship: employment and GDP



### **V.5.2.2 Postsecondary Education Leaders**

Postsecondary education leaders want to know that their educational offerings, programs and outreach services are having an impact. This study provides insight into how PSE structure and principal roles add value. It also may orient PSE leaders to engage more effectively with county leaders to make better decisions about resource allocations regarding PSE structure and principal roles.

### **V.5.2.3 Entrepreneurial Ecosystem Builders**

This study provides insight that can help entrepreneurial ecosystem builders understand the postsecondary education roles that add value as a partner in promoting entrepreneurship in rural areas.

## VI CONCLUSION

Almost nineteen (19) percent of the United States population lives in rural areas with major barriers to economic prosperity. State and local investments are being made in an attempt to revitalize rural communities. This study sought to examine the role that post-secondary education institutions can play in entrepreneurship and economic growth by undertaking two research questions: Does postsecondary education influence economic performance through entrepreneurship in rural areas? What contributes to post-secondary education's influence on entrepreneurship in rural areas? This research used a mixed method, empirical study with data on 85 rural Georgia counties and interviews of eight economic development specialist representing the study's top tier of rural counties. The data was analyzed using quantitative methods and supplemented with insights gained from content analysis of the interviews. The results indicate that postsecondary education influences economic development and entrepreneurship. The postsecondary education institute's structure, geographic context and principal roles determine the extent of the impact.

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## APPENDIX

A. **Table 29: Literature Review Process**

Research Step	Description	Results
1	Review relevant literature previously acquired to generate a comprehensive list of "potential search" terms customized to my topic.	19 terms
	Collapsed list of "potential search" terms to eliminate redundancy and identify the thesauri terms from database research.	7 key terms
	<p style="text-align: center;"><b>PRIMARY SEARCH TERMS</b></p> 4. Entrepren* OR New business* OR Self-employment 5. University OR College OR Higher Education* 6. Rural*	
2	Searched 3 scholarly business databases using primary search terms and combinations of primary search terms.	
3	Electronic screening within each of the databases based on the following filters and search limiters: Scholarly (Peer Reviewed) Journals, Published Date:, Publication Type: Academic Journals only, Location: United States and Language: English (only) Database search steps expanded in Appendix	See Results in Appendix
4	Collapsed list of findings from scholarly business database searches by screening to remove duplicates	
5	Manually reviewed findings from scholarly business database searches by reading abstracts for relevance	
6	Manually reviewed text and references of relevant studies to identify foundational studies and systematic literature studies on entrepreneurship theories, entrepreneurial ecosystems and university/higher education institution.	

B. Table 30: Literature Review Process expanded steps

Research Step 3 expanded	Resource Used (database, search engine)	Years Searched	Search Terms or Strategies Used (note Limits, MeSH, etc.)	Boolean with appropriate database syntax	# of Results
2/26/2021	Business Source Complete	Published Date: 20110101-20210131	<b>Entrepreneurship OR New business enterprise OR Self-employment</b> Limiters: Scholarly (Peer Reviewed) Journals XPublished Date: XPublication Type: Academic Journal XLanguage: English	DE "ENTREPRENEURSHIP" OR DE "NEW business enterprises" OR DE "SELF-employment"	12,586 RESULTS
8/31/2021	Business Source Complete	Published Date: 20110101-20210131	<b>Entrepreneurship OR New business enterprise OR Self-employment</b> Limiters XScholarly (Peer Reviewed) Journals XPublished Date: 20110101-20210131 XPublication Type: Academic Journal XLanguage: English XGeography United states	DE "ENTREPRENEURSHIP" OR DE "NEW business enterprises" OR DE "SELF-employment"	284



Research Step 3 expanded	Resource Used (database, search engine)	Years Searched	Search Terms or Strategies Used (note Limits, MeSH, etc.)	Boolean with appropriate database syntax	# of Results
04/14/2021	Business Source Complete	Published Date: 20110101-20211231	<b>Rural</b> Limiters: Scholarly (Peer Reviewed) Journals;; Document Type: Article; Publication Type: Academic Journal Language: English Geographic: - united states	TX Rural	2,380 RESULTS
2/26/2021	Business Source Complete	Published Date: 20110101-20210131	<b>Universities &amp; colleges</b> Limiters: Scholarly (Peer Reviewed) Journals XPublished Date: XPublication Type: Academic Journal XLanguage: English	DE "UNIVERSITIES & colleges" OR DE "BUSINESS schools" OR DE "CORPORATE universities"	5,381 results
08/31/2021		XPublished Date: 20110101-20210131	<b>Universities &amp; colleges</b> Limiters: XScholarly (Peer Reviewed) Journals XPublication Type: Academic Journal XLanguage: English XGeography United states	DE "UNIVERSITIES & colleges" OR DE "BUSINESS schools" OR DE "CORPORATE universities"	202 RESULTS

Research Step 3 expanded	Resource Used (database, search engine)	Years Searched	Search Terms or Strategies Used (note Limits, MeSH, etc.)	Boolean with appropriate database syntax Search link	# of Hits/Results
08/31/2021	Business Source Complete	XPublished Date: 20110101-20210131	<b>Entrepreneurship OR New business enterprise OR Self-employment AND Universities &amp; colleges</b> Limiters XScholarly (Peer Reviewed) Journals XPublication Type: Academic Journal XLanguage: English Source Types XAcademic Journals Geography Xunited states	(DE "ENTREPRENEURSHIP" OR DE "NEW business enterprises" OR DE "SELF-employment") AND (DE "UNIVERSITIES & colleges" OR DE "BUSINESS schools" OR DE "CORPORATE universities")	6 results
08/31/2021	Business Source Complete	XPublished Date: 20110101-20210131	<b>Entrepreneurship OR New business enterprise OR Self-employment AND Universities &amp; colleges AND rural</b> Limiters XScholarly (Peer Reviewed) Journals XPublication Type: Academic Journal XLanguage: English	(( DE "ENTREPRENEURSHIP" OR DE "NEW business enterprises" OR DE "SELF-employment") AND (DE "UNIVERSITIES & colleges" OR DE "BUSINESS schools" OR DE "CORPORATE universities") ) AND rural	5 Results

Research Step 3 expanded	Resource Used (database, search engine)	Years Searched	Search Terms or Strategies Used (note Limits, MeSH, etc.)	Boolean with appropriate database syntax Search link	# of Hits/Results
3/30/2021	ABI/INFORM Collection	Published Date: 2011-01-01-2021-03-26	<b>Rural</b> Limiters: Scholarly (Peer Reviewed) Journals Anywhere except full text XPublished Date: XPublication Type: Scholarly Peer Reviewed Xlocation: United States XLanguage: English	<a href="https://search.proquest.com/search/1922164?accountid=11226">https://search.proquest.com/search/1922164?accountid=11226</a> noft(Rural) AND stype.exact("Scholarly Journals") AND at.exact("Article") AND la.exact("English") AND loc.exact("United States US") AND PEER(yes) Additional limits - Source type: Scholarly Journals; Document type: Article; Language: English	2,369 results
3/30/2021	ABI/INFORM Collection	Published Date: 2011-01-01-2021-03-26	<b>Rural AND Higher Education</b> Limiters: Scholarly (Peer Reviewed) Journals XPublished Date: XPublication Type: Academic Journal XLanguage: English	<a href="https://search.proquest.com/search/1922174?accountid=11226">https://search.proquest.com/search/1922174?accountid=11226</a> noft(Rural) AND stype.exact("Scholarly Journals") AND at.exact("Article") AND la.exact("English") AND (loc.exact("United States US") AND PEER(yes)) AND noft(Higher Education) Additional limits - Source type: Scholarly Journals; Document type: Article; Language: English	923 results
3/30/2021	ABI/INFORM Collection	Published Date: 2011-01-01-2021-03-26	<b>Rural AND Higher Education AND Entrepreneurship</b> Limiters: Scholarly (Peer Reviewed) Journals XPublished Date: XPublication Type: Academic Journal XLanguage: English	<a href="https://search.proquest.com/search/1922140?accountid=11226">https://search.proquest.com/search/1922140?accountid=11226</a> noft(Rural) AND stype.exact("Scholarly Journals") AND at.exact("Article") AND la.exact("English") AND (loc.exact("United States US") AND PEER(yes)) AND noft(Higher Education) AND noft(Entrepreneur*) Additional limits - Source type: Scholarly Journals; Document type: Article; Language: English	17 results

Research Step 3 expanded	Resource Used (database , search engine)	Years Searched	Search Terms or Strategies Used (note Limits, MeSH, etc.)	Boolean with appropriate database syntax Search link	# of Hits/Results
4/12/2021	Web of Science	Published Date: 2011-01-01-2021-04-12	You searched for: TOPIC: (rural) Refined by: DOCUMENT TYPES: ( ARTICLE ) AND COUNTRIES/REGIONS: ( USA ) AND LANGUAGES: ( ENGLISH ) AND Timespan: 2011-2021		38,882results
4/16/2021	Web of Science	Published Date: 2011-01-01-2021-04-16	You searched for: TOPIC: (Entrepreneur*) Refined by: DOCUMENT TYPES: ( ARTICLE ) AND COUNTRIES/REGIONS: ( USA ) AND LANGUAGES: ( ENGLISH )		9,928 results
4/12/2021	Web of Science	Published Date: 2011-01-01-2021-04-12	You searched for: TOPIC: (rural) AND TOPIC: (Higher Education) AND DOCUMENT TYPES: ( ARTICLE ) AND COUNTRIES/REGIONS: ( USA ) AND LANGUAGES: ( ENGLISH ) Timespan: 2011-2021		2,713 results
4/12/2021	Web of Science	Published Date: 2011-01-01-2021-04-12	You searched for: TOPIC: (rural) AND TOPIC: (Higher Education) AND TOPIC: (Entrepreneur*) Refined by: DOCUMENT TYPES: ( ARTICLE ) AND COUNTRIES/REGIONS: ( USA ) AND LANGUAGES: ( ENGLISH ) Timespan: 2011-2021		18 results
4/16/2021	Web of Science	Published Date: 2011-01-01-2021-04-16	You searched for: TOPIC: (Entrepreneur*) AND TOPIC: (resource*) AND TOPIC: (Higher Education) Refined by: DOCUMENT TYPES: ( ARTICLE ) AND COUNTRIES/REGIONS: ( USA ) AND LANGUAGES: ( ENGLISH )		58 results
4/12/2021	Web of Science	Published Date: 2011-01-01-2021-04-16	TOPIC: (Entrepreneur*) AND TOPIC: (resource*) AND TOPIC: (rural) AND COUNTRIES/REGIONS: ( USA ) AND DOCUMENT TYPES: ( ARTICLE ) AND LANGUAGES: ( ENGLISH ) AND DOCUMENT TYPES: ( ARTICLE )		59 results

## C Table 31: Research Design

Research Design for "Entrepreneurship in rural areas: Examining the influence of post-secondary education"

Component	Specification
Journal (J)	<b>Entrepreneurship Theory and Practice (ETP)</b> is a leading scholarly journal whose mission is to publish original conceptual and empirical research that contributes to the advancement of entrepreneurship.
Title (T)	<b>"Entrepreneurship in rural areas: Examining the influence of postsecondary education"</b>
Problem Setting (P)	Rural areas are generally disadvantaged in economic growth strategies because of limited workforce, low education levels, and insufficient infrastructure. Entrepreneurship is recognized for job creation and economic development. Economic development professionals often look to postsecondary education for resources.
Area of Concern (A)	The area of concern for this study is postsecondary education's role in entrepreneurship and economic development in rural areas.
Conceptual Framing (F)	Resource based theory of the firm (Birger Wernerfelt, 1984) Resource-based theories of entrepreneurship argue that access to resources by founders is an important predictor of opportunity-based entrepreneurship and new venture growth (Alvarez & Busenitz, 2001)
Research Method (M)	A mixed method, empirical study was conducted. A quantitative study using descriptive statistics and regression analysis was conducted to examine relationships between post secondary education variables, entrepreneurial activity and economic performance. A qualitative review of economic development and entrepreneurship initiatives was conducted using interviews to examine the interaction among economic development, entrepreneurship and postsecondary education. Eighty-five rural counties in were the focus of this study analysis.
Research Question (RQ)	Does post-secondary education influence economic performance through entrepreneurship in rural areas? What contributes to post-secondary education's influence on entrepreneurship in rural areas?
Contribution (C)	C(F) Findings of this research illustrate resource-based theories of entrepreneurship in a rural context. C(A) Results of this study may equip economic development professionals with information to collaborate with postsecondary education institutions to strengthen rural entrepreneurial ecosystems

Table 2 in Mathiassen (2017)

**D Table 32 Acknowledgement of Informed Consent**



**Georgia State University**

**Acknowledgement of Informed Consent**

**Title: Examining the influence of post-secondary education on entrepreneurship in rural communities.**

Principal Investigator: Dr. Danny Bellenger

**Student Principal Investigator: Cathy P. Hill**

**Introduction and Key Information**

You are invited to take part in a research study. It is up to you to decide if you would like to take part in the study. The purpose of this study is to expand knowledge of the relationship between postsecondary education and entrepreneurship in a rural context. Policies promoting entrepreneurship are gaining popularity as a method for boosting rural economic development, however little is known about the extent of post-secondary education's impact on entrepreneurial activity in rural areas. This study undertakes the research questions "What is the influence of post-secondary education frameworks on economic performance through entrepreneurship and what contributes to the post-secondary education framework's influence on entrepreneurship in rural areas?"

Your role in the study will require approximately 45 minutes over one interview session. You will be asked to do the following: Provide information on policies, agencies, programs, technology, techniques, or best practices related to post-secondary education and entrepreneurial activities. Participating in this study will not expose you to any more risks than you would experience in a typical day. Overall, we hope to gain information about the influence of postsecondary education institutions on entrepreneurial activity in a rural context.

**Purpose**

The purpose of the study is to expand knowledge of the relationship between postsecondary education and entrepreneurship in a rural context. Policies promoting entrepreneurship are gaining popularity as a method for boosting rural economic development, however little is known about the extent of post-secondary education's impact on entrepreneurial activity in rural areas. This study undertakes the research questions "What is the influence of post-secondary education frameworks on economic performance through entrepreneurship and what contributes to the post-secondary education framework's influence on entrepreneurship in rural areas?" You are invited to take part in

this research study because you are an economic development specialist in a county with successful entrepreneurial activity. A total of nine people will be invited to take part in this study.

### **Procedures**

If you decide to take part, you will participate in a one-on-one in-person interview at your place of business or an agreed upon private setting following CDC COVID-19 protocols. Teleconference or virtual interviews may be conducted for your safety and convenience. Interviews will last approximately 45 minutes. You will be asked to answer four questions that provide information on policies, agencies, programs, technology, techniques, or best practices related to post-secondary education and entrepreneurial activities. Interviews will be recorded. Information from interviews will be transcribed and documented in a manner such that the identity of interviewees cannot readily be ascertained.

### **Future Research**

Researchers will remove information that may identify you and may use your data for future research. If we do this, we will not ask for any additional consent from you.

### **Risks**

In this study, you will not have any more risks than you would in a normal day of life. No injury is expected from this study, but if you believe you have been harmed, contact the research team as soon as possible. Georgia State University and the research team have not set aside funds to compensate for any injury.

### **Benefits**

This study is not designed to benefit you personally. Overall, we hope to gain information about the relationship between postsecondary education and entrepreneurship in a rural context

### **Alternatives**

The alternative to taking part in this study is to not take part in the study.

### **Voluntary Participation and Withdrawal**

You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may skip questions or stop participating at any time. You may refuse to take part in the study or stop at any time. This will not cause you to lose any benefits to which you are otherwise entitled.

### **Confidentiality**

We will keep your records private to the extent allowed by law. The following people and entities will have access to the information you provide:

- Dr. Danny Bellenger, Principal Investigator
- Cathy P. Hill, Student Principal Investigator
- GSU Institutional Review Board
- Office for Human Research Protection (OHRP)

Participant codes will be used to label data instead of using your name on study records. The information you provide will be stored in encrypted, password protected electronic files on Georgia State OneDrive. A separate code-to-name registry will be maintained for three years in a password-protected and encrypted file on Georgia State OneDrive. When we present or publish the results of this study, we will not use your name or other information that may identify you.

Interview recordings will be transcribed and stored for three years in password-protected and encrypted electronic files on Georgia State OneDrive. Data sent over the Internet will be protected with encryption and transmitted over secured networks, however you should be aware that internet transmission may not be secure. No IP addresses will be collected for this research.

#### Contact Information

Contact Dr. Danny Bellenger at 404-401-2424 and [dbellenger@gsu.edu](mailto:dbellenger@gsu.edu) OR Cathy Hill at 912-508-5203 and [chill7@student.gsu.edu](mailto:chill7@student.gsu.edu):

- If you have questions about the study or your part in it
- If you have questions, concerns, or complaints about the study
- If you think you have been harmed by the study

The IRB at Georgia State University reviews all research that involves human participants. You can contact the IRB if you would like to speak to someone who is not involved directly with the study. You can contact the IRB for questions, concerns, problems, information, input, or questions about your rights as a research participant. Contact the IRB at 404-413-3500 or [irb@gsu.edu](mailto:irb@gsu.edu).

#### Consent

We will give you a copy of this consent form to keep.

If you are willing to volunteer for this research, please sign below.

\_\_\_\_\_  
Printed Name of Participant

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

**Cathy Plummer Hill**  
Principal Investigator or Researcher Obtaining Consent

**2/15/2022**

Date



## VITAE

Cathy P. Hill is Founder and President of The Plummer – Hill Group, LLC providing professional services that include business development and strategic planning. In this capacity she led development of a partnership between Georgia Chamber of Commerce, University System of Georgia, the Technical College System of Georgia and Georgia Department of Education to produce Georgia InVenture Prize, an innovation competition that showcased the state's pipeline of college and university innovators in 2019. Cathy is also a Managing Director with Golden Seeds, Inc. a discerning network of investors who are seeking and funding high-potential, women-led start-ups.

Cathy retired from Georgia Power after 33 years having risen to executive ranks. As Georgia Power's Land vice president, Cathy led efforts to acquire, protect and manage the company's real estate assets that included 85,000 acres of land, 60,000 acres of water, 4,000 leased lake front properties and six full-service campgrounds. She also served as vice president of Coastal Region 2008-2016 where she provided overall leadership for engineering, construction, sales, customer service, economic development, governmental relations, community development and emergency response in coastal Georgia.

Cathy was born in 1961 and was reared in Dublin, Georgia. After graduating from Dublin High School, she received a bachelor's degree in Electrical Engineering from Georgia Tech and a Master of Business Administration degree from Georgia State University. She completed the executive management program at Harvard University.

As a 2010 fellow of the International Women's Forum, she studied at the prestigious Judge School of Business at Cambridge University. Cathy is a graduate of Leadership Georgia, the Regional Leadership Institute and Leadership Atlanta.

Cathy currently serves on the National Science Foundation's SBIR/STTR Subcommittee to the Engineering Advisory Committee, Executive Committee of the Georgia Tech Alumni Association, as Financial Secretary for Savannah State University Foundation and as a Director for Georgia's WIN List. She proudly serves on the board of Carver State Bank which is one of only 19 Black -owned commercial banks in the United States. She has served in governance roles of many prestigious education, healthcare, business and civic organizations including Georgia Natural Resources Foundation, Armstrong State University, United Way of the Coastal Empire, numerous chambers of commerce and Savannah – Chatham County Economic Development Authority.

Cathy has been recognized with public resolutions from Governor Nathan Deal in 2017 and the state of Georgia's House and Senate in 2009 commending her professional and civic work. She has been honored for professional and community achievements by many community organizations including United Way "Woman of the Year", Girl Scouts "Woman of Distinction" and American Red Cross "Hero".

Cathy is a silver star member of Alpha Kappa Alpha Sorority, Inc and a life member of the NAACP. She is an active member of Wesley United Methodist Church. She resides in McDonough, Georgia with her husband Mitchell and children: Mitchell, Jr. and Candace.