



UNIVERSITY OF  
LIVERPOOL

**RETHINKING UNIVERSITY SUPPLY CHAIN MANAGEMENT  
PROGRAMS FOR ECONOMIC DEVELOPMENT: AN ACTION  
RESEARCH APPROACH**

Thesis submitted in accordance with the requirements of the University of Liverpool for the  
degree of Doctor of Business Administration

By

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# ABSTRACT

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Universities historically have been regarded as economic drivers in their local communities, and their potential influence on the broader regional economy is a growing area of interest. Yet, institutions are lagging in strategically managing their role in economic development while depending on business, government, and university leaders to improve the fiscal position of the locals. Rigid societal norms in academia permeate power differences amongst faculty that complicate mid-level leaders' abilities to make strategic decisions for broader regional impact. This thesis unfolds a scholar-practitioner journey of a mid-level faculty leader at a small-town regional institution that grappled with finding a voice among more tenured faculty while trying to make a difference in the community (Weick, 1995; Rouleau, 2005; Luscher and Lewis, 2008). Hence, by integrating interlevel dynamics and scholastic methods, this mixed-methods action research (MMAR) thesis contributed to organizational learning of programmatic coordination to refocus the business school agenda to pitch in towards greater economic recovery efforts. The local financial crisis caused a sense of urgency to eschew pre-processed university models to play a role in economic revitalization, which justifies the importance of this research. Hence, this thesis set out to pragmatically identify regional development needs and understand the Texarkana workforce to create a flexible university model and rethink educational offerings to address the region's unique needs. This study documents living amid knowledge transfer, economic development, and action research theories to initiate a pragmatic response by creating an innovative economic university model malleable to the needs of the local ecosystem (Argyris, 1993; Gibbons et al., 1994; Coghlan, 2003; Buchanan and Bryman, 2007; Karpov, 2017). Additionally, this thesis provides a step-by-step framework for university leaders to refocus agendas towards economic growth.

One action research cycle in this thesis encompassed phases of construction, planning, action, and evaluation. The themes and actionable knowledge that emerged from the first and second phases guided the third, which initiated the change process. This MMAR study determined key issues in the region from quantitative and qualitative data to cross-validate multiple sources of evidence to identify the critical issues needing to be addressed with supply chain management programs and services. The planning of action, which occurred during phase three, drove immediate results in focusing the supply chain management departmental agenda on managing economic crises. Thus, how my department, institution, and society respond to economic needs

achieved impact by bringing forth a university economic development model that is flexible to changing economic landscapes. Equally important, this research developed a framework for university leaders aligning local business, civic, and governmental initiatives to play a role in economic growth. The implication of not reconstructing higher education in this way is that both the university and region will be ill-equipped during a financial crisis.

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# GLOSSARY OF TERMS

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AR- Action Research

AR-TX REDI-a regional economic development corporation

BR&E- Business Retention and Expansion

CBET- College of Business Engineering and Technology

Chamber- Texarkana Chamber of Commerce

DBA- Doctorate of Business Administration

EDC- Economic development council

FRED- Federal Reserve of Economic Data

IPED-Integrated Postsecondary Education System

SCM – Supply Chain Management

TAMUT- Texas A&M University- Texarkana



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# CHAPTER 1: INTRODUCTION

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## 1.1 RESEARCH INTRODUCTION

This mixed-methods action research (MMAR) study concentrates on how a mid-level leader at a small-town regional university refocused the Supply Chain Management (SCM) departmental programs and services to play a role in revitalizing an economy in crisis. Thus, this mechanistic-oriented action research focuses on driving departmental changes through an action research cycle that includes members of the regional ecosystem (Argyris, 1947; Coghlan, 2003). Hence, this thesis unfolds how the intersection of community economic development and higher education unite business, government, and university leaders to map the local economic terrain through the sensemaking and sensegiving progression (Elliott, 1991; Coghlan and Brannick, 2001; Coghlan, 2003; Greenwood and Levin, 2007; Kemmis and McTaggart, 2007). This research builds on Degan's (2014) argument that workforce training led by universities critically supports business competitiveness and economic growth. Equally important, this study denotes how faculty members reorient their roles and organizational identities through reflective moments of inquiry during the change process (Weick, 1993; Mills, 2011). This thesis did not aspire to single handily solve economic phenomena or workforce issues. Instead, this study aligned departmental and organizational missions to local economic needs through the action research process so that my SCM department at Texas A&M University-Texarkana (TAMUT) could develop strategies to contribute to local economic growth.

As a small yet growing institution with 2100 students, TAMUT focuses on tailoring its academic programs to support the community initiative of rebuilding a stagnated economy and encourage regional development. This scholarly-practitioner study integrated theory and actions to adapt supply chain management programs, the university model that we follow as a department, worksite training programs, micro-credential certificate offerings, and internships for local laborers to be educationally equipped for the needs of local businesses. These goals reflect line items 3.C and 4.B of the College of Business, Engineering and Technology's 2018 Strategic Plan, which are to "Focus on academic programs needed by the region" and "Engage and partner with local business groups" (Texas A&M University-Texarkana, 2018). This research further connects more considerable regional economic development efforts led by the Economic Development Council (EDC) of the Texarkana Chamber of Commerce. Through my appointed leadership role as the Supply Chain Management Program Coordinator, a mid-level leadership position at TAMUT, and as a task force member on the Economic Development Council, I work

alongside government and university leaders with a mutual plan to rebuild a stressed economy. This positionality uniquely places me within an insider action research role as a faculty member and mid-management leader at TAMUT and community leader of the EDC at the Texarkana Chamber of Commerce to formulate and implement supply chain management programs that are customary to local needs. Engaging with community business leaders on educational deficiencies and strengths, I play a role in driving positive change in my department, align its mission on economic development, and adapts educational programs to be an integral component of regional growth.

One implication of not reconstructing university programs on local economic growth is that both the university and region will be ill-equipped during a financial crisis. Secondly, the lack of alignment between the university and local businesses, government, and community needs will not generate knowledge transfer prescriptive to regional business models and community initiatives. Companies will struggle to stay competitive without fortified workers with the educational resources to help businesses evolve. Another consequence of not aligning educational programs to the local economy's needs is for the university to fall short in meeting its 2018 strategic plan, promising legislators to “develop and expand degree certificate programs guided by the unique environment and needs” (Texas A&M University-Texarkana, 2018, p.3). Failing to meet legislative guidelines will consequently lessen funding and support. Educational programming helps economic development through enhancing literacy skills, boosting productivity, improve financial performance, increased earnings potential, and competitive advantage. Moreover, being proactive in presenting opportunities to advance current technologies through education encourages new business recruitment, improves the standard of living, provides innovations, enhances R&D, and reduces costs of production. Figure 1 below diagrams how this thesis progresses economic development within the scope of educational programming.

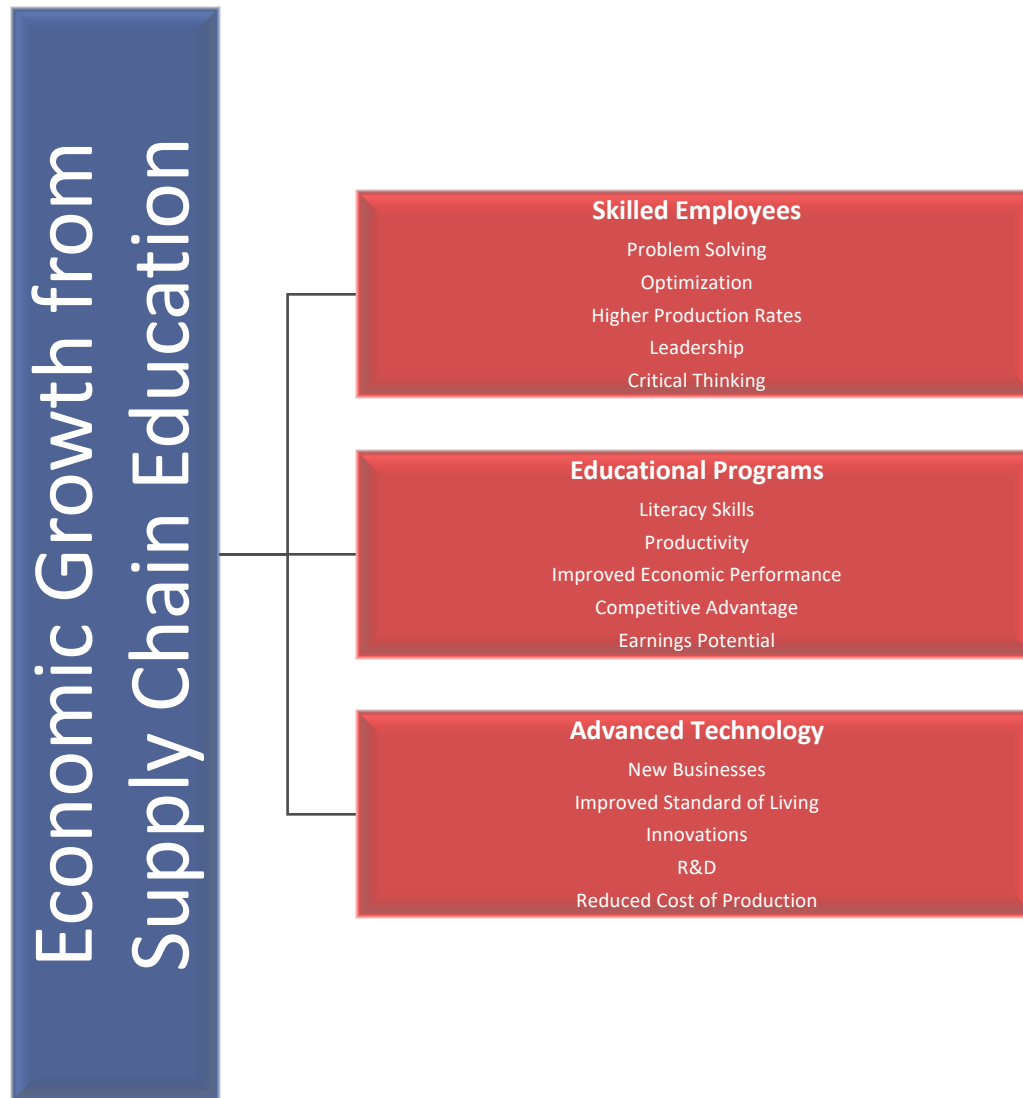


Figure 1: Economic Growth from Business Education *Source: Lane and Johnstone (2012)*

Diagnosing what ails the workforce to spur economic development requires an action research plan that addresses the Texarkana region's educational strengths and deficits through the eyes of regional members. My proximity to the stakeholders, community, and workforce makes it easier to understand the workforce's concerns regarding SCM. Figure 2 below illustrates my role duality within this thesis.

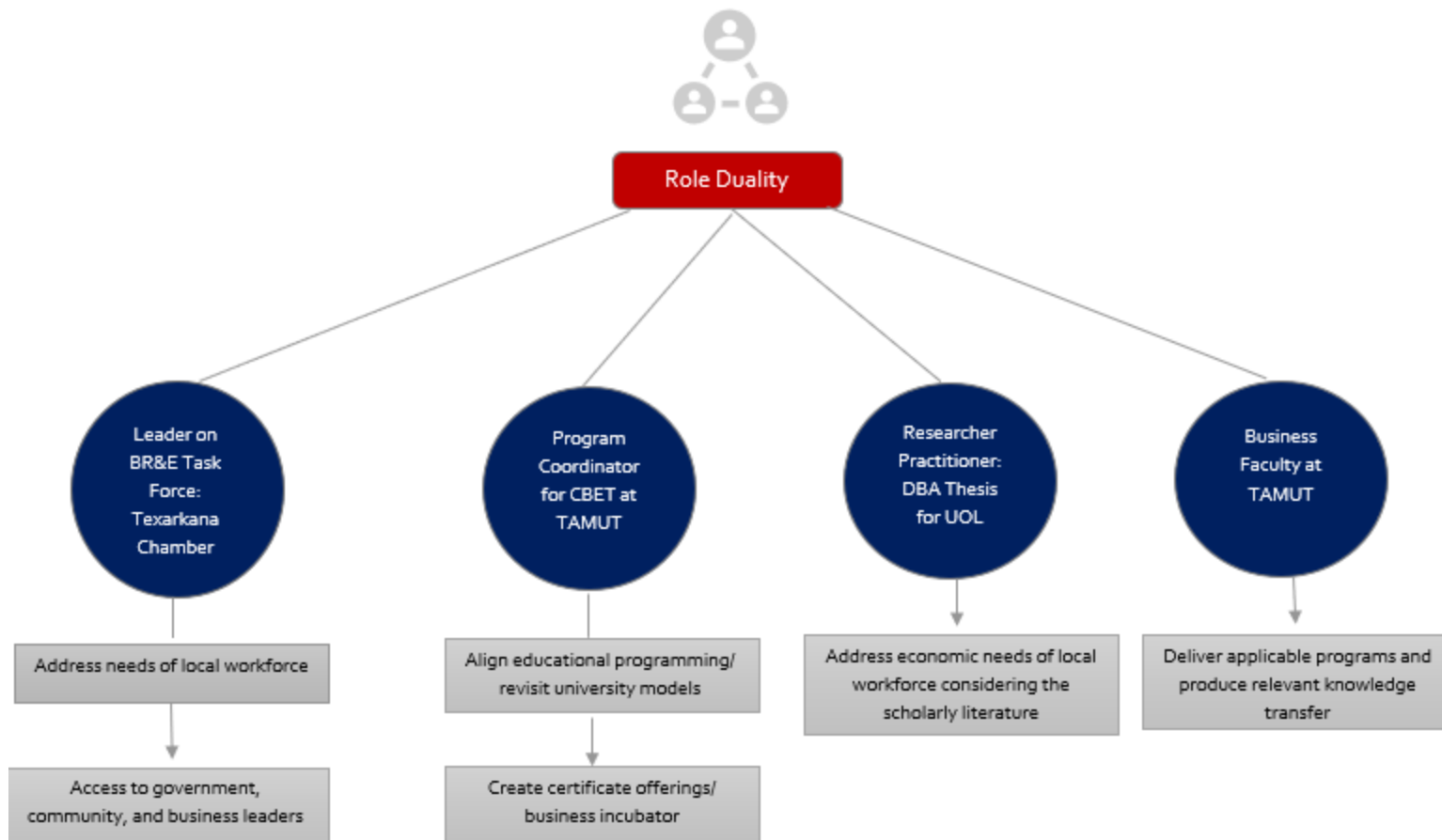


Figure 2: Adjusted Role Duality from Colghlan (2001) to Fit This Thesis Study

Source: Coghlan (2001)

It is a fact that the Texarkana region lags the rest of the state of Texas in higher education attainment (Texas A&M University-Texarkana, 2010). Improving what we know about the local workforce can help the supply chain management department at Texas A&M University-Texarkana adapt, develop, and strengthen its community education offerings to meet developmental needs, particularly within its Supply Chain Management program.

The research of Srinivas and Viljarnaa (2008) disagrees that a university can impact regional economic development. However, TAMUT has made headway in this regard. Since 2009, the university has educated thirty percent more of the region's workforce than before its transformation into a comprehensive regional university (Texas A&M University-Texarkana, 2018). This developmental contribution motivates this research to find ways to make a more significant community impact.

Therefore, to achieve TAMUT's and the EDC's mutual objective of regional economic development, Texarkana's workers and their current knowledge must be understood. Unearthing what matters to individual workers versus local business leaders becomes a priority in developing and expanding degree and certificate programs. For example, it is critical to discover who is in greater need of more educational development. Is it leaders or workers? Diagnosing the problems within the workforce allows this research to explore issues that are creating a barrier to regional development and connect those concerns with educational efforts to solve them. Through sensemaking and sensegiving during action research, knowledge is created by cultivating a reflective practice while acting as a catalyst for change (Greenwood and Levin, 2007; Coghlan and Brannick, 2014). Through research in action, this thesis surveyed regional government and business leaders, interviewed a sample of those surveyed, reflected on the results, and triangulated the quantitative and qualitative economic data through a neural network to develop. This process led to developing a strategic plan, a university model for my SCM department, and adapted supply chain programs to meet community demands. Thus, this research created a model that revamped antiquated paradigms that were not malleable to changing economic landscapes and were not intimately focused on community economic development initiatives.

Regional workforces and economies do not change overnight. Thus, workforce and economic development must start somewhere. Critical and reflective conversations about workforce issues were an essential first step and represented an intentional approach toward aligning SCM program offerings with the community's needs. For a small-town to be competitive, the



local workers need to be educated to improve technology, optimize productions, streamline operations, and be innovative (O'Lawrence and Martinez, 2009). Societies with a highly developed supply chain infrastructure benefit through economic growth because goods are exchanged efficiently, which drives down the costs of goods. The standard of living increases as the community enjoys lower-priced goods and purchases more products. Aligning education with what the city requires from SCM education creates opportunities for local businesses to grow by having access to workers that can make a meaningful impact. More considerable regional economic growth will take even longer, but this is an eventual goal of this research.

## **1.2 RESEARCH BACKGROUND**

### **1.2.1 ORGANIZATIONAL CONTEXT**

This research took place in a small-town regional university in Texarkana, Texas. As an institution, Texas A&M University-Texarkana's (TAMUT) history dates to 1971. It began as a small satellite campus of East Texas State University, offering only upper-division and graduate courses. The Texas A&M University System purchased East Texas State University in 1996 (East Texas State University History Collection, 2008). However, TAMUT continued with its small presence on the campus, occupying only a few classrooms in one building. Due to its limited size and scope, TAMUT had a negligible impact on the region's workforce and economy.

Following the economic recession of 2008, local business and educational leaders developed a radical vision to transform the small, fledgling college into a comprehensive regional university with an outward-focused mission to help rebuild the local economy. Having an outward-focus vision meant that TAMUT had to incorporate economic development within its mission statement. TAMUT leaders transcribed this vision into the Legislative Appropriations Request in 2010, which was revamped in 2018, to make a regional impact on workforce development. When TAMUT proposed a downward expansion (i.e., expanding to offer lower-division courses) in 2010, regional educational and business leaders argued that the addition would help keep people in the Texarkana region. At the time, statistics revealed that 65% of students left the area to attend college, twice the state average (Texas A&M University- Texarkana, 2010). "Few of these students return to upper east Texas to support our communities and grow our economy," TAMUT administrators noted in their proposal (Texas A&M University-Texarkana, 2010). TAMUT believed that expanding into a comprehensive four-year university would address these concerns and improve the local economy. "The continued economic and community development of this region is dependent upon a well-educated workforce," they wrote to the legislature (Texas A&M University-Texarkana, 2010). TAMUT described the

institutional transformation as one initially focused on "stopping the 'brain drain' from Texarkana" to one where the university serves as a "brain magnet" committed to the economy. Scholars argue that universities that tailor educational offerings to the needs of the local business community become economic engines of their regions by building a pipeline of workers with relevant knowledge applicable to local industries (Clark, 1998; Leydesdorff and Etzkowitz, 2003; Duke, 2014; Dyllick, 2015; Karpov, 2017; Cooke, 2018-2019). The university's highest priority became increasing educational attainment. According to the Legislative Appropriations Request, The Texas Higher Education Coordinating Board ranked the Texarkana region as the most educationally underserved area in Texas (Texas A&M University-Texarkana, 2010). In 2010, the percentage of the region's population that held a bachelor's degree was among the lowest in the state (Texas A&M University-Texarkana, 2018). Since then, these numbers have dramatically improved. For example, the university has increased its enrolment by fifteen percent since 2009 (Texas A&M University-Texarkana, 2018). While workforce development, through increased educational attainment, remains a key component of the university's mission, the university's departments must play a more active role in contributing towards regional economic sustainability. In her book *Cities of Knowledge*, O'Mara (2005) argues that economic development is a three-way street between politicians, business, and university leaders to synergize resources and economic growth efforts. The key is to build the most productive environment for companies and workers to take shape through civic and university relationships (Porter et al., 1991; Nickoli, 2013).

Harwick (2017) argues that small towns should restructure economies around the region's financial drivers to aid in economic revitalization. With vital railways and highway systems moving goods throughout the Midwest, Texarkana has a strong logistics and manufacturing presence. TAMUT narrowed in on how supply chain management (SCM) programs can enhance the region's economic drivers. While TAMUT responded to regional educational needs by expanding, including creating an SCM program in 2016, the Texarkana Chamber of Commerce initiated a Business Retention and Expansion (BR&E) program to identify red-flag issues affecting local businesses and economic development. When these changes unfolded, the Dean of the College of Business, Engineering, and Technology (CBET) recruited me, in 2016, to be the inaugural SCM instructor to enhance the education surrounding the city's strengths in logistics and manufacturing. Due to my supply chain management background, workforce research, and history of contributing towards growing the smallest MBA program to the largest in Houston, Texas, I was recruited to TAMUT. Additionally, my research and

experience brought the skills needed to analyze the local economic problem to drive programmatic change in the SCM department. To play a more active role in economic development, the department required a lecturer with a history in recruiting, SCM, and economic development to enhance education around its manufacturing and supply chain strengths. Three months later, the Chamber placed me on their BR&E task force to research regional growth barriers. The university's new mission and the Chamber's efforts synergized into a collaborative action group.

### **1.2.2 POSITIONING MYSELF WITHIN THIS RESEARCH**

Through an insider action research perspective, this research study presented me with the opportunity to explore relevant SCM barriers to Texarkana's regional growth that my department could influence. By living through scholarly management practice, I engaged in the world around me to problematize the economic development and SCM programming issues. Understanding the problem requires learning through inquiry, dialogue, and reflection (Rigg, Ellwood, and Anderson, 2021). As a research practitioner, I examined the locals' abilities to bring their ideas to fruition to determine where my program can influence greater entrepreneurial abilities and skills. My research interests bring value to the university, as I am passionate about SCM, workforce research, and developing regional economies. Thus, my skills in strategically distributing knowledge to spike motivation and economic prosperity are aligned with the university's mission to disseminate knowledge and increase the educated workforce's impact on local businesses. Through action research conducted as a Doctorate of Business Administration student at the University of Liverpool, I studied Texarkana's business retention and expansion issues in light of my realm of influence within the university's SCM department (Coghlan, 2001; Coghlan and Brannick, 2001). I chose my thesis topic based on my historical research interests, personal skillset, and my departmental needs, which cohesively align to contribute to economic development through upskilling logistics professionals.

I faced a crucial challenge in driving changes among tenured and positivist faculty members since I was both new and not tenured (Lewin, 1947; Weick, 2001; Rouleau, 2005; Luscher and Lewis, 2008). Therefore, with my Dean's recommendation, the local Chamber recruited me as a task force member on the Economic Development Council (EDC). Being on the Chamber's task force gave me more influence with my faculty peers to be a change agent within the department. To adequately conduct this study, the insider action research perspective was essential for me to develop a sufficient understanding of the university's internal operations and

how it collaborates with outside stakeholders to plan actions that can play a role in economic recovery.

### **1.3 THESIS AIMS AND OBJECTIVES**

This research aimed to identify regional economic development requirements to align SCM educational offerings at TAMUT to address local business needs. This study attempted to improve workforce knowledge by examining current labor force issues and what the industry leaders and workers are reporting as challenges. Through insider action research, collaborating with the Texarkana Chamber of Commerce and community business leaders addressed these concerns as a natural part of the research process and provided solutions to workforce problems in the Texarkana business community. The resulting research produced a collaborative and critical analysis of workforce issues in the region. It inspired the SCM department's educational development and realignment to TAMUT's mission, including broader community interests in the local economy. This study pursued a more meaningful way to understand regional workforce issues and economic development and the implications for my department through critical action research and collaboration. The following points were essential for me to become an agent of change through the action research process by learning to unlearn how programs are developed to consider a new way forward to contribute towards economic growth in the region (Lewin, 1947; Raelin, 2003; Greenwood and Levin, 2007; Coghlan and Brannick, 2014).

Therefore, the objectives of this research were to:

- Diagnose problems within the Texarkana workforce, which reveals what community leaders believe is lacking in SCM educational offerings, to contribute to business development and expansion efforts, as led by the Texarkana Chamber.
- Identify and address workforce problems within the context of my roles as SCM Program Coordinator and Instructor and my leadership role on the BR&E Committee on the Texarkana Chamber. Through critical action interviews, I connected perceived problems within the region's workforce with community insights into addressing them.
- Give students access to SCM education enriched with local pragmatic application equipped with the knowledge to make a difference inside local businesses. Equally important, educational offerings were adapted to prepare students for the local economy's business demands. Shifting education to address workplace-specific

business practices with a community perspective is a measurable step in making progress towards workforce development.

- Foster relationships between local professional leaders and SCM students to retain students in the area to stop the "brain drain" from Texarkana, which occurs when educated workers leave the region for other opportunities. Instead, become a "brain magnet" by leveraging unity between students and industry leaders as a deliberate starting point to retain educated workers in the Texarkana area. The implications of maintaining a pipeline of college certified and degreed professionals include the economic impact they can make on the region through entrepreneurial and industry innovations.

### **1.3.1 RESEARCH QUESTIONS TO CONSIDER**

As legislators and community members expanded TAMUT to become the linchpin in regional and local development, the institution needed novel ways to rebuild a stressed economy. The greater Texarkana area has failed to maintain large businesses' attention due to what the Texarkana Chamber believes is an absence of a qualified workforce. Therefore, this research enters a business climate receptive to new ideas. To contribute to economic development in the region, the overarching question in this action research study became:

- How can the SCM Department of TAMUT play a role in economic development?

The sub-questions are:

- What is the primary workforce issue in Texarkana that creates a barrier to regional growth?
- Do Texarkana corporate R&D departments and entrepreneurs have the resources they need to develop and consolidate new ideas and businesses?

Answering these questions allows me to make critical strategic decisions to adjust supply chain programs to contribute to the Texarkana community's economic growth. The questions provide insight into the impediments to economic development and the best approaches to supply the region with educated supply chain professionals armed with the required skills needed to make a difference when working in our local businesses.

### **1.4 JUSTIFICATION FOR RESEARCH SELECTION AND ITS SIGNIFICANCE**

Dyllick (2015) suggests that business schools seeking to impact the economy must rethink their traditional educational roles. Inspired by Kurt Lewin, who laid the foundation for action research,

this study sought to find practical and transferable ways for TAMUT to refocus the business school agenda by engaging with community problems through a critical action cycle (Greenwood and Levin, 2007). Using an MMAR methodology, this study established a criterion for investigating and prescribing solutions to the phenomena while actively engaging with the problem (Greenwood and Levin, 2007). The findings of this action research are valuable to the university because it actively documents outcomes through action research and how to address labor force phenomena during real-life practice through a mid-level university position (Coghlan and Brannick, 2014). Moreover, this method required collaboration between myself, the researcher, and the community, which inspired substantial joint planning, action, evaluation, and actions to make progress (Lewin, 1947). This thesis began a community reflective practice that encouraged Texarkana business leaders involved with this study to harness the power of relationships and to seek collaborative solutions while creating educational partnerships that enhanced the understanding of the local workforce. This collaborative cycle was instrumental for my university to take steps to fulfill its mission to promote growth and economic development by creating a skilled and educated workforce within this region.

### **1.5 CRITICAL ACTION RESEARCH OVERVIEW**

I found that using a mixed-methods approach was necessary as it captured the richness of the local labor force, and I determined that using only qualitative data could not fully delve into the complexities of workforce research. This thesis found it necessary to incorporate surveys, neural network economic data modeling, and critical action interviews to alleviate some of the limitations intrinsic in employing only one of these methods. The critical action cycle in this study went through four phases, including construction, planning, action, and evaluation (Lewin, 1947; Coghlan and Brannick, 2014). A central part of this thesis was constructing an artificial intelligence (AI) model that helped provide meaning to the data collected from the top five significant industries in the area. The model triangulated quantitative surveys, qualitative interviews, and regional economics. This process helped me decipher the local workforce's issues and presented new insights that assisted me in developing a university model and tailoring business education programming to improve the conditions inhibiting regional growth. This process required the cultivation of a critical feedback loop through real-time collaboration with the Chamber through a neural network to modernize how programs and services are adaptive to change. The steps of the action research process are presented in Figure 3 below.

## The Action Research Cycle in this Thesis

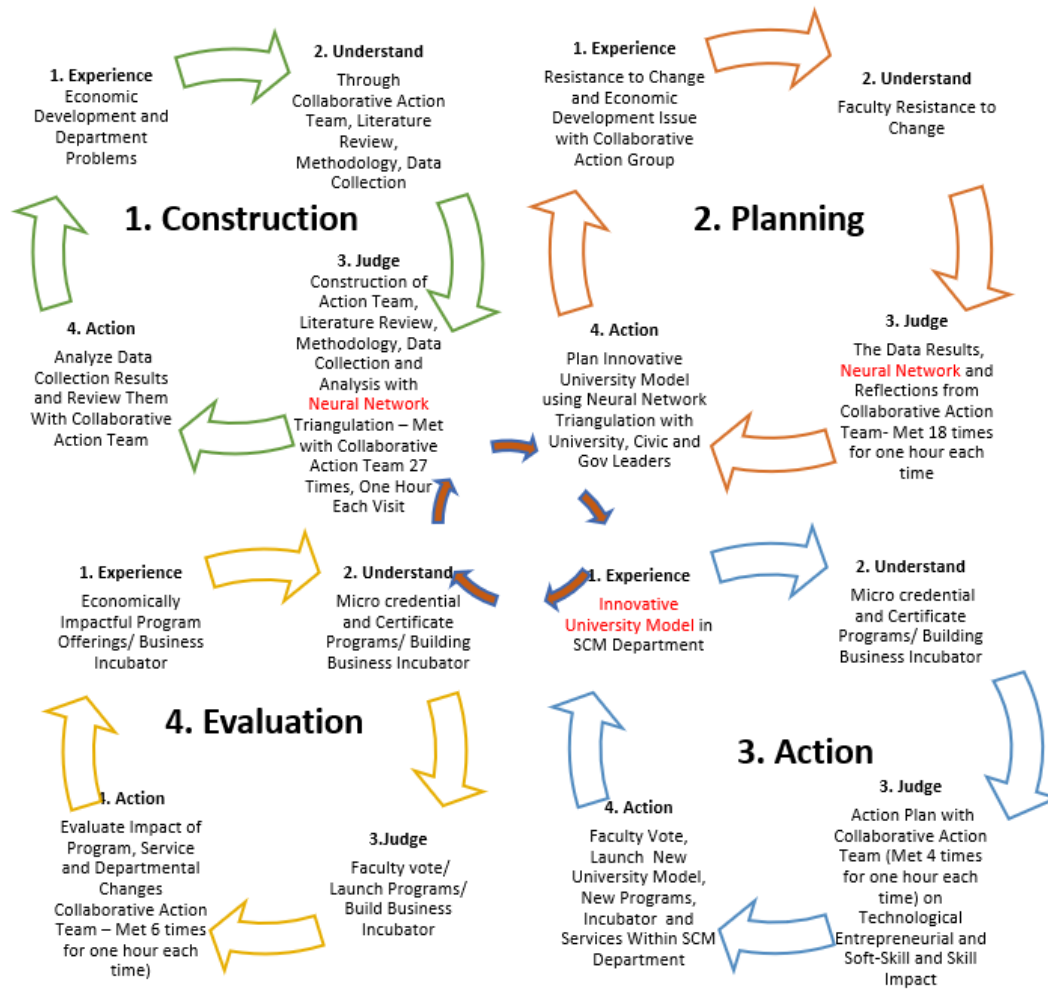


Figure 3: Action Research Cycle in this Thesis

Source: Coghlan and Brannick (2014)

## **1.6 RESEARCH MOTIVATION**

As a faculty member at TAMUT, my teaching and research are focused on SCM programs and how they progress workforce development. Beyond education, one of my primary commitments to the university is studying and offering solutions to the community's workforce problems in collaboration with local business leaders through the Chamber's EDC task force. I joined the task force to utilize my organizational affiliation to undertake critical action research that could aid in the Chamber and TAMUT's business retention and expansion efforts through the lens of a middle manager at a small-town regional university. Indeed, this research connected to each of my duties, leveraging my insider role to formulate and implement supply chain educational programs to foster economic development in Texarkana.

### **1.6.1 SCHOLAR-PRACTITIONER INSIGHTS**

My insider action research looked to problematize local economic issues with collaborative university interventions. As a practitioner involved in education and community development efforts, I recognized the need for action research on the regional financial crisis to take action on the areas that are creating barriers to growth. Since business leaders, educators, and workers disagree on the exact nature of regional workforce phenomena and how to best solve them, collaborative action research emerged as the ideal research method (Lewin, 1947). Some leaders blame economic issues on high turnover rates due to workers leaving the region for better opportunities, while others are saying that their leading cause for concern is finding educated and quality workers. Additionally, some business managers underscore how the rules and laws that govern local businesses affect their ability to expand and grow. All these areas for concern must be considered as CBET develops the right programs to address the needs of a workforce in crisis.

My dichotomous role as an action researcher and practitioner placed me in a unique position to do my part in addressing business retention and expansion problems in pursuit of a deeper understanding of the local workforce. Action-oriented research helped me generate new knowledge through university interventions to contribute to rebuilding the local economy. Due to my proximity to ongoing efforts to educate the workforce, this helped my university progress on the mission of economic revitalization. Thus, this study created an action-oriented plan that my department used to develop programs that aspire to impact regional and economic development.



## **1.7 CRITICAL ASSESSMENT OF RESEARCH CONTRIBUTION**

Building on the work of previous scholars (Gibbons et al., 1994; Lusher and Lewis, 2008; Srinivas and Vijamaa, 2008; Abel and Dietz, 2012; Pugh et al., 2016; Karpov, 2017; Montayama and Mayer, 2017), this research continued scholarly inquiry into questions about how colleges can impact the workforce and economic development. This research made a significant impact through multiple sources of evidence and guidance of the literature by creating an innovative university model for economic revitalization while connecting to quantitative design elements often neglected in university models. My organization benefited from this research because it was instrumental in supplying practical solutions to improve the regional workforce through higher education. Unlike traditional scholarly work, however, my action research created a collaborative community of practice with critical reflection to offer solutions in real-time. This approach provided my department with tools to better understand the workforce and address concerns through its educational programs, specifically SCM.

As the Texarkana region struggled to understand its workforce issues while developing regional economic development strategies, my research seized on existing community momentum by funneling these efforts into a critical action plan. I followed a critical action research model that features community collaboration to produce actionable change. Action research enabled me to focus on local problems and community initiatives while simultaneously conducting field-based research that is generative and cyclical.

This work augments my role as an instructor focused on developing and training business leaders. While the university is already impacting access to more educational programs, my research bridged the gap between SCM programs and regional development needs by harnessing collective energies already underway. These conversations focused on workforce weaknesses to inform the actionable plan to do my part to facilitate business growth and retention. Thus, these collaborations represent a new approach to implementing my university's mission of enhancing the quality of life in the community by improving workforce development through diagnostic educational offerings.

## **1.8 CHAPTER SUMMARY AND THESIS STRUCTURE**

This thesis follows a traditional structure, including a critical review of the literature, methodology, findings, analysis, action research, and conclusion chapters. Guided by Degan (2014), this thesis follows a framework for scholar-practitioners engaged in action research during moments of inquiry to determine the impact this research makes on literature and

practice. Thus, this study maps the terrain through a literature review, methodology, and relevant data collection methods to determine the appropriate actions to make an impact.

First, the literature review analyzes interventions to make universities nimble to the needs of the community, government, and workforce to stimulate economic growth (Booth and DeHay, 2016). Next, the methodology chapter details a rigorous procedure of action inquiry methods to guide this study towards answering the research questions. A justification of the MMAR approach is found in the methodology section. An MMAR methodology connects to my pragmatic epistemology, guiding how I engage with the literature and create knowledge in action. The findings chapter presents the themes that emerge from the data analysis to answer the research questions to drive individual, departmental, and organizational change. The action research chapter tests the plausibility of the actions by inquiring if my department, organization, and community support the actions of this study. The action research section also presents the first, second, and third-person development and evidence of contributions of this thesis while reflecting on the process of sensemaking and the emergence of action and planning. Hence, this thesis documents a journey of managing complex faculty relationships while translating ideas for economic revitalization into action. The conclusion chapter finalizes the research voyage of a mid-level leader at a university. It underscores how I manage changes and implementations, presents an overview of the research and scholarly-practitioner implications, and discusses actionable learning, reflections, validity, limitations, and future research considerations.

# CHAPTER 2:LITERATURE REVIEW

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## 2.1 INTRODUCTION

This systematic literature review develops a framework for action research shaped by theory and practice. This chapter forms a theoretical scaffold for the methodology and expands data interpretation. Conducting a systematic literature review by synthesizing scholarly works in tables for analysis purposes is central to framing the problem and deriving informed solutions for my practice. Several paradigms within the literature inform this thesis on orienting business education and departmental missions to promote economic development. The traditional model (Gibbons et al., 1994), the triple helix model (Leydesdorff and Etzkowitz, 2003), the University Model 3.0 (Karpov, 2017), the engaged university model (Uyarra, 2010), and the entrepreneurial model (Clark, 1998) are all considered in this research to choreograph community and university agendas centered on building local economies. Each model provides a framework for universities to play a role in economic revitalization. Guided by the critical action research theories of Lewin (1947), Raelin (2003), Greenwood and Levin (2007), and Coghlan and Brannick (2014), this research reflects Huff and Huff's (2001) model for re-focusing how business schools create and disseminate new knowledge for local financial impact (Gibbons et al., 1994). With action research and an innovative neural network, this chapter explores how to best adapt business programs to help a fluctuating economy in crisis (Torbert, 1999; Greenwood and Levin, 2007; Roth, Shani, and Leary, 2007; Coghlan and Brannick, 2014; Kiel, 2014). Directed by Caldwell (2003), a task force of civic and university leaders as change agents was considered to implement adaptive SCM educational programming. My research was motivated by guidance from scholars who present evidence that colleges can make an economic impact when university administrators understand the workforce and create programs and educational offerings that are in alignment with community needs (Clark, 1998; Leydesdorff and Etzkowitz, 2003; Uyarra, 2010; Duke, 2014; Dyllick, 2015; Halaby, 2016; Karpov, 2017; Cooke, 2018-2019). Through a pragmatic approach to management research, this critical literature review maps out the various systems that TAMUT can initiate to make an impact by integrating economic, knowledge transfer, and action research theories through an action research and neural network approach. This process was critical to deciphering which stimuli and processes (i.e., educational programs) will produce the desired workforce (as defined by our community partners) within the Texarkana regional context (Bhaskar, 1975; Johnson and Duberley, 2000; Creswell and Clark, 2007; Thorpe and Holt, 2008).

Following the lead of Cappelletti and Baker's (2010) application of Wenerfelt's (1984) Resource-Based Theory model, this research expands the classic organization view of management research to explore the role of a university's SCM program to contribute to local economic development initiatives.

Cappelletti and Baker (2010) and Abel and Dietz (2012) similarly argue that institutions can increase human capital capacities by underscoring the impact that skilled workers can make on organizations. Through a synthesis of the literature, I contend that adapting SCM education programs to the needs of a local community improves human capital by increasing the efficiency of businesses which improves profitability and the standard of living (Caffrey and Issacs, 1971; Gibbons et al., 1994; Etzkowitz and Leydesdorff, 2000; Huff and Huff, 2001; Cappelletti and Baker, 2010; Uyarra, 2010; Abel and Dietz, 2012; Dyllick, 2015; Pugh et al., 2016; Motoyama and Mayer, 2017).

## **2.2 SYSTEMATIC LITERATURE SEARCH AND REVIEW**

The systematic literature review in this study occurred within the construction phase of the action research cycle. I aimed to conceptualize Texarkana's economic development issues and what departmental changes were needed to strengthen the department's role in contributing to our local economy. Pilbeam, Alvarez, and Wilson (2012) argue that planning, searching, screening, extracting, synthesizing, and reporting are the key elements of a systematic literature review methodology. These elements helped me map out and critically analyze scholarly territory to identify the main theories and research concepts relevant to my research problems, as presented in Table 1 below (Lushcher and Lewis, 2008).

## Systematic Literature Review and Search Process

### Planning

<b>Q1:</b> How can the SCM Department of TAMUT play a role in economic development?	<b>Q2:</b> What is the primary workforce issue in Texarkana that creates a barrier to regional growth?	<b>Q3:</b> Do Texarkana corporate R&D departments and entrepreneurs have the resources they need to develop and consolidate new ideas and businesses?
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### *Deconstructing the Research Questions into Subsections: Relevant Literature to Research Questions*

Action Research	Supply Chain Management	Skilled Laborers	Educated Workers	Organizational Lifecycles	Educated Workers
Economic Development	Logistics	Programs	Higher Education	Small Town	Regional Institutions
Colleges and Universities	Neural Network	Current Education	Expected Education	University Economic Models	Regional Growth
Barriers	Workforce Issues	Texarkana	Resources	Entrepreneurship	R&D
KSA	Skills	Knowledge	Ability	Resource Satisfaction	Regional

### Searching

### *Identification of Boolean Key Words; Deconstructing the Questions to Relevant Items*

<b>Q1:</b> Action Research AND Higher Education OR Universities OR Colleges AND Economic Development OR Economic Growth OR Reactivating Economy (n=86,546,126); Supply Chain Management Education AND Economic Development (n=890); College OR University Economic Development Models (n=25,774,734); Small Town Colleges OR Small-Town Universities AND Economic Development (n=14,706); Education (n=226,946)	<b>Q2:</b> Action Research AND College OR University AND Economy (n=1,065,804); Barriers AND Regional Growth AND Small Town (n=66); Workforce Issues AND Small Towns AND College OR University (n=106,609,469); Neural Network AND Economy AND College OR University (n=116,811,348); Education AND Growth OR Expansion OR Economic Development OR Economy OR Expansion (n=12,471,132)	<b>Q3:</b> Action Research AND Skills AND Knowledge AND Abilities OR KSA AND Supply Chain AND Regional AND Growth OR Expansion OR Economic Development (n=7,792,714); Texarkana AND Entrepreneurs (n=0); Texarkana AND R&D (n=3); Resource AND Satisfaction AND Growth OR Expansion (n=218); Research AND Dissatisfaction AND Growth OR Expansion (n=50)
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<b>Screening</b>		
<i>Screening: Fine Tune Search to Discover Scholarly Articles Specific to this Study</i>		
<p><b>Q1: Literature Exclusion</b>  <b>Criteria:</b> Duplications, title not matching, articles that do not include full text, not a good fit between the research methodology and research questions, inflexible to the university setting, irrelevant to supply chain management departmental changes or context, studies that did not include adequate sampling or data collection</p> <p style="text-align: center;"><b>Literature Excluded</b>  <b>n=237,755,102</b></p> <p style="text-align: center;"><b>Studies included in literature review n=48</b></p>	<p><b>Q2: Literature Exclusion</b>  <b>Criteria:</b> Duplications, title not matching Boolean search, articles that do not include full text, inflexible to the university setting, not a good fit between the research methodology and research questions, studies that did not have adequate sampling or data collection, irrelevant to supply chain management departmental changes, my workplace context, or small towns</p> <p style="text-align: center;"><b>Literature Excluded</b>  <b>n=236,957,792</b></p> <p style="text-align: center;"><b>Studies included in literature review n=27</b></p>	<p><b>Q3: Literature Exclusion</b>  <b>Criteria:</b> Duplications, title not matching Boolean search, articles that do not include full text, not a good fit between the research methodology and research questions, inflexible to the university setting, studies that did not have adequate sampling or data collection irrelevant to supply chain management departmental changes, my workplace context, or small towns</p> <p style="text-align: center;"><b>Literature Excluded n=7,792,767</b></p> <p style="text-align: center;"><b>Studies included in literature review n=11</b></p>
<b>Extraction of Key Theories</b>		
<b>Action Research Theories</b>	<b>Economic Theories</b>	<b>Knowledge Transfer Theories</b>

Table 1: Systematic Literature Review and Search Process

Source : Tranfield et al. (2003) and Pilbeam et al. (2012)

Table 1 illustrates the process that led to the extraction of the three key theories aligned with answering my research questions, which were used to organize this thesis. Table 2 represents an example of a synthesis of a seventeen-page systematic literature review chart that I analyzed during this study, which served as my notes on the emerging themes, a historical record of relevant literature, and a data-repository.

## Systematic Literature Review Summary of Core Theories

### Action Research Theories

Contribution to Theory	Contribution to Practice	Limitations	Methodological Connection	Implication for Thesis
Action research marries practical knowledge with theoretical contexts through construction, planning, acting, and reflecting (Lewin, 1947; Coghlan and Brannick, 2014).	Cycles of action and reflection outline the importance of reflexivity in each phase of the action research cycle (Argyris, 2004; Coughlan and Brannick, 2014; Coghlan and Shini, 2014).	It does not connect to the quantitative design element often needed in economic development studies (Lewin, 1947; Kemmis and McTaggart, 2007).	To promote validity, the research must encapsulate a continuous commitment to reinforce the action research methodology and cycles of planning, action, and reflection( Buchanan and Bryman, 2007; Kemmis and McTaggart, 2007; Coghlan and Brannick, 2014; Coghlan and Shini, 2014).	Helped build a framework of understanding the economic phenomenon from various perspectives, which connects to better prescriptions due to the reflective questioning process (Lewin, 1947; Raelin, 2003; Luscher and Lewis, 2008; Coghlan and Brannick, 2014).

### Economic Theories

Contribution to Theory	Contribution to Practice	Limitations	Methodological Connection	Implications for Thesis
<p>The theories that guided this thesis are Etzkowitz and Leydesdorff's (2000) Triple Helix, Dubb and Howard's (2012) Anchor Institution, Pugh et al.'s (2016) Engaged University, Karpov's (2017) University 3.0, and Motoyama and Mayer's (2017) Entrepreneurial Models.</p> <p>Etzkowitz and Leydesdorff (2000), Pugh et al. (2016), and Karpov (2017) provide a framework of hybrid relationships between government, university, and industry to impact regional economic development by pooling resources.</p>	<p>Caffrey and Issacs (1972) offer simple formulas for calculating a university's economic impact and supply a model to discover new knowledge, technologies, and the commercialization of products.</p> <p>Guohong (2020) offers practitioners a neural network empirical framework to analyze socioeconomic issues.</p> <p>Puri and Kohli (2017) offer practitioners a supervised</p>	<p>There were differences in how colleges and universities measured R&amp;D from 2000-2006 (Caffrey and Issacs, 1972).</p> <p>No explicit, practical application for movement across industry and government (Etzkowitz and Leydesdorff, 2000).</p> <p>Offers little impact studies of small-town regional institutions (Dubb and Howard, 2012; Karpov, 2017; Motoyama and Mayer, 2017).</p>	<p>The neural network model supports the action research process to gain additional perspectives in terms of my university and the variables, allowing the university to make an economic impact (Anasari and Rias 2016; Motoyama and Mayer, 2017; Guohong, 2020).</p> <p>Caffrey and Issacs (1972) and Abel and Dietz (2012) recognize the pitfalls of monomethod research for university economic development studies.</p> <p>Abel and Dietz (2012) and Motoyama and Mayer (2017) provide insight on the dependent and independent variables that apply to universities in contributing to economic development.</p>	<p>Etzkowitz and Leydesdorff's (2000) Triple Helix Model and Dubb and Howard's (2012) Anchor Institution model guided the theoretical framework, and Guohong (2020) guided the neural network and empirical side of the analysis in this research.</p> <p>As Dyllick (2015) suggests, business schools must reconsider their curriculum to orient their research and teaching efforts to engage with public needs. This thesis's implication is to add a socioeconomic focus to my department's traditional role in economic development.</p>

Motoyama and Mayer (2017) provide a theory on how economic activity increases in university economic incubators.	neural network model to predict college programs' performance.	Fails to connect to the socioeconomic side to understand the implications for a society (Caffrey and Issacs, 1972; Etkowitz and Leydesdorff, 2000; Dubb and Howard, 2012; Karpov, 2017).	Motoyama and Mayer (2017) used triangulation of quantitative and qualitative data to study university impact on economic development and provided a triangulation framework for this thesis.	
Knowledge Transfer Theories				
Contribution to Theory	Contribution to Practice	Limitations	Methodological Connection	Implications for Thesis
Huff and Huff (2001) define and outline mode 2 knowledge creation and knowledge transfer and explain the move towards applicable knowledge production for business schools.	Gibbons et al. (1994) emphasize new avenues of academic research that focus on applicable knowledge for the society and the business community.	Control is weakened since it is broadly based (Huff and Huff, 2001; O' Mara, 2005).	Choosing an epistemology that centers science on a social activity where individual actors manipulate an intransitive reality (Huff and Huff, 2001; O' Mara, 2005).	Traditional university models focus on expert-driven and disciplinary rigid scientific knowledge creation (Gibbons et al., 1994).  Considers organizational change in broader contexts, such as residency and community, rather than a simple employment relationship (Huff and Huff, 2001; O' Mara, 2005).

Table 2: Systematic Literature Review Summary of Core Theories

Source: Enclosed on Chart Above



The planning, searching, screening, extracting, synthesizing, and reporting elements of my systematic literature review started to show the importance of the action research, economic and knowledge transfer theories, and the respective methodological framework. The systematic review and search process evidenced the necessity of having a mixed-methods action research (MMAR) approach because qualitative and quantitative data were needed to address my socioeconomic research questions (Abel and Dietz, 2012; Anasari and Riasi, 2016; Motoyama and Mayer, 2017; Guohong, 2020). Action research theories emerged as the core literature of this study, as they helped to gain insight and understanding of the societal element of the region's economic development problem, which is often neglected in economic development studies (Lewin, 1947; Raelin, 2003; Luscher and Lewis, 2008; Coghlan and Brannick, 2014). Additionally, the literature review unfolded the critical role of integrating a neural network within the methodology to support the action research process to gain additional perspectives on the variables and factors that enable my SCM department to contribute to broader economic efforts. Etzkowitz and Leydesdorff's (2000) triple helix model and Dubb and Howard's (2012) anchor institution model guided the theoretical framework, and Guohong (2020) guided the neural network and empirical side of the analysis in this research.

Specifically, the scholarship on colleges and economic development in small-town communities, university models, and neural networks helped me to understand how my department's programmatic changes can supply an impactful SCM workforce to contribute towards economic impact (Caffrey and Issacs, 1971; Etzkowitz and Leydesdorff, 2000; Abel and Dietz, 2012; Dubb and Howard, 2012; McHenry, Sanderson, and Siegfried, 2012; Dyllick, 2015; Halaby, 2016; Pugh et al., 2016; Harwick, 2017; Karpov, 2017; Motoyama and Mayer, 2017; Guohong, 2020). Each of these economic development themes is linked to the core headings of this chapter. A limitation of the economic theories is that they fail to connect to the socioeconomic side to understand the implications for a society, which is why integrating action research with economic theories contributes to both theory and practice. Building a conceptual and theoretical framework on action research, economic development, and knowledge transfer scholarship helped me to understand more about the conditions needed to drive departmental changes that have positive economic implications for the broader university and local community.

In conclusion, the systematic literature review protocol was instrumental in critically appraising the literature and determining that action research, economic, and knowledge transfer theories are the three key bodies of knowledge needed to provide insight on my research questions (Lewin, 1947; Weick, 1993; Etzkowitz and Leydesdorff, 2000; Huff and Huff, 2001; O' Mara,

2005; Dubb and Howard, 2012; Coghlan and Brannick, 2014; Guohong, 2020). The literature review implications for this study were to appraise what was already known about SCM programming and its role on economic development, conduct a critical analysis of quality research evidence, identify gaps in the literature, and inform the research methodology and research plan. The following section details how the literature review guided the selection of an expanded university model and how integrating a neural network complements the action research process.

### **2.3 COLLEGES AND ECONOMIC DEVELOPMENT**

Researchers from a practitioner and scholarly perspective argue that business schools provide a unique space for regional economic dynamism. They provide this space through various means, including knowledge production and transfer, community relationship building, retaining and expanding local businesses, hiring and training the local workforce, innovation, engaging in real-estate projects, and purchasing power (Nickoli, 2013; Valero and Reenen, 2016; Karpov, 2017; Porter, 2019). In the post-American Civil War period, many enterprises created were from universities like the Massachusetts Institute of Technology and Stanford University (O'Mara, 2005).

At the heart of economic development, universities impact community relationships, grow businesses, attract a generation of educated workers, and promote civic development. Nickoli (2013) argues that colleges are the “engine of economic development” for businesses with plans to relocate and are interested in growing their workforces and provide training to the locals to supply a “pipeline” of skilled and readily available workers (p. 69). The effective use of natural resources and human capital improves the region's standard of living through returns on capital, natural resources, and wage rate. The key is to build the most productive environment through civic and university relationships for businesses to take shape.

Some scholars vehemently argue against universities shouldering the responsibility of economic development (Sonka and Chicoine, 2005; Srinivas and Viljamaa, 2008). Srinivas and Vilarnaa (2008) contend that universities “cannot and should not be” expected to deliver on economic development from local and regional governments and business interest groups (p. 3). Instead, they suggest that universities should commit to excellence in teaching and research. Their research further argues that businesses should invest in their own R&D rather than relying on universities for growth (Srinivas and Vilarnjaa, 2008). Moreover, Sonka and Chicoine (2005) have found that fifty percent of all economic growth in the U.S. comes from corporate

investment in their R&D. Although Srinivas and Viljarnaa (2008) and Sonka and Chicoine (2005) make good points on why local businesses should not rely on universities alone to stimulate their business economies, other scholars present clear evidence that universities contribute towards economic development (Clark, 1998; Leydesdorff and Etzkowitz, 2003; Uyarra, 2010; Duke, 2014; Dyllick, 2015; Halaby, 2016; Karpov, 2017; Cooke, 2018-2019).

Heblich and Slavtchev (2015) show amplification of economic development when high-tech start-ups populate the region, even when they are not born out of the university population. This scholarly perspective is vital to consider as TAMUT's 2018 strategic plan focuses on academic programs needed by the region to respond to the community and government requests for economic revitalization (Texas A&M University-Texarkana, 2018). This thesis draws from the repository of knowledge generated by experts in how to adjust SCM program offerings to be a part of economic development. Kalantaridis and Bika (2010) suggested that innovations occur when an open knowledge system is connected to its surrounding context and innovative actors. From my experience, capitalizing on developing entrepreneurs and understanding the educational needs of the local community are instrumental to economic development initiatives.

Researchers suggest that colleges can synergize educational offerings to the needs of local businesses and workers so they can be productive members of the workforce (Duke, 2014; Cooke, 2018-2019). Drawing on my experience at the Chamber, a healthy workforce creates stronger communities and economies. Leveraging a cooperative extension of theoretical to applied knowledge formulates a symbiosis between civic leaders and educational institutions to produce productive citizenry (Duke, 2014). For this reason, I have found it instrumental to be a leader on the local chamber's BR&E committee. This political positioning gave this research direct access to local business and community leaders to assist with economic development through academic alignment.

Universities are catalysts in the development of advanced economies through innovation and R&D, both of which are essential for economic growth. Technology innovations and their commercialization are the hallmarks of economic development. These events occur naturally within the college setting by providing a space for think-tanks, operating incubators, and supporting business start-ups (Duke, 2014; Harrington and Maysami, 2015; Cooke, 2018-2019). Motoyama and Mayer (2017) insist that research developed at universities through licenses and spin-offs do not explain economic development for an entire region; therefore, it is essential to underscore that the university is a part (not the driver) of developing an economy. It becomes a

regional innovation system where ideas can come to fruition through research, development, and expertise.

This thesis used a stochastic and innovative approach weaving neural networks into the action research phases to understand fluctuations of the local workforce and economy to refocus the business school agenda and programs, specifically in SCM, to be adaptive to the local economy (Lewin, 1947; Coghlan and Brannick, 2014).

## **2.4 PROBLEM OVERVIEW WITHIN THE CONTEXT OF THE LITERATURE**

TAMUT functions as an economic anchor, which the locals expect to shoulder the responsibility of supplying growth in the region. For the university to meet these demands, it must gather information and create a strategic plan to address business retention and development. This research does not aspire to progress change for the entire university. Still, it does focus on how my college, specifically my discipline, can adapt educational offerings to do its part in developing the local workforce. Inspired by Lewin (1947), who embodies the idea that effective learning is active instead of passive, adapting business educational offerings to community needs through engagement is a more purposeful approach to addressing local educational issues. By connecting the local community's needs to SCM programs through insider action research, knowledge that is useful to address the workforce phenomena is generated (Roth et al., 2007; Coghlan and Brannick, 2014). Triangulating workforce issues is integral to tailoring business programs to address Texarkana's workforce pitfalls. It is imperative to mention that what one views as a labor force problem varies based on one role and position within the local economy. This study only focused on the issues related to business retention and development through the lens of an SCM program in a business college trying to adapt its course offerings to help make positive changes in the local economy. This research aspired to identify workforce issues in collaboration with business leaders from various industries and followed a model of leaderful change to consider what actions CBET at TAMUT could take in terms of educational development within its SCM program (Raelin, 2003). Creating curricular changes to meet community needs requires involving community stakeholders as “fellows of opportunity” to promote mutual learning in solving the problem in pursuit of the betterment of the local workforce and to become catalysts for change through formulating a task group (Elden and Levin, 1991; Honey and Mumford, 1996; Caldwell, 2003). Through this thesis, I involved community leaders, the local university, and the local Chamber of Commerce to create SCM programs that were prescriptive to local business needs in order to foster a climate of workers

with the wisdom to supply the innovation and positive change needed (Kash and Rycroft, 2002). This literature review was conducted through an insider action research lens, as this approach places the researcher in direct collaboration with local leaders, which includes phases of planning, taking action, evaluating the workforce issues to address them through educational programs, and managing change (Lewin, 1947; Caldwell, 2003; Raelin, 2003).

To contribute towards regional economic development through adaptive SCM programs, change management scholars provide useful insight into managing change (Lewin, 1947; Kotter, 1996; Weick, 2001; Caldwell, 2003; Luscher and Lewis, 2008). To form a prescriptive approach for how SCM business education could be tailored to improve the local economy, it is essential to get the support and influence of community stakeholders (Hart and Sharma, 2004). Involving the perspectives of public, private, and civic leaders as change agents within a task group was central to the thesis to support the complexity paradox of Lewin (1947) where learning to unlearn was a vital step in the problem-solving process. The confluence of realities across the community provides bearings for originating a story for change to unfold through sensegiving and sensemaking (Weick, 2001).

Noting the importance of forming a task group comprised of local business and community leaders, I reflected on Thomas (1977), who researched how productive teams adopt dialectical styles to individual personality traits of team members. Thomas (1977) demonstrates the paradoxical nature of pragmatic, tranquil, harmonious, compromising, and overbearing personality styles and how to navigate the political waters of each personality force. I draw on Honey and Mumford's (1996) suggestion that relationships are regarded as members within a fellowship with a mutual goal to be carried out and accomplished. Within a fellowship, there must be a reflection on the shades of political pulls, domination, and power distance (Buchanan and Bryman, 2007; Coghlan and Shani, 2014). In my experience, groups must act as a nebulous intellect to form an optimal solution. Working in solidarity where individual genius is extracted and focused on a unified team goal becomes a powerful force to solve business phenomena. Through past engagements with the members of the task group that this thesis encompassed, I know that most members are pragmatic and harmonious; therefore, Smith (1997) advises to gain insight from each individual through the questioning process. This action inquiry method considers each perspective to diagnose issues in real-time (Coghlan and Shani, 2014). Thus, individual team members were subjected to the alchemy of four spheres of morality, which included pledges of economic agency, community leadership, responsibilities beyond the boundaries of this research, and personal obligations (Badaracco, 1992). Focusing

on the nature of reality and the spheres that each team member encapsulates morphed into shaded decisions and metacognition, which cascaded as societal norms. Buchanan and Bryman (2007) argue that understanding phenomenon from a variety of perspectives led to better prescriptions of problems through the reflective questioning process. Their research suggests that subjecting the inquiry to this analytical process exposed it to various past experiences and conceptualizations, which drove new knowledge (Buchanan and Bryman, 2007; Coghlan and Brannick, 2014). Collier (1992) contends that to extract the individual genius of the group members, fostering an environment where collective capacities can grow and synergize is key. This research further considers Holme's (2008) argument that a group facilitator can unearth bias and point out groupthink, flawed thinking, and heuristics. Further, Kirkman and Rosen (2000) note the importance of the facilitator providing a supportive environment where strengths are celebrated, and the team learns from and is not discouraged by mistakes. Reflecting on the repository of literature on how teams make decisions and how to create new scholarly knowledge was paramount for the success of this research.

Ford and Ford (2010) argue that most organizational change failures are due to resistance to change. Hence leaders defend flawed ideas to their death and have a hard time admitting mistakes. One important notion to underscore is that leaders have difficulty processing every aspect of an organization while continuing to be expected to focus on daily agendas. With managers grappling with being pulled in other directions, Lunenburg (2010) argues that using a change agent is ideal as managers often do not have the time to implement planned changes. Raelin (2003) posits that change agents reduce natural resistance to change through a "leaderful change" paradigm, which embraces collaborative and participatory change. With Raelin (2003) guidance, leaders can weigh the opinions of research and organizational participants and revise action plans based on feedback (Waddell and Sohal, 1998; Raelin, 2003). Thus, the underlying aim is to create a mutually desirable change for the organization and stakeholders (Raelin, 2003).

This thesis used an innovative approach by incorporating neural networks within the action research cycle to render the complex variables of the Texarkana workforce and regional economic development into applicable data to formulate and implement an adaptive SCM curriculum. Neural networks provide an AI-based architecture to manage and process information that can reduce bias and resistance to change while simultaneously weighing amounts of data too large for ordinary business managers and community leaders to analyze independently. Gigerenzer and Gaissmaier (2011) suggest that leaders will often solve

problems with availability heuristics, which shortcuts thinking to reflect on recent experiences. However, a neural network approach to making decisions encapsulates big data and historical statistics (Guohong, 2020). Vicious cycles occur when thematic and overlapping loop cycles become routine in problem-solving situations. Using a neural network offers an innovative research approach that breaks away such vicious cycles. Staw and Ross (1987) note that improvement to the information system in how underlying problems are understood provides new perspectives into an old phenomenon.

Neural networks are capable of understanding depths of information using a layered design. Through this architecture, deep learning highlights important variables that otherwise appear as abstractions in my data. Thus, through neural networks and deep learning, I can make sense of vast amounts of information and discover patterns and factors from complex and sometimes seemingly unrelated nodes that allow me to connect and extract new meaning. Neural networks also have predictive capabilities that aid business and education leaders in planning responses to workforce issues by simulating “if-then” situations before implementing original programming. In short, they helped me conceptualize the Texarkana region’s workforce issues through an algorithmic approach to analyze this multifaceted issue and construct higher education program offerings that speak to the community's needs.

This thesis positions business programs, more specifically in the SCM department, within a broader ecosystem, to consider how curricular changes can play a role in a more extensive complex societal system. This research follows the guidance of Dooley (1997), who contends that economic development must reflect on the networks of entangled systems comprised where evolution in societal systems begins from the introduction of smaller acceptable norms. Thus, the single-cell and societal agent systems are mutually and nonexclusive components of economic development. When considering university SCM programs as one of several systems that contribute to regional economic growth and a piece of the business ecosystem, I use neural network and economic theory to frame how changes at the micro-level (within the curriculum) respond, adapt, and contribute to macro-level developments. Thus, by using a neural network, the dynamic personas of organizations become transparent, allowing scholars to uncover systematic and organic interactions between agents and cells. By implementing changes within the SCM program, TAMUT acts as a cell in a multidimensional agent to inspire economic growth (Dooley, 1997).

As TAMUT strains to shoulder economic development from civic leaders, I turned to scholarly and practical perspectives to offer guidance and form an action plan centering SCM programs on education that will drive economic development. Supply chain programming is one area that I can control to contribute towards meeting this lofty supposition. Guided by scholars who are experts in action research, economic and knowledge transfer theories, the literature provides promising guidance for creating an innovative and malleable approach to my university and the unique needs of the local ecosystem. Vecoven et al.(2018) demonstrate that neural networks can learn adaptive behaviour's within complex environments and draw rapid, yet accurate, conclusions. Therefore, this approach allows this research to isolate what adaptations to supply chain educational offerings can contribute to local economic development. Further, by incorporating a neural network throughout the construction and planning phases of the action research cycle creates an informative feedback loop between industry, government, and university leaders, which facilitates the planning and execution of programs that are adaptive to the evolving complexities of local businesses and growing needs. The action plan encompasses an amalgamation of insights from experts in the field to encapsulate knowledge used to drive economic advancement from SCM and business education.

## **2.5 ECONOMIC DEVELOPMENT IN SMALL-TOWN COMMUNITIES**

The vanguard of economic development is the progress from new technologies and the overall transition from agriculture to industry-based economies, which inspires a general increase in the standard of living. As motivated people with technical expertise leave rural areas for better opportunities, smaller towns are left to dilapidate. Without the ability to compete with metropolitan areas, small towns have unique challenges. Harwick (2017) suggests small-town restructuring economies leverage on the economic drivers for the city and progress towards capitalizing on them to aid in revitalization. With a strong transportation heritage that consists of railroads and highways to move goods throughout the Midwest and significant manufacturing presence, this thesis focused on how SCM programs can enhance Texarkana's economic drivers, which are transportation and manufacturing.

Fairfield, Iowa, demonstrated the importance of small-town colleges to local economies when the population declined in the 1970s because its economic anchor, Parsons College, shut down. Local politicians gathered and constructed a plan to recruit a new university to turn their financial plunge around (Semuels, 2017). Maharishi International University salvaged the Parsons College building and redeemed the town from economic decline. The university



brought new residents, money, and students and is now home to several start-ups and new businesses.

Gathered in Texarkana, TX, civic and political leaders started similar conversations when they decided to build a comprehensive regional university to help improve the floundering economy. TAMUT's position as a community-oriented institution provided a focus for this research as it is invested in addressing the local phenomenon, such as workforce problems, through educational programming. Located in an economically depressed area, the university faced lofty expectations as it sought to encourage growth and regional development. Hence, the theoretical discussion presented in this section illustrates how universities have an essential role in the economies of small-town communities and offer insight into how SCM business programming can make contributions to the Texarkana business climate.

## **2.6 FROM CITIES TO REGIONS OF KNOWLEDGE**

Since the Great Depression, universities have vigorously engaged in scientific research, which implicates the spill over effect of regional economic development through knowledge transfer. Due to the economy's downturn in the 1930s, federal grants encouraged colleges and universities to undertake increasingly technical research to impact and solve real-world problems. Through this pursuit, business and university leaders developed a mutually beneficial and symbiotic relationship. O'Mara, a knowledge transfer historian, argued, "The university engagement in economic development was a two-way street: politicians and business leaders seized upon these institutions as essential tools in larger economic strategies, and university administrators used these new economic policies to shore up their economic fortunes and become, in effect, a new breed of city builder" (2005, p. 39). Following the same line of thinking, the expansion of economic development initiatives at universities like the Massachusetts Institute of Technology, Stanford University, and the Georgia Institute of Technology became innovative "cities of knowledge." Following the pathway of other universities, TAMUT aspires to develop the local economy based on growing research and knowledge transfer.

Universities must consider the way scientific knowledge is produced in 21<sup>st</sup>-century universities. Juxtaposed to the monodisciplinary model of mode 1 knowledge production, the multidisciplinary cooperation across departments within higher education has facilitated transdisciplinary knowledge production (Gibbons et al., 1994; Karpov, 2017). Inspired by Gibbons et al. (1994), mode 2 knowledge production underscores organizational diversity, transdisciplinary processes, quality control, and reflexivity as distinct features (Thorpe and Holt,

2008). MacLean, MacIntosh, and Grant (2002) contend that mode 2 is an integral component of management research and is linked to the action research process. Thus, the coordination between researchers, the broader community, industry, and students changed how knowledge is produced. Hence, to develop “regions of knowledge,” partnerships with local actors are needed to adapt research to influence governmental entities to invest in institutions that produce high-impact knowledge and improve the quality of life.

## **2.7 COMPARING UNIVERSITY MODELS**

### **2.7.1 Historical University Models at TAMUT**

To understand the university model currently in place and why there is a need to change, I first begin this section with a brief review of the historical models at TAMUT. When TAMUT first opened in 1971, it was guided by the traditional university model, which is focused primarily on teaching and research. After the 2008 Great Recession, Texarkana grappled with unprecedented international competition levels, limited land for industrial use, and business retention and expansion issues. As a result, the town leaders envisioned TAMUT as the heart of economic transformation. This vision came from the idea that innovation, education, community engagement, and knowledge transfer spurs growth and prosperity. When Texarkana's local and state leaders transformed the university to encompass an economic development mission, it went from utilizing a traditional university model to an anchor institution model. Thus, before I began this research journey, the anchor institution model was in place and extended the traditional university role as an educational institution to an institution that strategically manages resources, knowledge, and capital for the community. Elements that change regional economies, such as hiring practices, product distribution, procurement, location, and resource management, were intentionally managed to bolster the regional economy rather than relying on the coincidental spillover effect. As Hecht (2013) explains, by embedding TAMUT within the regional ecosystems of public, private, and philanthropic actors, mutually beneficial policies and programs that support such developmental efforts were crafted. However, this model accepts that the university exclusively understands what is best for its community without interrogating motivations (Boyle and Silver, 2005). Such actions re-inscribe institutional elitism and cloud policy decisions with an aura of benevolence that obscures anchor institutions' self-interest (Silverman, 2014).

This thesis considers the critiques of anchor institutions and acknowledges the pitfalls with the current model. Under this model, the university did not engage with government and industry leaders to gain a real-life perspective on what is needed from our department to positively

influence the economy. Because our anchor institution model failed to embrace community concerns, I argue that it could not sufficiently consider each stakeholder in regional economic development decisions. Therefore, I explore how to extend our anchor institution model to include government, society, and institution leaders through an action research cycle to adequately adapt supply chain programs to best support local businesses and the economy. In my experience, the people's views and opinions are essential to understand what my department needs to do to meet their needs. Additionally, this qualitative data needs to be complemented by the integration of regional economic quantitative facts. The following section details a critical analysis of university models in the literature and explains the selection of expanding the current anchor institution model to include elements of the triple helix model.

### **2.7.2 Critical Analysis of University Models**

To critically analyze university model scholarship, I charted the core university models that emerged from the literature. The chart includes a comparison of the university models' attributes, weaknesses, and importance within the context of this research and is illustrated in table 4 within this section. This thesis brings together the scholars from a variety of disciplines and their contributions on how colleges and universities can make an impact on economic growth (Gibbons, 1994; Etzkowitz and Leydesdorff, 2000; Dubb and Howard, 2012; Pugh et al., 2016; Motoyama and Mayer, 2017; Balashov et al., 2019). University models that re-focus business school agendas towards economic development are accelerating in the twenty-first century. These models offer guidance on how colleges and university departments can strategically manage their role in economic development initiatives. This critical action research seeks to provide educational interventions for community leaders to use their land, supply chain employees, and transportation resources more efficiently to strategically help the local economy. Thus, I turn to the university models revealed in the literature review, as they have thematic scholarly overlaps that embody knowledge creation and governmental, civic, and entrepreneurial activities that inspire upward social mobility (Halaby, 2016; Karpov, 2017). Gibbons et al.'s (1994) traditional university model, Hecht's (2012) anchor institution model, Etzkowitz and Leydesdorff's (2000) triple helix model, Karpov's (2017) university 3.0 model, Pugh et al.'s (2016) engaged university model, and Motoyama and Mayer's (2017) entrepreneurial model emerged as the core university models in the literature, as they suggest an outward-facing approach and community collaboration to improve economic, social, and cultural life. Table 3 below exhibits the main models under consideration, their core attributes, weaknesses, and their importance in the context of this research.

## Core University Models Under Consideration

University Model	Primary Scholars	Core Attributes of the Model	Weaknesses of the Model	Connection to Research Problem
<b>Traditional University Model</b>	Gibbons et al. (1994)  Srinivas and Viljamaa (2008)	Focuses primarily on research and teaching  Centers mission on rigid scientific knowledge creation  Disseminates knowledge through educational training	Economic development has been a by-product of research and teaching  Economic development is passive rather than active	Guides scientific knowledge creation, which inspires economic growth as a byproduct of research and teaching
<b>Anchor Institution Model</b>	Dubb and Howard (2012)  Hecht (2012)  Dubb, McKinley, and Howard (2013)  Ehlenz, Birch, and Agness (2014)	Uses the university as an agent for change  Focuses on economic development  Considers a larger economy and extends the traditional role to focus on economic activities	It does not include practical training on orienting supply chain programs  It does not provide a flexible approach to adapt to the unique needs of a region	Important for broadly considering the impact on regional economic development  Practical application to pursue partnerships with the broader community
<b>Triple Helix Model</b>	Etzkowitz and Leydesdorff (2000)  Leydesdorff and Etzkowitz (2003)  Uyarra (2010)  Lopez (2013)  Lendel and Qian (2017)	Supplies a model to discover new knowledge, technologies, and commercialize products  Positions the university role and its relationship with other actors to make an economic impact  Sparks innovative environments	No explicit, practical application for movement across industry and government  It does not address knowledge transferability to orient prescriptive business education to the local economy	Three helices can be applied to promote economic growth  The model can be used as an analytical tool to understand the university role and relationship to other community actors

<b>University 3.0 Model</b>	Markel (2013) Sonsova (2013) Karpov (2017) Balashov et al. (2019)	Focuses on education, research, and the commercialization of knowledge to make an economic impact  Develops new technology and commercializes these products, which creates new businesses  Generates jobs, technologies, and patents which increases revenue	The model does not include practical information on centering business programs to promote economic development	Adds a socioeconomic focus to the traditional role, which includes the commercialization of knowledge, products, and new businesses to inspire economic development
<b>Engaged University Model</b>	Lindholm and Dahlstarand (1999) Gonzalez- Perez (2010) Tripl, Sinozic and Lawton (2015) Pugh et al. (2016) Egorov, Leshukov and Froumin (2020)	Coordinates business support to innovation and trade schemes  Strategic coordination between colleges and local entrepreneurs and businesses is achieved  Acts as an intermediary between professors, local businesses, entrepreneurs, and the college	It does not guide how to involve civic leaders and community initiatives to promote upward social mobility and economic impact  The model does not provide a prescriptive approach to address educational weaknesses in the region	Supplies guidance into supporting local entrepreneurs to generate innovations that affect the local economy  Gives insight into being a catalyst for change and improving the quality of life in communities and cities
<b>Entrepreneurial University</b>	Kirby (2004) Riviezzo, Napolitano and Rosaria (2010) Motoyama and Mayer (2017)	Creates innovation tanks where knowledge transfer makes an economic impact  Increases entrepreneurial capital in the region	The model does not provide an approach that is flexible to the needs of a changing economic landscape, nor does it diagnose what the local industries need the university to provide	Presents a practical way to engage more entrepreneurial activity to aid in the commercialization of new knowledge

Table 3: Main Models Under Consideration – Sources Included in Chart

In critically analyzing the models under consideration, the traditional and anchor institution models do not consider engaging outside stakeholders to gain economic insight. The triple helix, 3.0, entrepreneurial, and engaged models consider the university's relationship with other community actors to make an economic impact. The traditional and anchor institution models are too focused on "scientific" research and lose relevance to the local business climate, failing to generate useful knowledge to make a real impact. Considering the importance of rigor and relevance to knowledge creation, this thesis finds it essential to orient SCM programs to the local industry needs to present knowledge that is transferable and valuable to the local workforce. Through my university leadership roles and economic development experience, I find that providing knowledge transfer that can make an economic influence while understanding the implications for a society are the key elements that I considered as pillars for this thesis. Anderson, Herriot, and Hodgkinson (2001) contend that a dichotomy exists between the worldview of the researcher and the practitioner; therefore, an extension of the model is needed to close the gap by including stakeholders in economic agendas to generate practical and applicable knowledge. Hence, this thesis finds Pedler (2005) informative as he vehemently declares that knowledge produced during action can be implemented in practice and is therefore grounded both theoretically and practically. This research reflects Cavender's (2013) argument that applicable knowledge considers the labyrinth of socio-political assumptions, political pulls, allegiances, and underlying assumptions in real-world phenomena requiring outside stakeholder perspectives. Arguably the traditional and anchor institution models fail to fill the gap between institutions, government, and universities' mutual, but divided, economic development roles (Hecht, 2012). In my experience, the lack of alignment among stakeholders and regional ecosystems is counteractive to achieving joint economic development initiatives. Therefore, the traditional and anchor institution models alone will not allow me to answer my research questions in this study that seeks to understand the barriers to regional growth, local R&D capacities, and how SCM programming can play a role in economic revitalization.

The university models that consider the societal element to its economic development role are the triple helix, engaged, 3.0, and entrepreneurial models; however, there are several distinctions between them. Etzkowitz and Leydesdorff's (2000) triple helix model envisions a series of hybrid relationships between government, university, and the industry as three helices to impact regional economic development by pooling resources in a way that increases their effect on local economies. Uyarra (2010) notes that some institutions aspire to be "engaged" universities that join a coalition of public and private partners to improve their local economy;

however, they fail to synergize economic development plans between the university, government, society, and industry. Instead, the engaged model is a way to help individuals' bespoke business, innovation, and trade through strategic coordination to become a one-stop-shop for entrepreneurs (Pugh et al., 2016). Karpov (2017) identifies the "university 3.0" model whereby universities are involved in developing and commercializing technologies, introducing them to the market, managing intellectual property, and creating new businesses; however, the model does not seek to coordinate stakeholder efforts with economic revitalization. Similarly, the entrepreneurial model focuses on the commercialization of knowledge through community partnerships to inspire economic development on top of supplying the technology necessary for innovation and growth (Kirby, 2004; Motoyama and Mayer, 2017). However, the entrepreneurial model does not seek to address local industry needs to upskill workers in areas that can impact the region.

Critical action research is at the heart of this study because the ultimate goal is to develop new knowledge about the local workforce by engaging with outside stakeholders. The next step is to then transform this knowledge into action-oriented interventions, which will initiate a change process in how my department manages educational offerings. Thus, extending the anchor institution model to incorporate the triple helix model's elements is ideal for engaging civic, government, and university leaders to align economic development initiatives and share learning experiences to properly serve the community.

### **2.7.3 Models Underpinning This Study**

Although this research considers the six core university models that emerged in the systematic literature review, extending the anchor institution model to include the triple helix model's elements is primarily applicable to this study. The research questions seek to understand the barriers of regional growth and the local workforce's current R&D capacities to determine what my department can do to contribute to economic development. To drive actionable change, a university model that is flexible to the unique needs of the region is needed. A hybrid anchor institution/triple helix model approach offers ways to engage local stakeholders, partners, and university leaders to collaborate on interventions relevant to regional needs. As a result, this supplies workers that fill educational gaps which can impact local businesses. Thus, collaborative sensemaking across government, civic, and university leaders explore ways in which the SCM department can have an impact on the broader economy through practice-mediated actions grounded in the triple helix literature. The anchor institution model alone does not integrate outside stakeholders' socioeconomic views and therefore fails to understand the

university's role as a part of a broader economic ecosystem. It is important to underscore that the anchor institution model currently in place does well in procuring goods, hiring, and managing resources locally. Therefore, replacing this model with the triple helix model may thwart the processes that are already making an impact. Thus, incorporating the elements of the triple helix model that integrate socioeconomic views enriches economic development efforts with stakeholder perspectives. This allows my department to quickly respond and adapt to the community's economic needs. This research is motivated by scholars' guidance that presents evidence that colleges can make an economic impact when university administrators understand the workforce and create programs and educational offerings that align with community needs (Dyllick, 2015; Halaby, 2016; Karpov, 2017).

Each of the six core university models that emerged from the literature fall short in understanding the economic particulars required to make data-driven decisions relevant to Texarkana's economic development problem (Gibbons et al., 1994; Etzkowitz and Leydesdorff, 2000; Hecht, 2012; Pugh et al., 2016; Karpov, 2017; Motoyama and Mayer, 2017). Therefore, I argue that the anchor institution and triple helix models can be tailored to integrate a neural network to support the action research cycle. Through this approach, purposeful choices and curricular changes can be made in my department that allow for strategic alignment towards the goal of enhancing the region's economic progress. The choice of tailoring a model that expands the anchor institution model to consider the perspectives of the local community, government, and industry leaders, as suggested by the triple helix model literature, is a movement towards providing prescriptive SCM programming to the region (Etzkowitz and Leydesdorff, 2000; Leydesdorff and Etzkowitz, 2003; Uyarra, 2010; Lopez, 2013; Lendel and Qian, 2017). I further argue that the literature guided me to the necessity of integrating a neural network in the expanded university model to make meaning of the economic data collected. The inclusion of the neural network provides additional insights toward answering the research questions in this study (Zhang, Cheng, and Yang, 2005; Romanchukov, Berestneva, and Petova, 2019; Guohong, 2020; Hao, Xing-yuan, and Yu-jie, 2020). The choice of extending the anchor institution model to include the elements of the triple helix model adds value in answering my research questions as well. This choice retains the anchor institution's principles of strategically managing resources, knowledge, and capital while incorporating the triple helix model's elements of gaining a more robust economic perspective by involving political, community, and business leaders in SCM programming. By involving elected officials and leaders in the community, I make headway in understanding how my department plays a role in economic



development and what SCM programming is needed to reduce workforce issues in the community, which aligns with my research questions in this study.

## **2.8 RETHINKING UNIVERSITY ECONOMIC DEVELOPMENT MODELS WITH NEURAL NETWORKS**

Artificial neural networks (ANNs) emerged as a tool for data analysis to enrich the action learning process during the planning phase of the action research cycle. An ANN can be designed to understand the relationship between economic and societal parameters within a region's economy (Romanchukov et al., 2019). Babkin, Karlina, and Epifanova (2015) argue that a neural network objectively reflects the particularities that develop within societal systems. This type of economic modeling's multilayer nature allows me to dissect the interactions between variables and discern what educational program changes may impact economic growth and development in my region. ANN models are widely applied to economic forecasts and can solve problems that would be difficult to solve by usual statistical methods, as they uncover hidden patterns in the data while also minimizing bias through computational analysis. Flexible and adaptive due to their sequence learning design, neural networks are powerful predictive models that can respond to change in real-time (Zhang et al., 2005; Hao et al., 2020). For instance, Guan, Wang, and Clarke (2005) used an ANN to simulate and forecast urban growth using backpropagation to determine the probability of economic development when manipulating various socioeconomic variables. An ANN provides real-time data analysis and enables me to be responsive to changing economic landscapes. Thus, the ANN enhances and preserves the action research process by enriching the action research cycle's planning phase with a data analytics tool.

ANNs have been used in higher education planning. For instance, Guohong (2020) coordinated efforts between higher education and industry through the Internet of Things to develop a prediction model with fuzzy neural networks to predict where coordinated efforts should be concentrated. Guohong (2020) is insightful, as the researcher gives data-driven insight on the impact of coordinated economic development efforts across a region. Puri and Kohli (2007) accurately predicted the performance of college programs before offering them to the community by creating a forecast with a supervised neural network model. Similarly, Anasari and Rias (2016) analyzed data of simple linear regressions and integrated them into a multilayer perceptron neural network model to determine factors that impact regions. Motoyama and Mayer (2017) revisited colleges and universities' role in economic development through triangulating quantitative and qualitative data. Motoyama and Mayer's (2017) study presents a

solid framework to cross-check quantitative data with qualitative data, which provides a robust understanding of complex economic systems.

Action research emerged in the literature as critical for universities to understand their economic development role by triangulating both qualitative and quantitative data. For instance, Sady, Zak, and Rzepka (2019) used an action-oriented case study, along with a triangulation of quantitative data, to determine the insights on the role of universities in sustainability-oriented competency development. Similarly, Amungwa (2018) recommends integrating action as a rural development strategy by triangulating qualitative and quantitative data on the unemployment issues among Cameroon's graduates to determine actionable ways to make an impact on their long-term economic crisis. I argue that the integration of neural networks and triangulation during the planning phase of the action research cycle is assistive in making SCM programs adaptable to changing economic landscapes in real-time.

### **2.8.1 JUSTIFICATION FOR USING AR, TRIANGULATION, AND ANN AS A METHODOLOGICAL FRAMEWORK**

Considering economic development as a central issue, the literature review revealed triangulation with ANNs as a methodological tool adds value to the action research process. This framework is justified to discover departmental implications for economic development at a regional level. Action research scaffolds the way my department can contribute towards economic development by capturing various community perspectives with surveys and reflective interviews during the construction phase. Triangulating both the survey and reflective interviews cross-checks and validates my complex data, enhancing my ability to make prescriptive decisions relevant to community needs. A neural network emerged as a tool to make meaning of complex economic data to unearth the areas that my university department can focus on to contribute towards economic growth (Walczac, 2011; Motoyama and Mayer, 2017; Amungwa, 2018; Romanchukov et al., 2019; Sadyet et al., 2019). It is important to note that the ANN does not confront but complements the action learning process. The ANN analyzes the economic data during the action research cycle's planning phase to provide a richer insight into my research questions that need quantitative and qualitative answers. If I did not incorporate an ANN in this study, it would be challenging to unearth the specific contextual variables that I needed to focus on within my scope of practice. Triangulation is an important part of the planning stage of the action research cycle. It is instrumental in unearthing the variables relevant to this study's context. Additionally, the ANN constructs a visual representation of quantitative and qualitative data, enabling deeper connections to the data collected through

double loop thinking. In this research, I argue that the neural network supports the action research process by gaining additional perspectives of the economic variables pertinent to the local community to guide the data analysis to make data-driven decisions that can have a positive economic influence.

## **2.9 SYNTHESIS OF RESEARCH FINDINGS**

Based on the systematic literature review conducted, the key domains of literature that relate to this study are the triple helix and anchor institution models, action research, and knowledge transfer theories (Etzkowitz and Leydesdorff, 2000; Dubb and Howard, 2012). Since this study sought to understand regional growth barriers, R&D capabilities, and the SCM educational interventions needed, this required rethinking the anchor institution model. The anchor institution model choreographs the internal strategic management of knowledge, capital, and resources to make an economic impact. However, to determine barriers to regional growth, my department must obtain insight from outside stakeholders.

The triple helix model, which focuses more on external economic insight, allows room to gain a robust perspective of the economy. This is also relevant to the topic of this thesis because with an outside stakeholder perspective, my department can be more adaptive and flexible to changing economic needs. Therefore, having the community members' insight helps my department create SCM educational programs that play a role in breaking down barriers to regional growth.

The literature review pertaining to action research and knowledge transfer theories also proved fruitful to this study. To extract applicable knowledge from community members for a programmatic change, action research enables me to gain practical knowledge through construction, planning, action, and reflection. Additionally, knowledge transfer theories help me transcribe the knowledge into locally relevant programs to make a positive economic impact. Knowledge transfer theories guide the applicable production of knowledge, especially surrounding R&D, from the SCM departmental programming standpoint. Since this study sought to understand the ways my program can contribute to the regional economy, a neural network supports the planning phase of the action research process by triangulating the variables and factors that are within my scope of practice that I can adapt to contribute towards economic advancement. Based on a synthesis of these domains of literature, a mixed-methods action research methodology emerged as the necessary approach to identify the economic

development variables that my department can focus on to drive change in how our programs and services address the unique needs of an economy in crisis.

### **2.9.1 THEORETICAL FRAMEWORK**

For my department to contribute towards the local efforts of economic revitalization, action research, knowledge transfer, and economic theories become the pillars to drive change.

Action research theories emerged as one of the three core bodies of knowledge critical for informing my research questions. These theories built a framework of construction, planning, action, and reflection to drive change in my specific context through community collaboration and reflection. Due to the reflective questioning process, using an action research method connected to an enhanced understanding of what changes my department needed to make to pave the way forward in making an economic contribution to society (Lewin, 1947; Raelin, 2003; Luscher and Lewis, 2008; Coghlan and Brannick, 2014). Insights from the action research theories provided opportunities to gain new knowledge about local economic development by involving the community and government leaders to question underlying assumptions and former practices of our SCM programs (Argyris, 1993; Coghlan, 2003). Leveraging on the need to adapt business educational offerings to meet the local community's needs, I use this research to create an action-oriented plan that initiated the change process to take the steps needed for my department to positively impact the community. Thus, the information gleaned about action research theories are key to underpinning this study.

Knowledge transfer was the second key theory that emerged from the systematic literature review. O'Mara (2005) suggests that an abundance of money, an influential university, the right location with control over land, and high-tech development as the end, not the means, are essential to developing a "city of knowledge" that makes an economic impact on its population. This opens the door for regional branch campuses, like TAMUT, to actively manage their contribution to the economy. Thus, the final key in developing cities, or "regions of knowledge," is to create partnerships with local actors to adapt research for use in the local economy and persuade governmental entities to invest in educational institutions that produce high-impact knowledge and improve the locals' quality of life. Since this study sought to impact the local economy, the knowledge transfer theory was found to be essential.

The university models and neural network scholarship were the third prominent literature domains that emerged to guide my research inquiries into the selected phenomenon. The contextual university and economic models were needed to refocus my department's economic development agenda to change how our programs and services are adapted to meet an economically depressed region's need. Informed by university models' scholarly contributions, knowledge creation, and neural networks, a theoretical scaffold for action research was established. Current university models address different ways that colleges can engage in their communities for economic development; however, these studies talk in general terms without connecting to action research or microeconomics to make a tangible impact (Caffrey and Issacs, 1971; Etzkowitz and Leydesdorff, 2000; Uyarra, 2010; Abel and Dietz, 2012; Dyllick, 2015; Motoyama and Mayer, 2017). My research focuses on an actionable situation that explores the connection between SCM curricular changes and economic development through enhanced workforce training and human capital improvement (Lewin, 1947; Collier, 1992; Caldwell, 2003; Raelin, 2003; Amanor-Boadu, Marletta and Biere, 2009). Thus, the use of neural networks allows my action research to analyze and contemplate data variables in real-time, allowing my solutions to be responsive to numerous factors that may be unanticipated by business managers (Romanchukov et al., 2019; Guohong, 2020). As such, the neural network supports the action research process by gaining insight into economic variables pertinent to the local community to guide the data analysis and make strategic decisions that can play a role in economic development. Through this systematic literature review, I learned more about these key domains, gained a scholarly perspective of my workplace problem, and identified the proper methodological framework suitable for this study.

### **2.9.2 REFLECTIONS ON THE VALUE OF OUTLINED THEORETICAL FRAMEWORK**

The synthesis of the research findings revealed gaps in the scholarly literature which this study sought to address. Scholars recognize the pitfalls associated with monomethod research when investigating university economic development contributions (Caffrey and Issacs, 1971; Abel and Dietz, 2012). Also problematic is that the literature review revealed that action research typically does not connect to the quantitative design elements often needed in economic development research (Lewin, 1947; Kemmis and McTaggart, 2007). Equally important, economic theories fail to connect to the socioeconomic side to understand society's implications. As revealed in the literature, each of these problems is a challenge that must be overcome in this study. Thus, a mixed-methods action research approach emerged as the best course of action and added scholarly value to join the social element to the economic

component necessary to inform my research questions. The theoretical framework that emerged from the systematic literature review informed the methodology, data analysis, and subsequent findings of this study with practical implications for SCM programming at my university. This review of relevant literature informed me of the best way to formulate this study and the methodology to gather quality data to answer the research questions. Based on the concepts under investigation, this literature review also emphasized the need to use a triangulated approach to data collection and analysis that allows the topic being studied to be analyzed from various angles in order to provide the most robust level of understanding.

# CHAPTER 3: METHODOLOGY

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## 3.1 INTRODUCTION

This chapter explains my mixed methods action research methodology and describes my epistemological and ontological positions. It further justifies the pragmatic philosophical paradigm for this study, acknowledging multiple realities and perspectives (Bhaskar, 1975; Ray and Sayer, 1999; Johnson and Duberley, 2000; Creswell, Plano and Cark, 2011; Thorpe and Holt, 2008). A mixed-methods approach to inform the chosen action research methodology was justified to view and understand the phenomenon with rich and diverse data, supporting my pragmatic research philosophy (Ray and Sayer, 1999; Creswell, Plano Clark, 2011). To drive actionable change, I found it essential to seize the richness of Texarkana's workforce through an MMAR approach. As per the literature, one method could not capture the complexity of the interconnected systems that impact regional economies to create adaptive SCM programs and services flexible to economic changes. Researchers argue that pragmatism and action research are highly compatible as each of the action research phases follow a period of reflection to generate new knowledge in management research. Therefore, I used this symbiosis of pragmatism and action research to tailor business educational programs to local business needs to drive actionable changes (Dewey, 1938; Lewin, 1996; Greenwood and Levin, 2007; Coghlan and Brannick, 2010).

## 3.2 RESEARCH PARADIGM

This section justifies and explains why this thesis follows a pragmatic research paradigm, which is an epistemological position that defines knowledge according to its utility and examines how it is suitable for this action research study (Mc Henry, Sanderson, and Siegfried, 2012). It delves into the reasons other philosophical perspectives are rejected. Each choice, strategy, and approach are shaped by my ontological and epistemological positions, which constructs the research methodology, procedures, and methods.

Multiple routes to knowledge exist due to the constellation of research ontologies and epistemologies that guide research endeavors. One criticism of management researchers is ill-informed philosophical positions (Whitley, 1984). The epistemology forms a framework for the management researcher not to stray against the research foundation. Therefore, proper management scholars define their epistemological theory and research paradigm that informs their study before scientific theoretical practice begins. Understanding my epistemological

perspective is vital to distinguish between reliable and unreliable knowledge (Bhaskar, 1975; Johnson and Duberley, 2000). The implication is that management researchers need to reflect on philosophical assumptions while engaging in management research.

My epistemological lens aligns with personal views of what constitutes scientific research and advances the knowledge economy. As a researcher, I position myself within the research as both a participant and observer, rejecting impartiality and embracing critical reflexivity while being a part of knowledge creation. I find it necessary to engage with stakeholders through a dialectical stance encompassing multiple mental modes reflective of diverse viewpoints. This is vital to critically select the best approach to address the complexities of modern societal interactions to discover practical solutions. Through this process, I incorporate retroduction to deepen my understanding of organizational structures and the mechanisms involved that generate observable events.

A pragmatic epistemology supports a mixed-methods approach through the collection of qualitative and quantitative data, which is suitable for this thesis (Creswell, Plano and Clark 2011). Practical and relevant knowledge considers the functional and unique value of “what works,” which in this thesis necessitates the collection of multiple data sources. Through subject-object transitions, a pragmatic position distinguishes the will of action from the consequence of action to form knowledge that helps people deal with the world around them (Dewey, 1938). Practical interventions in action subject the phenomenon to the tolerance of reality, which has imposed pragmatic limits due to the availability of conceptual resources. Thus, science becomes a social activity where an intransitive reality confronts changes based on socially constructed transitive practices.

A vital component of TAMUT’s strategic plan is “engaging with local community groups and businesses to mutually progress regional needs” (Texas A&M University-Texarkana, 2018, p. 4). This strategic plan centers this research on a pragmatic paradigm where the negotiated consensus of the community generates knowledge. Due to the complex nature and emergent properties of the stakeholder relationships that impact local economic development, a positivist research philosophy would not offer a flexible approach applicable to the open system of the region. The societal ecosystem that encapsulates this region is not a stable and deterministic machine, the antithesis to the positivistic closed system. Building on Dewey's (1938) argument that knowledge is generated through cycles of action and research, this corroborates with a pragmatic view where knowledge is practical. This thesis attempts to eschew the pre-processed



nature of the supply chain management business curriculum to generate a prescriptive approach to SCM programming that meets the needs of the local business climate. I chose a philosophical position that pairs well with a methodology that requires a reflexive political praxis by the participants involved, which in this case were local businesses, civic, government, and university leaders.

### **3.3 ACTION RESEARCH COMPLEMENTED WITH NEURAL NETWORKS**

This thesis follows an innovative action research process that integrates a neural network that complements the cycle of construction, planning, action, and reflection within this study. The action research process with a neural network is vital to pursue practical changes for my department as this research unfolds (Lewin, 1947; Coghlan and Brannick, 2010). Each phase has an immersive, emergent, and iterative cycle that includes experiencing, understanding, judging, and acting on the problems encountered in my department and the surrounding community (Coghlan and Brannick, 2014). Figure 4 below represents the action research cycle and four phases implemented in this research (Coghlan and Brannick, 2014). Additionally, the figure highlights the neural network components in red within the action research cycle.

## Action Research Cycle Phases Timeline

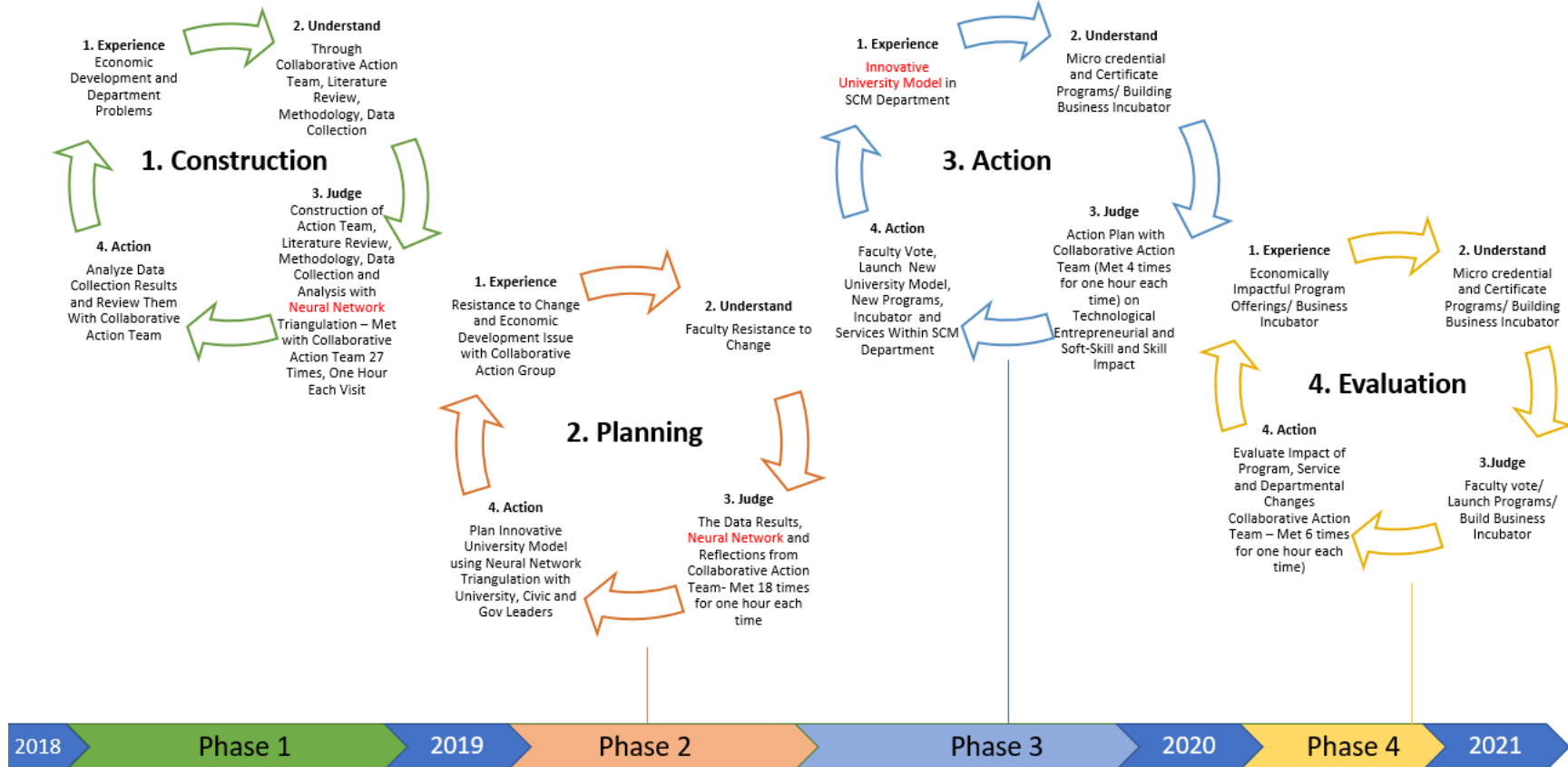


Figure 4. Action Research Phases in this Thesis

Source: Coghlan and Brannick (2014)

The action research process began in 2018 when I first drafted my proposal to this research and ended in 2021, when I submitted this thesis. Thus, the action research cycle and phases lasted the duration of this research journey. To fully articulate how the neural network complements the action research process and detail the timing and process of collaboration with others, I found it necessary to break down each action research phase.

The first phase involved constructing and conceptualizing Texarkana's economic development problems to understand the departmental changes needed to strengthen our role in broader economic development efforts. The construction phase entailed critical reflections with relevant stakeholders, a literature review, a methodology guided by the literature, administering a survey, conducting interviews and collecting economic data. This phase also consisted of the construction of a neural network. At the beginning of this phase, I created my critical action team, which consisted of Chamber, university, and business leaders. This was done to reflect and construct the economic development issues to better understand what actions my department needed to plan out to make a positive contribution to the local economy. Next, I conducted a literature review to inform my research questions and explore the theoretical foundations of actions. Then, the population sample was identified and informed by the literature to include the top fifty largest businesses and government officials. After the sample was identified, data was collected through a BR&E survey. After I collected the survey data, I held dialogic and critically reflective interviews with a sample of 35% of the survey participants to cross-check, validate, and better understand the survey results (Lewin, 1947). Then, I triangulated the survey and interview data with economic data in my region to develop SCM programs that match the industrial economy. It was necessary to use an innovative approach to connect the views of the locals to relevant economic data to build programs and services that evolve with industry needs. Section 3.5.4 details the neural network process and the utility of integrating it in the action research process. However, it is essential to underscore that quantitative and qualitative data were necessary to curate legitimate knowledge to promote social changes through SCM education.

The planning phase flowed from the theoretical and contextual framing of the issue and diagnoses with my critical action team. During both the construction and planning phases, I shared the neural network model plan to triangulate quantitative and qualitative data with economic modeling to predict and plan the most impactful changes our department can make with our SCM programs and services. The neural network model acts as a real-time feedback loop where industry, university, and government leaders gain access to practical, relevant, and

timely economic development information to break down communication barriers and start reforming developmental efforts. The outcomes of the neural network were subjected to reflections from this study's critical action team. Equally important, I collaborated with stakeholders to gain insight into my interpretation of the findings and plans for action. After considering the collaborations and reflections with the stakeholders, I constructed a resilient and flexible university model for economic impact that was prescriptive to my region, university, and department. Additionally, I planned how to navigate faculty resistance to change.

During the action research, or third phase of the action research cycle, I held a departmental faculty vote at TAMUT to activate the innovative university economic development model for my department to modernize how we create programs and services to become economically impactful. A majority of the faculty voted the plan into action. Next, in the fourth phase, or evaluation phase, I evaluated the actions and made recommendations for future actions.

In summary, the action research cycle in this thesis integrated critically reflective collaborations during each of the four phases to understand the context, theory, and practices to plan actions for my department to contribute towards economic renewal. To increase rigor and construct and plan practical actions relevant to my region, I integrated a neural network that complemented the action research process. As mentioned, the neural network provided a feedback loop by connecting the views of business, university, and civic leaders through economic modeling in real-time to align economic development efforts. The neural network supported my action research cycle by helping me to integrate the economic and educational dimensions critical in answering the research questions in this thesis.

### **3.3 1 RESEARCH APPROACH**

This thesis utilized triangulation in a mixed methods action research approach. This approach combines conceptual frameworks of neural networks through actionable practice. This method is valuable in integrating theory, practice, and useful applications derived from multiple sources of evidence to drive actionable change for how my department develops programs for regional growth (Hibbert, 2010; Herr and Anderson, 2005; Greenwood and Levin, 2007). When reviewing the literature, I found that incorporating a triangulation and MMAR approach was necessary to make sense of the quantitative and qualitative design elements. Thus, my research approach makes a significant contribution in terms of bringing forth university economic development models that connect the quantitative side of the research that is frequently neglected in action research.

In reviewing the research and the methodological implications from researchers in the field, Halaby (2016) stands out for contending the viability of using a college or university as an economic incubator with quantitative data collected with a survey and qualitative data collected from the case studies through a pragmatic epistemology. In addition, this thesis considers Leydesdorff and Etzkowitz's (2003) research approach by incorporating action research with 200 participants in a critical reflective interview to ascertain if the public is a fourth helix in university models due to university-government relations. However, a critical and pivotal point of consideration occurred when analyzing Mc Henry, Sanderson, and Siegfried (2012), who unearthed methodological issues associated with studying the economic impact of colleges and universities. In this research, it is argued that most research approaches do not account for multiple factors, including spillover benefits from increasing human capital and added local tax benefits. Thus Mc Henry Anderson and Siegfried (2020) underscored the importance of conducting this research with mixed methods.

When considering a research approach, I first turned to the existing literature to see how quantitative, qualitative, or mixed approaches operated in related studies in this field. Reviewing the literature helped me understand the dominant research approaches in my field of study, which are applicable to this thesis. Related to qualitative research methods, current research on the impact that universities have on economic development relies on conceptual models (Gibbons et al., 1994; Etzkowitz and Leydesdorff, 2000; Leydesdorff and Etzkowitz, 2003; Srinivas and Viljamaa, 2008; O'Lawrence and Martinez, 2009; Uyarra, 2010; Dubb and Howard, 2012; Hecht, 2012; Dubb et al., 2013; Guinan et al., 2013; Lopez, 2013; Ehlenz et al., 2014; Pugh et al., 2016; Karpov, 2017; Lendel and Qian, 2017; Motoyama and Mayer, 2017; Balashov et al., 2019). However, some scholars in this management research field have relied heavily on the statistical evaluation of workforce data (Valero and Reenan, 2016; McHenry et al., 2012). Others leverage their research approaches on case studies related to the university involvement in community economies (Porter, 1991; Aamot, 2018; Nickoli, 2013; Duke, 2014; Harwick, 2017; Semuels, 2017). Abel and Dietz (2012) investigate how a university increases the region's human capital through a qualitative empirical model.

Triangulation became a recursive theme in how colleges have studied economic impact through educational programming (Sagor, 2005; James, Milenkiewicz, and Bucknam, 2008; Motoyama and Mayer, 2017). Sagor (2005) contends that triangulating multiple data sources increases the credibility of research arguments in developing relevant and feasible action plans. James et al. (2008) argue that using the triangulation of qualitative and quantitative data created more

rigorous and cohesive conclusions and results. Motoyama and Mayer (2017) revisited the roles of universities for economic development by triangulating the data of several case studies and surveys. Thus, I found that research related to understanding the economic contributions colleges and universities have on local economies provided a robust framework for my thesis to utilize triangulation in a quantitative and qualitative sequential MMAR approach.

### **3.3.2 RATIONALE FOR USING QUANTITATIVE AND QUALITATIVE METHODS**

Stakeholders are mutually grappling with ways to revitalize the local economy. Through the insider researcher role, an opportunity existed to connect qualitative and quantitative data in real-time to break down communication barriers and provide open access to information between civic, university, government, and business leaders, with mutual economic development interests. Stakeholder acceptability came naturally in this thesis. The aim was to positively contribute to the community by providing a pipeline of impactful and skilled laborers to the region through relevant and innovative programs and services. Using both qualitative and quantitative data was necessary to gain a majority faculty vote among my academic colleagues. However, the decision to use a mixed-methods approach was initially driven by the literature. The scholarly works revealed the importance of including mixed data from the university, business, civic, and government leaders with economic data modeling to reform programs adaptive to industry changes (Caffrey and Issacs, 1971; Leydesdorff and Etzkowitz, 2003; Abel and Dietz, 2012). In order to make a sound argument for how reforming SCM programs and services can play a role in improving the local SCM industry and thus impact the economy, real-time information access between the university and local relevant businesses was necessary.

To derive a mixed-methods methodological decision, I first critically assessed the quantitative and qualitative approaches colleges and universities use in economic development studies. I found rich scholarly insights that led me towards this approach. Action research and a neural network feedback loop between stakeholders complement one another and assist in communicating mutual economic development initiatives (Guohong, 2020). Equally important, this study focuses on how my department can play a role in broader economic initiatives; thus, my colleagues and researchers in the field who are economists would expect to see economic modeling as a component of this research. To argue the need to rethink how we offer programs and services to impact the economy, I must show how our current anchor institution model fails to adapt to change. To do this, integrating a neural network that connects the elements of the triple helix model, i.e., government, university, and civic leaders, through real-time economic modeling is key. This allows me to make strategic decisions that can impact the local supply

chain industrial economy as it faces new challenges. Having access to an adaptive model of change and bringing together the societal views from civic and government leaders in real-time generates a competitive advantage for our ecosystem.

In this study, collecting quantitative and qualitative data was essential for modernizing how my department structures programs and services to provide relevant industrial economic development tailored to the local society's needs. First, I collected survey data from a pool of the largest businesses in the region to gain knowledge on economic development barriers. Twenty-three out of the fifty firms participated in the survey, which is a forty-six percent response rate. This data sample represents the leadership of 14,517 local employees or 21% of the total Texarkana population. It is critical to understand that this study occurs in a small town with a majority of the locals working at the Red River Army Depot. Leadership is saturated across few businesses, which is why there is a small population of leaders to sample. My sample size aligned with well-established research in this field of study (Patton, 1990; Creswell, 2013; Aamot, 2018; Dubb, 2019).

Next, I interviewed seventeen out of the twenty-three surveyed, identified as key informants by my collaborative action team, to cross-check and validate survey findings. After that, I triangulated the quantitative survey with the qualitative interview data and economic data from my region. Following the guidance of the literature and the requirements of economic modeling, specifically in understanding growth rate, GDP, and education levels, I used the thematic outcomes from the survey and interview findings to create linear regression models. The regression models provide parameters that guided the areas that needed further exploration (Blomqvist, Mann, and Sumpter, 2018; Guohong, 2020). The regression findings served as the basic building blocks, or perceptrons, to build the neural network used in this study. As per the literature review, data from the U.S. Bureau of Labor, the Postsecondary Education Data System (PEDS), and Federal Reserve Economic Data (FRED) are needed to bring additional facts regarding the importance of education to economic development. This has been most recently done through a neural network approach (Caffrey and Issacs, 1971; Abel and Deitz, 2012; Cooke, 2018-2019; Guohong, 2020). Figure 5 below illustrates the qualitative and quantitative variables under consideration, the source of the data analyzed, the guidance provided by the regression models, and the three themes derived from the neural network.

## Innovative University Model: A Neural Network Approach

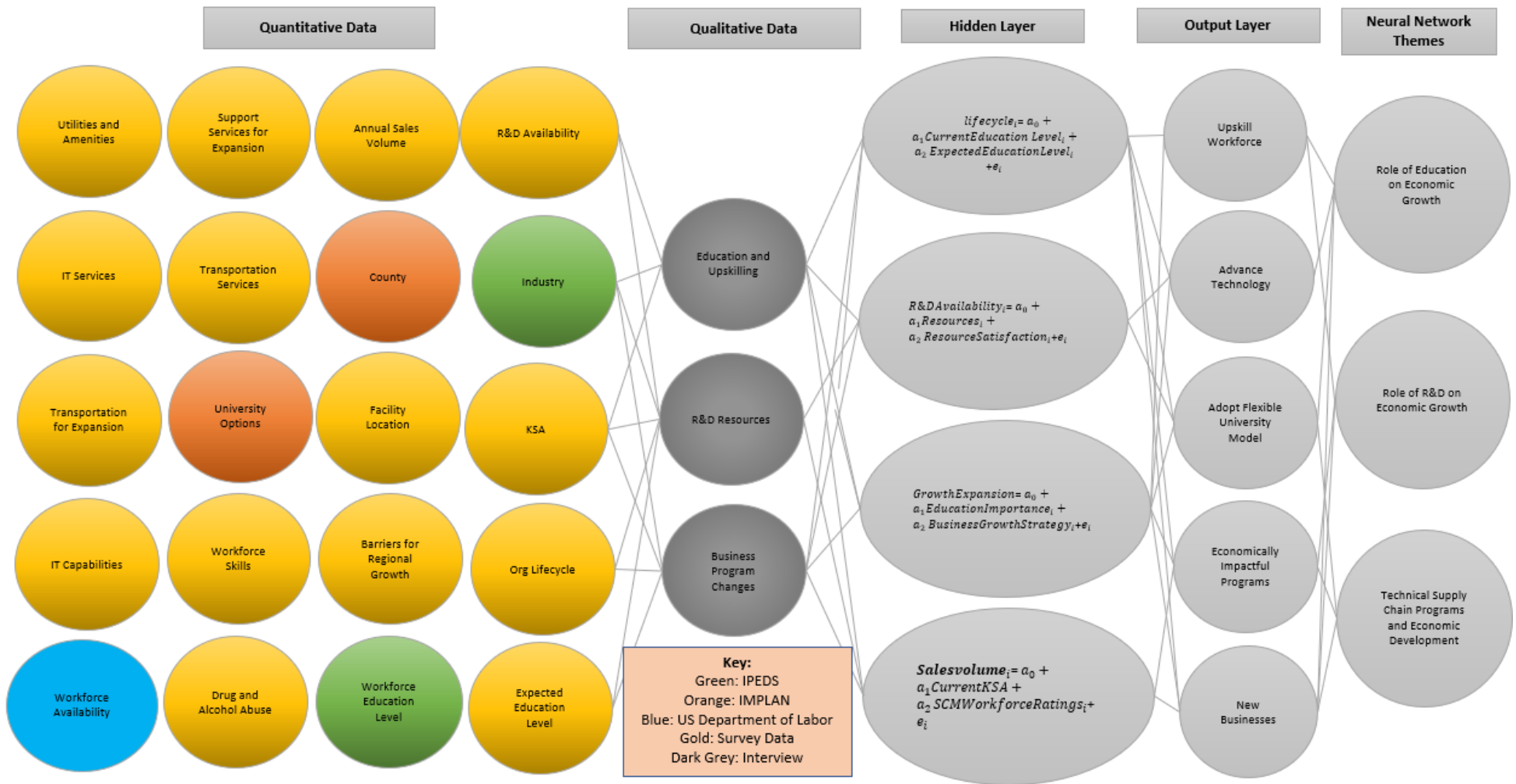


Figure 5: A Neural Network Approach – Created for this thesis

Sources: Caffrey and Issacs (1971); Abel and Deitz (2012); Cooke (2018-2019); Guohong (2020)



Each data variable “node” within the model corresponded to specific questions from the business retention and expansion survey, data collected from FRED and IPEDS databases, and human capital issues discovered during one-on-one interviews. Figure 5 identifies the data source of each “node” with a key presented at the bottom of the image. The neural network provided a visual that effectively represented the top three regional concerns. Moreover, it connected these specific community issues with abstract theories to generate real-world outcomes applicable to the Texarkana workforce. The neural network also constructed a visual representation of the survey, interview, and economic data collection results, enabling me to connect deeper meaning to the data collected through double loop thinking. Equally important, the information connects directly to data sources, which updates in real-time. This model gives business, university, and government leaders access to streamlined data to make headway on joint missions to revitalize the local economy. The neural network also constructs a visual representation of the quantitative and qualitative nodes and their relationships, enabling me and other stakeholders a way to connect deeper meaning to the data collected through double loop thinking.

The qualitative and quantitative samples in this study allowed me to achieve saturation and data satisfaction. The data reached the point where no new information would be garnered with more participants or data (Ivankova, 2015). By collecting purposeful and homogenous data from a population of information-rich individuals, I gained access to relevant knowledge central to this study's research questions and purpose and gave stakeholders real-time access to regional economic data (Patton, 1990; Creswell, 2013). The neural network provided an interconnected system for data sharing across stakeholders that can make a measurable impact on the economy. The implication of not integrating a neural network as part of this study would have been a lack of conscious coordinated efforts between local industries, local government officials, and our SCM offerings. Access to a collaborative model that is rich with stakeholder perspectives and regional economic information presents opportunities to be more transparent in an effort to drive economically impactful change.

### **3.4 RESEARCH DESIGN**

Figure 6 below represents the research design model that I created for this thesis by adapting Saunders, Lewis, and Thornhill's (2009) “research onion.”

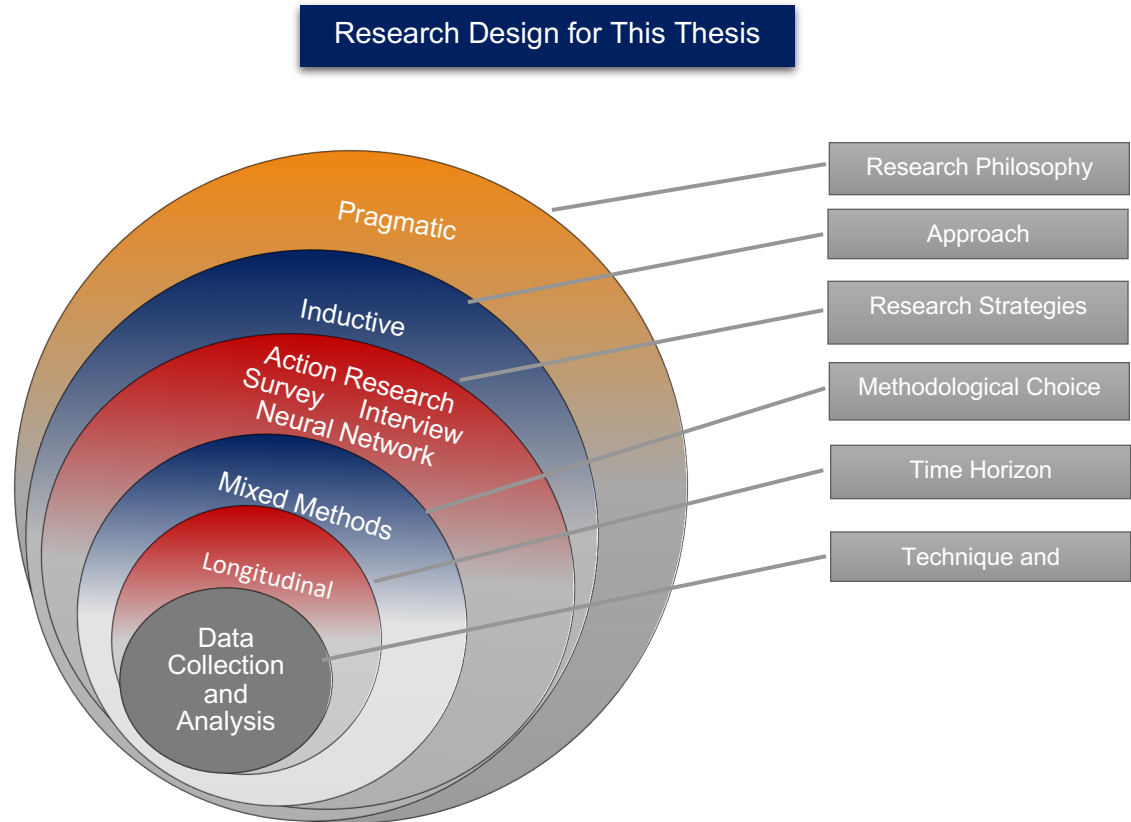


Figure 6:: Thesis Research Onion Adapted from Saunders, Lewis, and Thornhill (2009)

This study required qualitative and quantitative strands to address the research questions in this study. The best approach was to converge or diverge the strands when addressing the research questions to decrease any discrepancies during the joint data interpretation phase. This research used an innovative approach by incorporating neural networks as an analytical tool to mix quantitative (Quan) data with qualitative (Qual) data. The neural network tool helps with qualifying the quantitative data first using statistical methods to identify the key themes that emerged by comparing and contrasting the findings to the qualitative data set to provide multiple lines of sight to enrich my understanding of stakeholder perspectives. The neural networks drew connections by triangulating and coding the emerging themes during the qualitative and quantitative research phases, which provided data-driven ideas by comparing the quantitative results to the qualitative results (Lyons and De Franco, 2010).

Through this research design, I collected the quantitative data first, then the qualitative data. Next, I triangulated the data and analyzed the results to create a rich picture of stakeholders' views, attitudes, and behaviors to increase validity through cross-checking. Figure 7 below breaks down the MMAR quan+qual triangulation design utilized in this thesis.

### Mixed Methods Action Research Concurrent Quan+Qual Triangulation Design

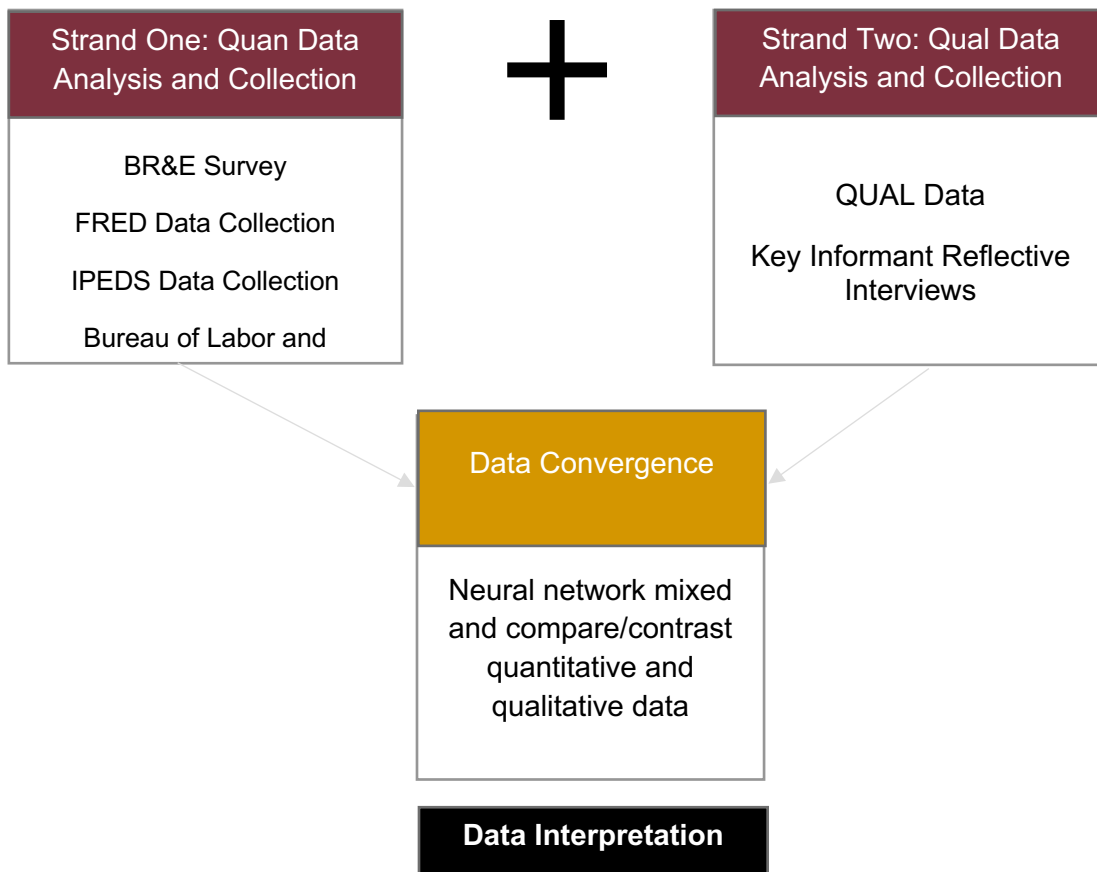


Figure 7: Research Design for this Thesis: Adapted from Teddlie and Tashakkori (2009)

Source: Teddlie and Tashakkori (2009)

## 3.5 DATA COLLECTION

### 3.5.1 DATA NEEDED FOR THIS RESEARCH

To unveil workforce issues in the Texarkana region and how my department can address these problems with programs and services, both qualitative and quantitative data were required. The first data collection phase of this study was quantitative and influenced the actions of the qualitative research phase. The quantitative phase consisted of the Business Retention and

Expansion Survey (BR&E), guided by the research questions within this study (Forza, 2002). The survey aimed to collect a diversity of perspectives on local issues and identify individuals to follow up with one-on-one interviews. I began the quantitative data analysis section of this chapter by explaining the data collection strategy for the BR&E survey to focus the analysis on my locus of control in terms of economic impact. The longitudinal and iterative nature of the qualitative and quantitative data strands available to this study presented a rich picture of the societal ecosystem. Therefore, an MMAR methodology is ideal for discovering practical resolutions. The qualitative component of this study was necessary to collect data related to potential restraints and limitations to economic development (Creswell, 2013). Interviews, naturalistic observation, audio-visual materials, focus groups, documents, and photo-voice are the most common sources of data within a mixed methods action research study and were all considered for this study (Ivankova, 2015). The process of sample identification and data collection sources for this thesis are detailed and justified in the sections below.

### **3.5.2 DATA COLLECTION METHOD**

When choosing between available data sources to inform my research problem, I formed a chart, illustrated in Table 4 below, that synthesizes other scholars' qualitative and quantitative data source choices and the advantages and disadvantages of each within an MMAR study.

<b>Advantages and Disadvantages of Qualitative Data Sources</b>		
<b>Qualitative Advantages and Disadvantages</b>		
<b>Data Source</b>	<b>Advantage</b>	<b>Disadvantage</b>
Individual Interview	<ul style="list-style-type: none"> <li>Accounts for first-hand stakeholder experience</li> <li>Explores useful and relevant plans of action</li> <li>Inspires collaboration and involvement</li> </ul>	<ul style="list-style-type: none"> <li>Time-consuming and transcription can be labor-intensive</li> <li>Recordings may be intimidating</li> <li>Requires training in qualitative interview and transcription</li> </ul>
Focus Group Interview	<ul style="list-style-type: none"> <li>Explores the experiences and views of different stakeholders</li> <li>Triangulates the scope and depth of the problem and utility of actions/interventions</li> </ul>	<ul style="list-style-type: none"> <li>Attendance can be challenging to achieve</li> <li>May require incentives for participation</li> <li>Issues of power may prevent equal voice</li> <li>Requires training in recording techniques</li> </ul>
Observation	<ul style="list-style-type: none"> <li>Captures first-hand experience in natural settings</li> <li>Reveal details that may not be captured within other methods</li> <li>Identify gatekeepers of information</li> </ul>	<ul style="list-style-type: none"> <li>Can disrupt routines</li> <li>Necessitates attention to detail and good listening skills</li> <li>Natural behavior can be affected due to being observed</li> <li>Requires proper training on recording techniques</li> </ul>
<b>Quantitative Advantages and Disadvantages</b>		
Survey	<ul style="list-style-type: none"> <li>Collect background information about the issue and stakeholders' perspectives over a short period of time</li> <li>Identify individuals of interest for an interview, a focus group or observation follow up</li> </ul>	<ul style="list-style-type: none"> <li>Time-consuming and may require training on unbiased questioning that elicits honest answers</li> <li>Procedures must be followed for survey administration and population identification</li> <li>The response rate is typically low</li> </ul>
Assessment	<ul style="list-style-type: none"> <li>Collects benchmark data or sets up a baseline to test the effectiveness of an intervention or can be conducted during reconnaissance</li> <li>Randomized controlled trials launched to assess intervention</li> <li>Identifies individuals to follow up with during an interview or focus group</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to develop the test with credible psychometric properties</li> <li>Must follow systematic and standardized procedures when collecting</li> <li>Procedures require training, so involving stakeholders and community members in assisting with collection is problematic</li> <li>Requires training of recording techniques</li> </ul>
Observation Checklist	<ul style="list-style-type: none"> <li>Notes change over time and is effective for testing interventions</li> <li>Fosters reflective discussions</li> </ul>	<ul style="list-style-type: none"> <li>Time-consuming and requires training to develop pilot study and checklists to capture behaviors that are targeted</li> <li>Specific behaviors must be intuitive and precise so that it can be recognized</li> <li>Training to properly use the checklist is needed</li> </ul>

Table 4: Advantages and Disadvantages of Qualitative and Quantitative Data Sources

Source: Teddie and Tashakkori (2009), Creswell (2013), Stinger (2014), and Ivankova (2015)

The chart helped me to choose a survey over the observation checklist and assessment as part of my methodological framework. A survey was selected because it is an effective method to collect a multiplicity of perspectives of the local issues in order to inform the action/intervention plan that makes progress in aligning business education with regional economic needs. Further, surveys are an instrumental collection method that has a spillover benefit of identifying individuals to follow up with for a one-on-one interview. An assessment did not apply to this study as the predominant aim of an assessment is to evaluate performance, ability, or health condition. Observation checklists were disregarded for this study since this research includes multiple stakeholders across the region who form the socioeconomic system.

The qualitative data sources used in this study were one-on-one interviews and a reflective journal. The most common data source in action research is an interview to unearth unarticulated knowledge about perspectives, views, and experiences related to the research problem (Ivankova, 2015). Buchanan and Bryman (2007) contend that analyzing a phenomenon from a diversity of perspectives connects to improved prescriptions to issues through the reflective questioning process. A survey instrument was a quantitative data string within this study. The methods in this thesis adhered to pragmatic epistemology and MMAR methodology to increase opportunities for reflection during data collection.

### **3.5.3 IDENTIFYING THE POPULATION SAMPLE**

Tashakkori and Teddie (2003) described sampling as collecting a set of artifacts from a small portion of a larger unit to maximize the ability of the researcher to address the phenomenon within the study. There are two types of samples within the MMAR literature: probability/nonprobability (random selection with equal opportunity) samples and purposeful samples (intentionally selecting individuals that have knowledge that can inform the research problem) (Creswell, 2013). As a practitioner-researcher, considering the sample size and sampling method is crucial for a sound MMAR study. The methodology chapter was informed by the literature review and the sample sizes that similar research utilized. A small number of sampled participants within an area of interest can be adequate to discover a resolution to a community-oriented issue, given the right sampling method (Ivankova, 2015). For instance, Aamot (2018) conducted a case study on how one university can impact a local economy by studying a region of 65,000 residents surrounding Bemidji State University with a homogenous and purposeful sampling of fifty relevant stakeholders to determine generalized ideas about colleges and economic development.

Another example is how Dubb (2019) used a homogenous purposeful sampling of seventy-two local business, civic, institutional, and government leaders to obtain data to understand the impacts of homegrown economic activities on stimulating the local economy in order to present an example that other universities can follow. Therefore, these comparable research endeavors presented a scaffold by which to build a representative and statistically significant sample for this study. In alignment with the literature, I collected purposeful and homogenous data from a sample of individuals from the top fifty largest businesses in the area to provide useful knowledge central to the research questions and purpose of this study (Patton, 1990; Creswell, 2013). A homogenous and purposeful technique improves rigor by selecting informative local educational offerings and economic development concerns (Patton, 1990; Barbour, 2001). The implication of choosing a probability/nonprobability random sample would leave me sifting through irrelevant data, making triangulating relevant data problematic, and may not even consider the stakeholder's experiences that matter to my research problem. Babbie (2005) and Noor (2008) argue that purposeful sampling improves the validity and trustworthiness of data. Therefore, this thesis found the purposeful sampling method ideal to represent my population.

In the pursuit of developing appropriate criteria in order to generate a sampling pool of subjects that would bring forth rich data and an understanding of my research problem, I turned to the local Chamber, university, government and business leaders to critically reflect on various stakeholder options and their viability to shed light on my research phenomenon. I did this to critically reflect and leave no stone unturned in choosing a homogenous and purposeful sample that would provide information-rich data. Hackler (2013) advises community partners to assist with participant recruitment, which is why incorporating the Chamber and community leaders was essential in selecting a sound sample for this thesis. After these discussions and turning to the literature, I chose a sample of fifty leaders across the region's five significant industries to encapsulate a representative and diverse sample of information-rich stakeholders (Granovetter, 2005; Amanor-Boadu, Marletta, and Biere, 2009; Teddlie and Tashakkori, 2009; Creswell, 2013; Harwick, 2017; Semuels, 2017; Aamot, 2018; Dubb, 2019). The implication of not including information-rich sources that understand the local economy and the key constituents that know information about my research problem would be data results that are non-actionable to contribute towards economic development.

With the criteria of being a “top 50 business” as those that employ over fifty employees in small-town Texarkana, a homogenous case sample was purposefully selected based on size and number of employees to increase validity (Ivankova, 2015). The significant businesses have 23,692 employees from an overall 67,592 residents (Texarkana Chamber of Commerce, 2019).

Further criteria for my sampling subjects included being a C-suite level executive at one of the largest fifty local employers. After the BR&E Survey was conducted (Quantitative data collection phase), the next phase of the sequence was to interview at least 35% of the respondents, which is a statistically reliable and homogenous sample of surveyed subjects. The surveys were conducted to incorporate qualitative data that dives deeper and provide insights into the survey areas that needed more expansion and clarity. Each participant was coded with a pseudonym to remain anonymous. The pseudonym of the participant, number of employees, and interview involvement is shown in Table 5 below



Survey Participants: Pseudonym, Participant, Number of Employees, and Interview Involvement				
Pseudonym	Employer	Primary Local Function	Total Employees	Interviewed
Kevin	Red River Army Depot & Tenants	Manufacturing	4135	Y
Charles	CHRISTUS St. Michael Health System	Healthcare	1800	Y
Todd	Cooper Tire & Rubber	Manufacturing	1750	Y
Adam	Southern Refrigerated Transport	Logistics	1235	Y
Jon	Domtar, Inc.	Manufacturing	900	Y
Denny	DLA Distribution-Red River Army Depot	Manufacturing	623	Y
Tim	Collom & Carney Clinic	Healthcare	611	N
Breanna	Ledwell & Sons Enterprises	Manufacturing	435	Y
Angel	Texarkana, Texas – City	Government	395	N
Johnny	Orr Chevrolet	Service	395	Y
Samantha	E-Z Mart Stores, Inc.	Service	275	N
Sarge	McDonald's	Restaurants	255	Y
Mary	AEP/SWEPCO	Service	250	Y
Ben	Texarkana, Arkansas – City	Government	240	Y
Denn	TAMUT	Service	220	N
Alice	Smith-Blair, Inc.	Manufacturing	200	N
Marie	New Millennium	Manufacturing	100	Y
Jerry	Sonic	Restaurant	180	Y
Tom	Tyson Animal Food	Restaurant	118	Y
Timny	Four States Fairgrounds	Entertainment	113	N
Fred	TSD Logistics	Logistics	100	Y
Joe	FedEx	Logistics	98	Y
Brandy	Tristate Iron and Metal	Manufacturing	89	Y

Table 5: Surveys Conducted for this Thesis

A survey and interview were conducted in this study. As argued by Creswell (2013), gaining a general understanding of the stories told by the participants is a vital step that must take place before the coding process. The reason that a holistic understanding of the qualitative data is needed is that it helps identify themes without losing contextual connections. Most importantly, it helps the researcher not take words out of context during the coding process, which helps maintain the integrity of the data. Audibly listening to the transcriptions several times and transcribing the data through NVivo and manual transcription helped me gain a general understanding of the narratives told by the interview participants. Once I confidently understood the context and had an account of the participants' views in this study, I proceeded to code the data inductively, which is detailed in subsection 3.6.1. The next sections detail the business retention and expansion survey, the key informant interviews, and how this information focused

a linear regression guided artificial neural network to make meaning of the economic data in the Texarkana region.

#### **3.5.4 THE BUSINESS RETENTION AND EXPANSION SURVEY**

The BR&E survey fully explores Texarkana's business ecosystem to consider how the SCM program at TAMUT can further adapt to the needs of the region. Ivankova (2015) argues that surveys are among the most used data collection instruments in MMAR. Although surveys are also common in other quantitative research studies, Greenwood and Levin (2007) stress that action research philosophies must inform their application. Further, many scholars (Caffrey and Issacs 1971; Roth et al., 2007; Srinivas and Viljamaa, 2008; Uyarra, 2010; Abel and Dietz, 2012; Lopez, 2013; Duke, 2014; Dyllick, 2015; Halaby, 2016; Motoyama and Mayer, 2017) use surveys as a data collection method while studying the economic impact of colleges and universities. In the pursuit of choosing to utilize a survey for quantitative data collection, I turned to the research design and methodological limitations of survey collection methods from researchers in the field. I decided to chart the research question, data collection method, theoretical position, research design, and methodological limitation of key researchers in my field of study for analysis purposes to determine the best approach for survey instrumentation. An example of part of the chart is illustrated in Table 6 below.

Core Theories	Authors	Date	Research Question	Theoretical Position	Research Design	Findings	Contribution to Theory	Contribution to Practice	Limitations	Implications for Thesis	Connections to
Economic Theories	Etzkowitz and Leydesdorff	2000	What are the dynamics of innovation?	Pragmatic	Mixed methods	University research may be the loci (or center) of the knowledge-intensive network across industrial sectors and technology	Envisions a series of hybrid relationships between government, university and industry to impact regional economic development by pooling resources in a way that increases their effect on local economies	Supplies a model to discover new knowledge, technologies and commercialize products	No clear practical application for movement across industry and government	Envisions a series of hybrid relationships between government, university and industry to impact regional economic development by pooling resources in a way that increases their effect on local economies	Can be used as an analytical tool to understand the university role and relationship to other community actors
Action Research Theories	Greenwood and Levin	2007	Book Reference n/a	Action Research	Action research methods	Action research reference material	Provides framework for action research including epistemology, ontology and methodology	Create organizational change through active participation in the research process	Trustworthiness is questioned by positivist researchers, therefore Greenwood and Levin (2007) address this through increasing validity throughout the action research process	The study's critical action team engages in neutral inquiry during real-time, which subjects the process to both scrutiny and judgment	The Action research methodology creates knowledge in action through collaboration and reflection and acts as a catalyst for change
Economic Theories	Guinan, McKinley, and Yi	2013	How can the needs of struggling communities be addressed with local institutional wealth?	Positivist	A series of case studies	Stronger communities presents opportunities for investments are allocated to the real needs of the local community	Presents an argument that when universities engage in investing in the community they can mobilize financial resources that can make big impact on local communities	Considers larger economy and extends traditional role to focus on economic activities	Scholarly perspective does not include the business school context	Practical application to pursue partnerships with the broader community	Connects to survey and interview questions

Table 6: Key Scholars on the Economic Impact of Universities that Utilize a Survey Method

Sources: Included in the Table above

Next, to design a survey instrument, I gained critical insights from the scholarly literature that helped me collect data to answer my research question. The survey questions and corresponding literature and neural network code are shown in Table 7 below.

Texarkana Chamber of Commerce Business Retention and Expansion Survey 2019	Informed By Literature
<b>Q1 Company and Employee Information</b>	Demographics of the region – Porter, 1991; Huff and Huff, 2001
Q2 Please indicate the industry that describes your organization.	Huff and Huff, 2001; Greene, 2002; Hecht, 2012
<b>Q3 Where is your company's primary product/service in its life-cycle? (Emerging, Growing, Maturing, Declining).</b>	Dubb et al., 2013
<b>Q4 What is the number of employees at this location?</b>	Huff and Huff, 2001; Abel and Dietz, 2012
<b>Q5 Where is your company's primary market? (Local, Regional, National, International).</b>	Huff and Huff, 2001; Abel and Dietz, 2012
<b>Q6 How many years has your company conducted business in this community?</b>	Kerr, 2001; Pugh, et al., 2016
<b>Q7 What is your company's plan over the next three years in terms of strategies? (Personnel: Expand/Grow, Personnel: Stay Stable, Personnel: Downsize).</b>	Dubb et al., 2013
<b>Q8 What percent of your current workforce has at least the education level listed? (Diploma/GED, Technical Cert, Associates, Bachelors, Graduate)</b>	Greenwood and Levin, 2007; Dyllick, 2015; Karpov, 2017; Vaughn, 2019
<b>Q9 When hiring, what level of education would you prefer your recruits to have? (Diploma/GED, Technical Cert, Associates, Bachelors, Graduate)</b>	Kerr, 2001; Greenwood and Levin, 2007; Dyllick, 2015; Karpov, 2017; Vaughn, 2019
<b>Q10 Rate each of the following sources of competitive advantage based on how important it is to your business. (Your Product/ Service, Technology: Equipment/ Processes, Technology: IT, People: Workers, People: Educated Professionals, Availability of Education for your people, Low Prices for your product or service, Ability to control or keep costs low, Government Abatements/ Taxes, Transportation/ Logistics, R&amp;D or Product Development)</b>	Etzkowitz and Leydesdorff, 2000; Able and Dietz, 2012; Dyllick, 2015; Motoyama and Mayer, 2017
<b>Q11 In terms of competitive advantage, how satisfied are you with this in the region? (Your Product/ Service, Technology: Equipment/ Processes, Technology: IT, People: Workers, People: Educated Professionals, Availability of Education for your people, Low Prices for your product or service, Ability to control or keep costs low, Government Abatements/ Taxes, Transportation/ Logistics, R&amp;D or Product Development)</b>	Gibbons et al. 1994; Etzkowitz and Leydesdorff, 2000; Fisher, 2000; Kerr, 2001; Greene, 2002; Dyllick, 2015; Karpov, 2017; Balashov, 2019

<p><b>Q12 Please rate the level of impact each factor has on your market share or profitability. How important is it to you? (Your Product/ Service, Technology: Equipment/ Processes, Technology: IT, People: Workers, People: Educated Professionals, Availability of Education for your people, Low Prices for your product or service, Ability to control or keep costs low, Government Abatements/ Taxes, Transportation/ Logistics, R&amp;D or Product Development)</b></p>	<p>Etzkowitz and Leydesdorff, 2000; Fisher, 2000; Dyllick, 2015; Balashov, 2019</p>
<p><b>Q13 Please answer the following question from the perspective of someone expanding or growing their business. Please rate Texarkana’s ability to provide utility and amenity services. For this question, how important are each of these in attracting new business? (Electricity, water, sewer, land availability, transportation services, downtown presence, parks and recreation, arts and theater, educational services (university and colleges), health and medical services)</b></p>	<p>Axelroth Hodges and Dubb, 2012; Dubb and Howard, 2012; Guinan et al., 2013; Ehlenz et al., 2014; Dyllick, 2015</p>
<p><b>Q14 Please answer the following question from the perspective of someone looking at expanding or growing their business. (Circle or mark the number of your rating) Please rate Texarkana’s ability to provide utility and amenity services. For this question, how well does Texarkana provide these services? (Electricity, water, sewer, land availability, transportation services, downtown presence, parks and recreation, arts and theater, educational services (university and colleges), health and medical services (Electricity, water, sewer, land availability, transportation services, downtown presence, parks and recreation, arts and theater, educational services (university and colleges), health and medical services)</b></p>	<p>O’Mara, 2005; Rowe, 2008; Hecht, 2012; Pugh, et al., 2016; Karpov, 2017</p>
<p><b>Q15 Please rate Texarkana’s ability to provide these support resources for new or expanding businesses. For this question, how important is it for Texarkana to provide it? (Electricity, water, sewer, land availability, transportation services, downtown presence, parks and recreation, arts and theater, educational services (university and colleges), health and medical services)</b></p>	<p>Kerr, 2001; Greenwood and Levin, 2007; Hecht, 2012; Karpov, 2017</p>
<p><b>Q16 Please rate Texarkana’s ability to provide these support resources for new or expanding businesses. For this question, how well does Texarkana provide it? (Technology: Equipment, Technology: IT services, People: Worker availability, People: Educated professionals, Availability of financing and capital, Government abatements/taxes, R&amp;D or Product Development, Property location)</b></p>	<p>Gibbons et al., 1994; Etzkowitz and Leydesdorff, 2000; Pugh, et al., 2016</p>

<p><b>Q17 Based on your experience or perception, please rank order Texarkana's transportation services 10 (the best) to 1 (the worst). (Airport and airport service, Passenger trains, Freight trains, Semi-truck freight, Metro and commuter serves, Taxis and other auto passenger services (Uber or Lyft, etc.), Consumer shipping (UPS, Fed Ex, etc.), Transloading or freight transfer services)</b></p>	<p>Caffrey and Issacs, 1971; Lambert, Garcia-Dastugue, and Croxton, 2005; Cappelletti and Baker, 2010; Abel and Dietz, 2012; Corominas, 2013</p>
<p><b>Q18 Please rate the importance of Texarkana's ability to provide these transportation-related services for a new or expanding business. Rate how important are each of these in attracting new business. (Airport and airport service, Passenger trains, Freight trains, Semi-truck freight, Metro and commuter serves, Taxis and other auto passenger services (Uber or Lyft, etc.), Consumer shipping (UPS, Fed Ex, etc.), Transloading or freight transfer services)</b></p>	<p>Gibbons et al., 1994; Etkowitz and Leydesdorff, 2000; Huff and Huff, 2001; Uyarra, 2010; Pugh, et al., 2016</p>
<p><b>Q19 From your perspective, how well does Texarkana provide these services?</b></p>	<p>Gibbons et al., 1994; Etkowitz and Leydesdorff, 2000; Huff and Huff, 2001; Onwegbuzie and Johnson, 2006; Dyllick, 2015; Pugh, et al., 2016; Motoyama and Mayer, 2017</p>
<p><b>Q20 Based on your experience or perception, please rank order Texarkana's higher educational services 10 (the best) to 1 (the worst). (Community college options, continuing educational, Four-year degree options, Research and development, Post bac and graduate degree, Speakers and enriching continuous education, Ability to draw grant, Advisory services)</b></p>	<p>Kerr, 2001; Greenwood and Levin, 2007; Karpov, 2017; Balashov, 2019</p>
<p><b>Q21 Rate how important each of these is in attracting new business for your company. (Community college options, continuing educational, Four-year degree options, Research and development, Post bac and graduate degree, Speakers and enriching continuous education, Ability to draw grant, Advisory services)</b></p>	<p>Kerr, 2001; Greenwood and Levin, 2007; Karpov, 2017; Balashov, 2019</p>
<p><b>Q22 From the perspective of attracting new business, how well does Texarkana provide these services?</b></p>	<p>Kerr, 2001; O'Mara, 2005; Greenwood and Levin, 2007; Pugh, et al., 2016; Karpov, 2017; Balashov, 2019</p>

<b>Q23 How does the following affect your company’s ability to grow or expand? (IT: Availability of this resource, IT: Need more capability in this resource, IT: Need more training in this resource, IT: Need a higher level of education in this resource, IT: Costs of this resource, IT: Manager team impedes this, IT: Government or political (actions or programs)</b>	Greene, 2002; Greenwood and Levin, 2007; Balashov, 2019
<b>Q24 How does the following affect your company’s ability to grow or expand? (HR: Availability of this resource, HR: Need more capability in this resource, HR: Need more training in this resource, HR: Funding or financing sources available for this, HR: Costs of this resource, HR: Manager team impedes this, HR: Government or political (actions or programs)</b>	Kerr, 2001; Greene, 2002; Abel and Dietz, 2012
<b>Q25 What percentage of your people have had a habit of being influenced by drugs or alcohol on the job?</b>	Kerr, 2001; O’Mara, 2005; Srinivas and Viljamaa, 2008
<b>Q26 What level best describes your annual sales volume? (Operating at a loss, 0 to \$50M, \$51 to \$250M, \$251M to \$500M, +\$500M)</b>	Srinivas and Viljamaa, 2008; Dubb et al., 2013
<b>Q27 Please check all boxes that best describe the location of your facility. (Urban setting, Rural setting, North of I30, South of I30)</b>	Etzkowitz and Leydesdorff, 2000; Kerr, 2001
<b>Q28 Please list the city nearest city to you.</b>	Porter, et al., 1991; Huff and Huff, 2001
<b>Q29 Please list the county of your location.</b>	Porter, et al., 1991; Huff and Huff, 2001
<b>Q30 Please list the state where your facility is located.</b>	Porter, et al., 1991; Huff and Huff, 2001

*Table 7: BR&E Survey and Key Scholarly Guidance*

*Sources: Included on the above table*



During the construction phase of the action research cycle, I met with the Chamber for twenty-seven hours during my survey construction and implementation process. A key function of these discussions was to offer space for self-reflection and reflexivity on the survey questions, as it is an important part of critical action research (Marshall and Reason, 2007). I utilized Survey Monkey (online) as a platform for survey distribution to obtain more participating respondents, as the Chamber has a history of higher response rates with this modality. During this process, I conducted a pilot survey of ten retired Chamber board members to ensure that business leaders easily understood the survey and to discover if the instrument was capturing data relevant to this study. I used their feedback and collaborated with the Collaborative Action Team to modify the survey, according to feedback received. Then, I distributed the survey, participation information sheet, and consent form to the Chamber's email distribution list, which consisted of Texarkana's top 50 businesses. The survey was available from May to September 2019. Following the survey's end, I anonymized the survey data to ensure participant confidentiality.

### **3.5.5 ONE-ON-ONE KEY INFORMANT REFLECTIVE INTERVIEWS**

Turning to the scholarly literature inspired the decision to incorporate key informant interviews encompassing a representative sample (35%) of the respondents from the BR&E survey to collect informed, honest, and open discussions from community stakeholders (Teddlie and Tashakkori, 2009; Cappelletti & Baker, 2010; O'Cathain, et al., 2010; Creswell, 2013; Guinan et al., 2013; Pugh et al., 2016; Motoyama and Mayer, 2017). argue that interviews are appropriate to make sense of complex situations. Facilitating convergent interviews with open-ended questions allowed for the freedom of natural conversational flow with key informants. The interviews were instrumental for following up on the significant findings of the BR&E survey and to develop a more vibrant picture of the Texarkana workforce and economy (Coghlan, 2001; Coghlan and Brannick, 2001; Greenwood and Levin, 2007). Other scholars have similarly integrated interviews within their data collection methods to study the economic impact of colleges and universities (Capelletti, 2010; O'Cathain, et al., 2010; Guinan et al., 2013; Pugh et al., 2016; Motoyama and Mayer, 2017).

During the interviews, I drew from the knowledge of Weick (2001), which underscored the importance of the confluence of realities across community stakeholders to develop a story that unfolded through sensemaking. Intrinsic depth was captured by establishing a relationship through authenticity to expose the research phenomenon to as much tact and information as possible to increase rigor and relevance (Raelin, 2003; Coghlan, 2003).

The interview procedure began with critical reflection and articulated the idea of a free space for thinking to take place. A continuous critique was carried out throughout the duration of the interview process, and refined structures were identified through the discussion. The interviews also included combined change aspirations, and follow-up was done to validate the process. All of these actions were done to support bringing ideas into critical action (Nielsen and Lyhne, 2015). As detailed in Table 8 below, the interview questions encouraged participants to think freely and state opinions about the current economic climate.

Interview Question	Informed by the literature of:
1. What is the best way to unveil workforce issues in the Texarkana region?	Caffrey and Issacs, 1971; Huff and Huff, 2001; Onwegbuzie and Johnson, 2006; Cappelletti and Baker, 2010; Uyarra, 2010; Abel and Dietz, 2012; Pugh et al., 2016; Motoyama and Mayer, 2017
2. What is the main workforce issue in Texarkana that creates a barrier to regional growth?	Lewin, 1947; Argyris, 1993; Torbert, 1999; Caldwell, 2003; Raelin, 2003; Buchanan and Bryman, 2007; Greenwood and Levin, 2007
3. Do you have the resources you need to bring ideas to fruition?	Abel and Dietz, 2012; Bozic and Dunlap, 2013

Table 8: Literature that Informed the Interview Questions

Sources: Included in the Table

This approach encouraged responses to flow liberally and uncover information that may have otherwise remained hidden.

The interviews were held at the Chamber between July and October 2019. While conducting the interviews, I was mindful of Coghlan’s (2003) warning to the scholarly practitioner that is researching from the inside not to assume too much based on personal experiences, which may lead to not probing as deeply as one would when researching from the outside. Failure to heed this warning would result in a lack of new knowledge exposed, and reframing might not occur. Patton (1990) emphasizes the importance of placing myself into the interviewee’s perspective while reflecting on the interactions. The interviews provided an impetus for analysis, data interpretation, reflection, and action on knowledge gained in real-time.

While this study focused on creating educational programming to improve workforce problems in the Texarkana region, these unique concerns were not shared by all the participants. Keeping

community stakeholders focused on the central goal of this research presented a challenge. Many of the participants engaging in this critical action research had their own agenda and were only interested in workforce issues that impacted their private industries. Ritchie (2003) recommends limiting interviews to no more than one hour and following a set of questions to keep the respondents on topic.

### **3.5.6 LINEAR REGRESSION MODEL**

Empirical studies on the economic impact of colleges and universities use linear regression models. Some utilize these models as a supervised learning technique to build neural network predictive models to understand the relationships between quantitative and qualitative data to drive actionable programmatic change (Caffrey and Issacs, 1971; Puri and Kohli, 2007; Abel and Dietz, 2012; Lendel and Qian, 2017; Motoyama and Mayer, 2017; Guohong 2020). Results of supervised neural networks are more interpretable and practical than unsupervised neural networks. Further, supervised techniques alleviate “black box” criticisms of neural network models since they begin with an easy-to-interpret linear regression (Blomqvist., Mann, and Sumpter, 2018; Storm et al., 2019). Abel and Dietz (2012) utilized results from regression analyses to determine the mean value of higher education activities to assess economic impact. Still, they found the model limiting in synthesizing the data measured and collected differently across universities. Additionally, Puri and Kohli (2007) accurately predicted the performance of college programs before offering them to the community by creating a forecast with a supervised neural network model.

Phase one of data collection began with the quantitative data collected from the BR&E. Due to a large amount of quantitative data collected, I first started the data analysis with simple linear regressions, a statistical technique to study the relationship between variables. The regression formulas became the beginning of the perceptron’s (algorithm for supervised learning of binary classifiers) input into R to code the neural network later in this chapter. Thus, the regressions were the building blocks that guided the programming of the neural network model, which contained both quantitative and qualitative data. The Business School at the University of Colorado has been conducting methodological triangulation with neural networks and simple regressions for real-world business research in economic studies to improve output performance for practical applications (Guohong, 2020). The University of Colorado’s success in methodological triangulation using neural networks for business research is vital for this thesis because it provided some guidance on the regression formulas and programming of the neural network for this study. Marijana, Popski, and Ivan (2009) forecasted economic growth by

running simple linear regression models to develop the model specification for 10,000 neural networks that found the methodology beneficial in predicting Europe's economic growth. To conduct a data analysis of customer retention, Ansari and Riasi (2016) began to analyze the data with simple linear regressions to study the relationships between collected variables to start constructing a multilayer perceptron neural network model to determine the key factors that impact retention. Anthony, Maurice, and Claude (2014) created a model to predict recessions by utilizing simple regressions as benchmarks for neural network programming. The regressions conducted in this study took a similar approach to other researchers in the field to determine SCM programmatic changes that drive positive economic impact. Table 9 below contains the hypotheses and linear regression models used for this thesis.

### Regression Models Used in this Thesis

Research Questions	Linear Regression Model	Conceptual Model	Dependent Variable (Y)	Explanatory Variables (X)	Corresponds with Survey Questions
<b>H1: The lifecycle of the organization (<i>L</i>) is associated with current (<i>HeD</i>) and expected (<i>Ed</i>) education.</b>	Equation: $lifecycle_i = a_0 + a_1 CurrentEducationLevel_i + a_2 ExpectedEducationLevel_i + e_i$  Model: $L \sim HeD + Ed$	<i>HeD</i> and <i>Ed</i> are associated with <i>L</i>	L	HeD and Ed	Q3, Q8, Q9, Q10, Q11, Q12, Q23, Q24
<b>H2: The current resources (<i>I</i>) and the satisfaction level of resources (<i>Ca</i>) are associated with local businesses' ability to bring ideas to fruition with R&amp;D (<i>P</i>).</b>	Equation: $R\&DAvailability_i = a_0 + a_1 Resources_i + a_2 ResourceSatisfaction_i + e_i$  Model: $P \sim I + Ca$	<i>I</i> and <i>Ca</i> are associated with <i>P</i>	P	I and Ca	Q10, Q11, Q12, Q13, Q23
<b>H3: Education (<i>HeD</i>) (<i>Ed</i>) is associated with economic growth and expansion in this region (<i>St</i>).</b>	Equation: $GrowthExpansion = a_0 + a_1 EducationImportance_i + a_2 BusinessGrowthStrategy_i + e_i$  Model: $St \sim HeD + Ed$	<i>HeD</i> and <i>Ed</i> are associated with <i>St</i>	St	HeD and Ed	Q8, Q9, Q10, Q11, Q12, Q24
<b>H4: Skills, knowledge, and abilities (<i>GHR</i>) isolated by the supply chain industry (<i>I</i>) is associated with regional growth and expansion (<i>St</i>).</b>	$Salesvolume_i = a_0 + a_1 CurrentKSA + a_2 SCMWorkforceRatings_i + e_i$  Model: $St \sim GHR + I$	<i>GHR</i> and <i>I</i> are associated with <i>St</i>	St	GHR and I	Q18, Q24
<b><i>HeD</i> = Current Education Level</b>					

***Ed***= Expected Education Level

***L***=Regional Growth

***I***=Resources

***Ca***=Resources Satisfaction Levels

***P***=R&D Ability

***St***=Growth and Expansion

***M***=Industry

***GHR***=Skills, Knowledge, and Abilities

**\*Each of these variables was identified from reviewed literature**

*Table 9:: Regression Models used in this Thesis*

*Sources: Abel and Deitz (2012); Cooke (2018-2019)*

During the construction phase of the action research cycle, I used four simple linear regression models to analyze the data collected during the BR&E survey, which were guided by my research questions, the reviewed literature, and my hypotheses. First, similarly to other scholars (Caffrey and Issacs, 1971; Abel and Dietz, 2012; Dubb et al., 2013; Blomqvist., Mann, and Sumpter, 2018), I created a regression model to ascertain if the lifecycle of the organization ( $L$ ) as the dependent variable explained if the current education levels within the organizations ( $HeD$ ) and expected education levels ( $Ed$ ) as the independent variables impacted product and organizational lifecycle. I determined if the slope equals a constant  $\beta_{1,0}$ . Determining if  $H_0:\beta_1=\beta_{1,0}$  or  $H_1:\beta_1\neq\beta_{1,0}$  is essential to assess whether current and expected levels of education were related to local businesses' product and company lifecycles. It is important to note that if  $\beta_1$  hallmark, then  $Y$  does not depend on  $X$ , and  $X$  is independent. Next, through the same methodology, I tested the  $Y$  predictor variable as the resource ratings ( $I$ ) and ( $Ca$ ) to see if they explained a company's ability to bring ideas to fruition with R&D ( $P$ ) as the independent variable (Leydesdorff and Etzkowitz, 2003; Abel and Dietz, 2012; Dyllick, 2015; Motoyma and Mayer, 2017). Then, I ran a regression to see if Education ( $HeD$ ) ( $Ed$ ) as the  $Y$  dependent variable could explain economic growth and expansion in this region ( $St$ ) as the  $X$  independent variable. Finally, I tested if skills, knowledge, and abilities ( $GHR$ ) as the dependent variable could explain growth ( $St$ ) within the supply chain industry ( $I$ ) as the independent variable.

The linear regressions were then modified into neural networks for non-linearity by programming the regression equations into the neural network model, which is explained in the next section.

### **3.5.7 NEURAL NETWORK APPROACH**

Due to the massive amounts of economic information about the Texarkana workforce, I selected an innovative approach to play a smaller role in solving a more substantial economic development problem. Creating a supervised artificial neural network makes it easy to see how the university's SCM program is one of several systems that contribute to the regional economic landscape and is a piece of the business ecosystem. By implementing changes within the SCM program, TAMUT acts as a single cell in a multidimensional agent to inspire economic growth (Dooley, 1997).

During the first and second phases of my action research cycle, I constructed and planned a neural network model to represent regional economic stagnation issues in this area. Being known as an internationally published expert in neural networking, the Chamber turned to me to process and make sense of information to diagnose and find a solution to their workforce

problems. This gave me access to people and information. Guohong (2020) argues that neural networks capture more complex relationships than traditional statistics and are more appropriate for community-oriented studies. I found the quantitative and qualitative data fruitless alone because it did not allow a proper space to analyze the complexity of the local workforce and failed to account for the economic and political dynamics unique to Texarkana.

The neural network functioned as an integral mixed methodological tool for triangulating and coding large amounts of qualitative and quantitative data to enable sophisticated machine learning that could make connections and see patterns within the data that may otherwise have been overlooked as an abstraction. Contrasted to this method is monomethod research, which often omits spillover benefits from enhanced human capital, the role of local taxes, and notes the double-counting possibilities of economic impact when colleges and universities evaluate their economic influence (McHenry et al., 2012). Therefore, data sources from the Integrated Postsecondary Education Data Systems (IPEDS), the U.S. Bureau of Labor and Statistics, and the Federal Reserve Economic Data (FRED) are a quantitative data component of economic research specifically related to college and universities (Caffrey and Issacs, 1971; McHenry et al., 2012). Hence, the neural network layers data from IPEDS and FRED on top of the survey and interview results to triangulate the variables that were unearthed by the neural network to underscore the variables responsible for economic fluctuations in this region, within my scope of practice (McHenry et al., 2012; Vecoven et al., 2018). Layering the interview and survey responses to IPEDS and FRED data ensured that the model effectively represented regional concerns. Moreover, it connected these specific community issues with abstract theories to generate real-world outcomes that were applicable to the Texarkana workforce.

As indicated previously in Figure 5, each node within the model corresponded to specific questions from the business retention and expansion survey, data collected from FRED and IPEDS databases, and human capital issues discovered during one-on-one interviews. Coded nodes made the model effectively representative of regional concerns. Moreover, it connected these specific community issues with abstract theories to generate real-world outcomes applicable to the Texarkana workforce. The neural network also constructed a visual representation of the survey's results and the quantitative and qualitative nodes and their relationships, enabling me to connect deeper meaning to the data collected through double-loop thinking. As mentioned above, Figure 5 identifies the framework for the university model that was built through a neural network approach. The adaptive nature of the model allowed me to dissect the interactions between variables and discern what educational program changes might



promote economic growth and development (Guohong, 2020; Vecoven et al., 2018). After observing the model's utility in representing regional human capital and workforce concerns, I partnered with the Chamber to reflect on the model's effectiveness and then revised the neural network to improve its representation of regional concerns. These improvements moved this research towards its goal of playing a part in addressing local workforce problems by elucidating the underlying educational issues of the labor force for the Chamber and TAMUT.

### **3.5.8 REFLECTIVE JOURNAL**

Reflexivity is central to action research and a key component of improving one's own research practice (Coghlan and Coghlan, 2003; Herr and Anderson, 2005; Kemmis and McTaggart, 2007; Mills, 2011; Creswell, 2013; Stringer, 2014). Greene (2007) similarly argues that reflection is a necessary component of mixed methods research. In both modes of inquiry, notes and observations recorded for reference created opportunities for reflection on the research process and exploring personal introspection through self-aware meta-analysis (Finlay, 2002; Coghlan and Brannick, 2010; Cunliffe, 2010). Coghlan and Brannick (2010) recommend using a reflective journal with regular entries to facilitate reflexivity that promotes a critical self-evaluation of the researcher's influence on the research and added insight for data analysis. Coghlan (2019) argued for the benefits of keeping a reflective notebook to document events and how the researcher feels about the experiences and how learning has occurred during action. Further, since reflection is an essential component of the action research cycle, a reflective journal helped facilitate this process and provided a venue for improving the research based on observed interactions, experiences, and data findings. Throughout this research, I journaled after each interaction with any stakeholders by using Schein's (1999) Observation, Reaction, Judgment, and Intervention (ORJI) model and Kolb's (1984) cycle. Kolb (1984) aids in processing experience, reflecting on the experience, contextualizing, and deciding on the appropriate action during each phase of data collection. Each entry contained personal notes, observations, and reflections that informed my critical action plan and contributed to the implementation of this research. I found journaling to be vital in capturing my interpretation of the moment and reflecting on the "why's" to make deeper connections, which also unearthed any underlying bias. Working alongside community leaders with economically impactful ideas, I found that journaling was instrumental in keeping my research within the scope of this study. Thus, the journal is the repository of the amalgamated data collected throughout this study. Reflective journaling contributes to practical knowledge informed by the sample of participants involved.

### **3.6 DATA ANALYSIS**

As an action researcher, I employed various data analysis methods, including an inductive thematic analysis, transcription of the interview recordings, coding and structuring the data collected, and organizing it into themes. Since the purpose of this study was to investigate SCM changes that could contribute to local economic development, I needed to collect data from a variety of sources. This was necessary to make the most well-informed decisions that could impact the local community and be accepted by my colleagues as being a robust and comprehensive study. As stated earlier, the data collection process began with the BR&E interview, which guided the key informant interviews. Then, both the survey and interview findings led to the construction of four regressions, which guided the neural network to focus on relevant economic data in the region to create an adaptive university model pertinent to the changing economic landscape.

The quantitative data from the survey collected in this thesis was analyzed using the central tendency statistical analytical method. This analytical tool aids in assessing the BR&E survey and how prescriptive supply chain programming can play a role in local economic development. Comparably, Akintobi and colleagues (2012) incorporated a central tendency statistical method to assess business leaders' knowledge, skills, and abilities developed through a participatory community-oriented program.

After analyzing the survey findings, this led to more questions about the perceptions and views about the barriers to regional growth and how SCM could help. I turned to the literature and found that scholars in similar fields also had to conduct interviews to gain a more robust perspective of regional growth barriers (Teddlie and Tashakkori, 2009; Cappelletti and Baker, 2010; O'Cathain et al., 2010; Creswell, 2013; Guinan et al., 2013; Pugh et al., 2016; Motoyama and Mayer, 2017). Therefore, I conducted informed, honest, and open discussions with community stakeholders through key informant interviews. By including qualitative and quantitative data in this study, I gained a richer understanding of the problem's businesses were facing and could therefore develop more targeted educational interventions to help improve the local economy. This section will explain the qualitative data collection and analysis and how the themes that emerged from the survey and interviews informed the neural network approach. The qualitative data allowed me to develop a rich understanding of how the participants engage with regional economic development issues within their unique contexts and collect their perceptions of SCM competencies in the region. Connecting an economic study to the rich

views of the locals brought value to university models aimed at economic development that my department could use to make prescriptive programs to meet the needs of the locals.

### 3.6.1 THEMATIC ANALYSIS

Like many action researchers, I used an inductive thematic approach to analyze the qualitative data gathered through the critical action interviews to make meaning of the data (Hinchey, 2008; Creswell, 2009; Stinger, 2014). A content analysis of the data is conducted to identify current sustainable economic efforts and identify growth potential in business curricular development centered on regional concerns. This type of analysis organizes, describes, and interprets the perspectives of the interviewed stakeholders to form an understanding of the research problem while preserving the unique vantage points and their pragmatic and relevant explanations. The interview aims to focus and reflect on what the respondent has to say rather than conform to this study's hypothesis (Hinchey, 2008). By categorizing thematic findings into relevant codes, this analysis develops an intuitive framework to communicate the findings to interested stakeholders to facilitate further action and reflection. The qualitative analysis through an inductive thematic method is represented in Table 10 below.

Qualitative Analysis Through Inductive Thematic Method		
Step 1	Prepare Data for Coding	<ul style="list-style-type: none"> <li>• Interviews conducted with the guidance of literature</li> <li>• Interviews were transcribed with NVivo 12 and verified with manual transcription</li> </ul>
Step 2	Read and Understand Before Coding	<ul style="list-style-type: none"> <li>• Read the entire transcript several times</li> <li>• Gain a holistic understanding of the stories told before initiating the coding process</li> </ul>
Step 3	Coding Process	<ul style="list-style-type: none"> <li>• Inductive thematic coding with NVivo and Excel</li> <li>• Combine codes into nodes or core elements</li> <li>• The thematic themes become elements</li> </ul>
Step 4	Presentation of Results	<ul style="list-style-type: none"> <li>• Themes are recorded and presented</li> </ul>

Table 10: Qualitative Analysis Through Inductive Thematic Method

Source: Creswell (2013); Ivankova (2015)

The following subsections detail the process of each of these four steps.

### **3.6.2 STEP 1: PREPARING THE DATA THROUGH TRANSCRIPTION**

After each interview, I prepared a verbatim transcript of the interview in NVivo 12. I then read through the text while listening to the interview to ensure the accuracy of the transcription. Any transcription errors made by the software were manually corrected. To enhance my efficiency as a researcher, a reflective journal was also kept throughout the process. NVivo 12, a computer-assisted qualitative data analysis software, was used to help make sense of the large amount of data collected throughout the interview process.

### **3.6.3 STEP 3: INDUCTIVELY CODING THE DATA**

Inductive thematic coding was used to allow the themes to emerge from the data naturally. By utilizing this approach, codes are derived from the participants instead of a set codebook (King, 2004). Complex stratified codes were developed around nodes in a layered format. This open coding process involved breaking down the dataset into smaller samples, reading each sample line-by-line, and determining the codes that covered each sample. Then, I moved on to the next section of text and applied appropriate codes utilizing either codes previously created or establishing new ones. Throughout this process, each line of text was re-read to ensure appropriate coding as the list of codes grew.

As suggested by Auerbach and Silverstein (2003), I also prepared a summary case report of the key points made by the participants to accompany the NVivo transcription. The summarized case report of the interviews was organized into a chart in Excel to ensure that the transcription coded through NVivo was capturing the emerging data patterns correctly. The benefit of checking the NVivo analysis was to make certain that the software used maintains the credibility of the qualitative research. Figure 8 below represents an example of the manual coding that I conducted in Excel to verify the utility of the NVivo 12 software.

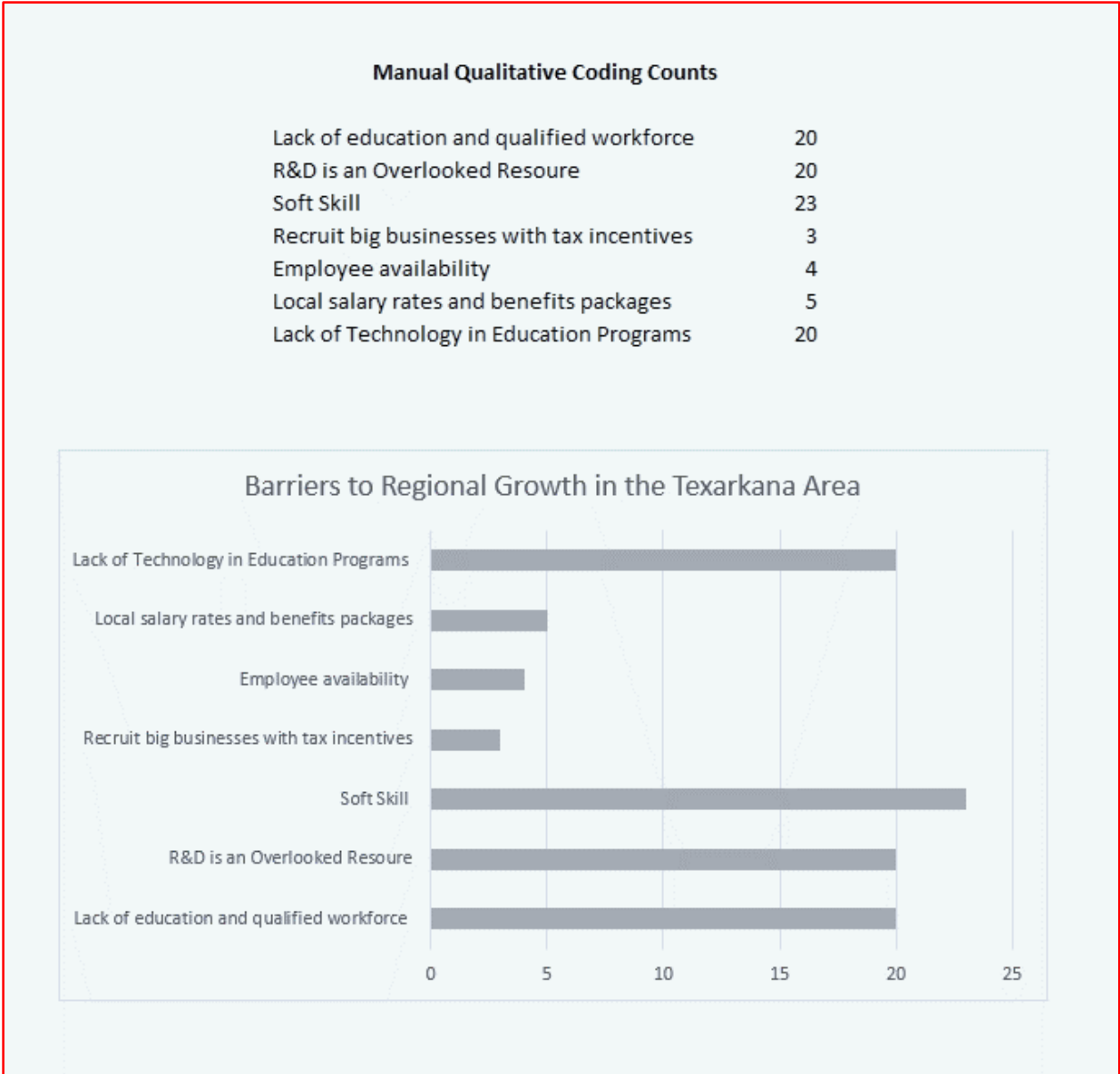


Figure 8: Manual Qualitative Coding Counts

As shown in Figure 9 below, the NVivo 12 thematic coding technique that I conducted presented the same outcome as the manual coding method that I conducted in Excel. Since I was new at the NVivo 12 coding process, taking the time to ensure alignment between the two software packages was vital for me to be certain that I was using an accurate coding technique within the software application. Figure 9 below represents how the line-by-line coding chart is presented in NVivo 12.

Interview Questions and Answers		Search All Codes and Cases	
Name	Files	References	
Education plays a role in regional growth		1	20
Adapt curriculum to industry needs		0	0
Center education around soft skills		1	23
Internships		1	1
Mechanical engineering programs		0	0
More lunch and learn opportunities		1	1
Recruit more members to local community		0	0
Vocational training opportunities		0	0
R&D is an overlooked resource		1	20
Need assistance with government regulations		1	2
Need curriculum development		1	1
Need internship programs		1	1
No		1	3
Yes		1	9
The Role of Technical Supply Chains		1	20
Adapt curriculum to the needs of the local business		1	3
Career centered elementary and middle school programs		1	4
Civic Involvement		1	2
Funding for employee referrals, recruitment and internships		1	2
Know the needs of local businesses		0	0
Worker knowledge, skills, and abilities (soft skills)		1	1
Workforce, on-the-job training and higher education		1	2

Figure 9: NVivo Coding of Interview Responses

Organizing the data helped me identify key themes and ensure that the related sub-themes were considered as well. Repetitive data were placed in nodes within NVivo to allow for more manageable grouping. In addition, this also helped with the planning of future actions. The key themes that emerged from the interviews would inform the changes my department would make to contribute to economic growth in the region.

The coding process was reflective, enabling contextual categorizing and sense-making of codes and themes within the SCM programming and economic development literature. When reviewing the data, creating trees to illustrate the words frequently used together was instrumental in creating a theoretical narrative of the participants' stories. Using NVivo as an organizational tool was powerful in understanding the stories' context and where the stories overlap. Creating a word frequency cluster surrounding a word spoken during an interview helped to reveal an overarching story surrounding the stated phrase or word.

For instance, when reviewing the data, I decided to create a word tree to illustrate the words frequently used surrounding the term “education” during the qualitative interviews. Figure 10 below represents the NVivo results.

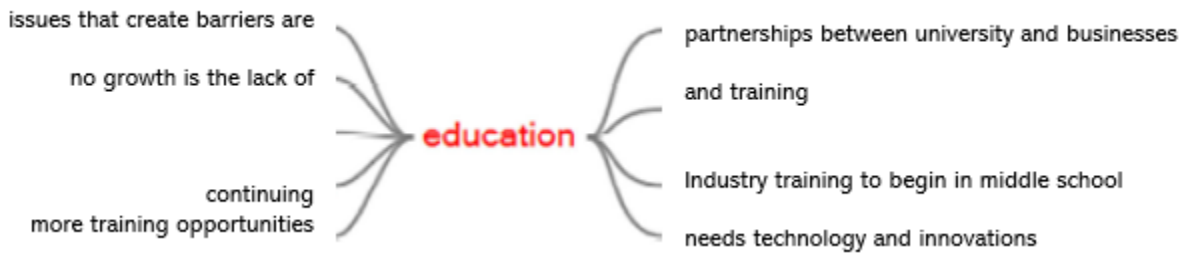


Figure 10: NVivo word tree on “education” from the data from this thesis

Understanding the story told helped me understand the locals' views considering the context that the words were said. Based on this example, I was better able to understand the complexities of the findings and how they were interrelated. Throughout the qualitative data analysis process, approximately fifteen-word trees were developed to help me visually see the data and enhance my understanding. One benefit of a word tree is that it retains some of the contexts in which words are said. This helped me refresh my memory on what was said and ensure the coding was correct so that the themes and sub-themes that emerged from the data accurately captured what was said. Word trees also helped me pick up on relevant related concepts and connections that I might have missed without the visual representation of the data.

#### **3.6.4 STEP 4: GENERATING RESULTS FROM OVERALL THEMES**

Finally, the codes were grouped in a hierarchical format to better see the relationships between codes and nodes to generate themes. From this coding of the data, it was determined that there were three key takeaways from the interviews: education plays a role in regional growth, R&D is an overlooked resource, and the role of technical supply chains needs modification.

In conjunction with the quantitative economic data collected, these qualitative findings were combined for inclusion in the neural network to better address the research questions. The use of a mixed-methods action research approach assisted with stakeholder acceptability. It allowed

programmatic recommendations to be generated from various data points and did not solely rely on one source of information. The quality of outputs from the neural network is linked to the quality of inputs. As such, the qualitative data collected needed to be coded correctly to enhance the neural network output. This methodology allowed for the development of a better-suited economic model that more aptly addressed the issues of the local region.

### **3.6.5 SELECTION OF PARTICIPANTS**

As an action researcher, I found Ivankova's (2015) argument insightful that a small number of sampled participants within a certain area of interest can be adequate to discover a resolution to a community-oriented issue if a suitable sampling method is used. Based on the goal of this study, I opted to use purposeful sampling, where I intentionally chose individuals with knowledge related to the study's topic so that they could inform the research problem (Creswell, 2013). Other researchers have found that a small number of participants in a well-defined area can provide sufficient insight to discover a solution to a community-oriented problem (Aamot, 2018; Dubb, 2019). Thus, I decided to focus my interviews on those with the most insight into the problem – the local business leaders themselves. The interview population consisted of those who participated in the BR&E survey. Twenty-three business leaders were invited to participate, and 17 agreed to do so. Each one-on-one interview was recorded, transcribed, and lasted approximately thirty to sixty minutes, depending on the participant's time restraints and willingness to share information. The interviews took place over a period of three months.

### **3.7 QUALITY, VALIDITY, RELIABILITY, CREDIBILITY, DEPENDABILITY, TRANSFERABILITY, AND TRUSTWORTHINESS**

When conducting quality MMAR studies, the practitioner-researcher must be mindful of three key considerations:

- Methodological rigor of qualitative and quantitative methods in each study strand and related quality issues
- Quality considerations related to the action research cycles
- Quality of meta-inferences resulting from quantitative and qualitative methods

An MMAR study aims to produce meta-inference about the phenomenon grounded in extrapolations from valid qualitative and quantitative data strands. Validity is central to provide evidence of the relevance and fit of the study. At the same time, reliability generates confidence that other researchers will derive the same results when the research procedures are followed



(Mertler, 2012). Tashakkori and Teddlie (2010) cited two editions of the SAGE Handbook of Mixed Methods in Social and Behavioural Research to underscore quality conclusions as the prime controversy in mixed-method studies. The complexity of mixed methods is difficult, as the intentional synthesis of qualitative and quantitative data to generate meta-inferences is complex (Onwuegbuzie and Johnson, 2006; Creswell, 2010; Maxwell and Mittapalli, 2010; Tashakkori and Teddlie, 2010).

The methodological rigor of each of the qualitative and quantitative data strands are addressed with the correct assessment of the problem and accurate representation of the intervention. In the pursuit of new knowledge, the scholarly practitioner must ensure qualitative findings accurately reflect the dialogic interactions and views of the participant stakeholders. A rigorous procedure in place for data collection and analysis addresses weaknesses to ensure process validity throughout data strands (Tashakkori and Teddlie, 2003). The chronology of data collected, analysis procedure, and order of the quantitative and qualitative data strands are all critical components of validity (Dellinger and Leech, 2007).

The action research paradigm encapsulates its quality considerations, including insider versus outsider interpretation of the researcher's role, objectivity versus subjectivity during the researcher's practice, and generalizability versus transferability of knowledge. Greenwood and Levin (2007) warn researchers about the criticisms of action research and underscore the tension between academic rigor and relevance for research practitioners. Herr and Anderson (2005) contend that due to the complex nature of the stakeholders involved in action research, the positionality (insider or outsider) is open to interpretation. This presents a conundrum for the researcher to balance power, decipher who owns the etic (numeric) and emic (qualitative) data involved, and present an accurate representation of the problem. Roth, Shani, and Leary (2007) suggest integrating collaboration and co-learning opportunities in both the insider and outsider settings. Coghlan and Brydon-Miller (2014) out that action research must formulate its epistemological perspective to determine the distance the researcher assumes between the subject and object. Coghlan and Shani (2014) argue that action research must be mindful that problems are framed, collaborations are formed, and action cycles are conducted with rigor, reflexivity, and relevance. Herr and Anderson (2005) and Onwuegbuzie and Combs (2010) offer valuable insight into validity criteria within the action research process, including the outcome, process, democratic, catalytic, and dialogic components. Reason (2006) contends the importance of transparency and clarifying the first (yourself), second (participants), and third (written context) person points of view within the research study. The hallmark of sound action

research is researching to change an organization with the implication of impacting a more extensive range of stakeholders (Eden and Huxaham, 2016). However, it must be noted that generalizability does not apply to the action research methodology (Stinger, 2014). The implication of action research may impact a broader context; however, transferability is based upon the specified details about the study's setting and the phenomenon addressed (Lincoln and Guba, 1985). Thus, it becomes the researcher's responsibility to be explicit about the settings, practical problems, and research participants to generate transferability to other settings.

Quality of meta-inferences resulting from quantitative and qualitative methods must be evaluated through an MMAR process model, which is a framework for assessing the four phases of the action research cycle. These reflect quality indicators at each stage of the study: planning, design, implementation, and dissemination, which serve as a check against quality to validate the strategy related to the MMAR methodological consideration. To promote validity, the research must encapsulate a continuous commitment to reinforce the action research methodology and “cycles of planning, action, and reflection” (Coghlan and Brannick, 2010, p. 11). Rigor and relevance can enhance action science validity when research procedures incorporate intentional practices that include recursive iterations of action and reflection (Kock, McQueen, and Scott, 1997). Other scholars present problem analysis, methodology, epistemology, knowledge creation, action research cycles, reflection, and limitations as central to valid and reliable action research studies (Lewin, 1947; Caldwell, 2003; Buchanan and Bryman, 2007; Miyazaki and Taylor, 2008; Coghlan and Brannick, 2014). Likewise, some researchers agree that the cycles of action must include a reflection of political pulls and power distance to unearth underlying bias and flawed thinking (Lewin, 1947; Caldwell, 2003; Buchanan and Bryman, 2007; Miyazaki and Taylor, 2008; Coghlan and Brannick, 2014). Coghlan and Shani (2014) show how framing the context of collaborative relationships makes an explicit attempt to illustrate the action research cycles to increase rigor, reflectivity, and relevance. Lincoln and Guba (1985) suggested using “member checking” as a quality protocol to ensure that the participant members' perspectives were captured accurately. Teddlie and Tashakkori (2003) recommend using “inference quality as a criterion” to consider the transferability and validity of meta-inferences within mixed methods approaches (p. 681). Creswell and Clark (2011) advised the purposeful chronology of the design of quantitative and qualitative strands to increase validity and relevance.

The validity of MMAR occurs when the reality is created that fosters an environment where organizational problems are solved and new knowledge results (Greenwood and Levin, 1998). To achieve trustworthiness in this research pursuit, the data was derived from rigorous protocols outlined in the methodology so that this thesis can be considered rigorous by researchers in the field. Further, credibility was established by being confident in the truth of the research through standard procedures, member checking, triangulation, and reflective journaling (Connelly, 2016). This study is dependable as the conditions and data remained stable throughout the quantitative and qualitative data collection process. Validation was a continuous process of negotiated reality and meaning derived from actions taken during the MMAR study. Foundational, inferential, utilization, consistency, and consequential are the phases of the research process that guided the generation and application of inferences to provide stability of meta-inferences (Dellinger and Leech, 2007). Primarily, this research methodology aimed to close the gap between the research and the practitioner while bridging the realities of both domains (Aram and Salipante, 2003). Participating with stakeholders and reflecting on each action inspired by action research endeavors created knowledge in action with a pragmatic and reflective approach.

### **3.8 ACCESSIBILITY, PARTICIPANT INCONVENIENCE, AND ETHICAL IMPLICATIONS**

In compliance with the University of Liverpool ethical conduct requirements, this research was approved by the DBA Ethics Committee. This thesis collected data from human subjects, which necessitated an ethical approval through an application process that consisted of an ethics application form, standard participation information sheet, ethics response form, and participant consent form. After the DBA ethics committee reviewed the documents, feedback was given, considered, and the ethical documents were revised. Final approval was granted after the revisions were accepted. All subjects signed the informed consent as per the University of Liverpool's protocol.

Inconvenience to the participants is one challenge that this research faced. Business executives have tight schedules. I discovered that giving the participants open access to the neural network reduced respondents' procrastination as the neural network model took shape in economically modeling the region's unique economy. This access reduced inconveniences experienced by the participants because they saw immediate progress in helping them better understand their workforce through the model's utility.

Although the economic interests of community business leaders and stakeholders largely outweigh overt political concerns, this study was not entirely ethically neutral. TAMUT is invested in workforce development as an institution of higher education training students for future careers. The university is also interested in developing partnerships that provide internship opportunities and result in philanthropic giving. To minimize these conflicts of interest, there were no discussions of philanthropic giving to TAMUT during this thesis.

The potential risk of participating in this study centered around the confidentiality of the information disclosed during the interview and survey process. There were safeguards, including encryption and anonymization, to defend against any adverse effects of this study. The research procedures ensured privacy during data collection. My procedure for data collection included all possible measures to not directly or indirectly disclose participant information. Therefore, I encrypted electronic data and stored it on an M drive on a computer that was password protected and under video surveillance. The storage of all physical files required securing them in a locked box. Five years after the publication of this research, electronic data will be degaussed, and the paper files will be burned. This safeguards that the data is irreversibly destroyed so that the information cannot be disseminated in the future.

### **3.9 SUMMARY AND PERSONAL REFLECTIONS**

This chapter described the approach to this thesis study to unveil workforce issues in the Texarkana region and how my department acted as a single unit of a broader economic landscape that played its part in progressing on the goal of local economic revitalization. I argued the importance of using a MMAR approach to study this thesis phenomenon with rich and diverse data, which aligned with my pragmatic research philosophy. This choice considered the quantitative side of university economic development models which are frequently neglected in similar action research studies.

This thesis took a systematic approach to develop its research methodology framework by choosing a research philosophy to guide its approach (deductive) and research strategies (action research, interview, survey, and neural network) through an MMAR methodological choice that existed within a cross-sectional and longitudinal time horizon. These decisions guided data collection and subsequent analysis. I decided on an appropriate research strategy after designing a model to show how my philosophical paradigm is in alignment with the research philosophy approach, strategy, and method. The research design best suited for this study was a concurrent triangulation study design which consisted of quantitative and qualitative

data to cross-check stakeholder perspectives about the local economic landscape and how programmatic changes can help. The study design included a purposeful sampling approach guided by similar research sampling techniques conducted in the field. I am mindful of the chronology of data collection, analysis of the procedure, and order of the quantitative and qualitative data strands that are all critical components of reaching validity in this research pursuit (Dellinger and Leech, 2007).

Subsequent chapters of this thesis rely on the discussion here to further elucidate the workforce concerns within the Texarkana region. Chapter Four provides a narrative of the action research phases and includes critical reflections as I make sense of the data. An evaluation of the outcomes of this research appears in Chapter Five. Final thoughts on the research process and the implications and conclusion of this study comprise the sixth chapter.

## CHAPTER 4: REPORTING THE FINDINGS

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### 4.1 INTRODUCTION

This chapter presents three themes that emerged from the qualitative, quantitative, and triangulation data analyses findings and outcomes, which were used to answer the research questions in a practical way to make data-driven decisions for actionable change. The outcomes published by practitioners and researchers exploring university models to re-consider business school agendas around economic development guided me on how to analyze the findings in this study to begin the planning process for my department to support broader regional development initiatives (Gibbons et al., 1994; Karpov, 2017; Etzokwitz and Leydesdorff, 2000; Uyarra, 2010). Thus, this chapter breaks down the research findings and assessment of the data and its ability to answer the research questions.

The findings in this chapter presented a critical analysis of how the homogenous and purposeful sample of participants informed the research questions. Following my concurrent triangulation research design, this chapter began with discussing the quantitative data collection and progressed to qualitative data collection. It also explains how the data was triangulated during the convergence phase to verify the outcomes (Morse, 1991). Next, the emerging themes, outcomes, reflections, and implications derived from the qualitative, quantitative, and neural network triangulation led to actionable and continuous improvement initiatives for my department to center programs and services towards economic development.

### 4.2 CONSTRUCTION PHASE OF ACTION RESEARCH

#### 4.2.1 QUANTITATIVE FINDINGS

The quantitative findings during the construction phase of my action research cycle led to immediate programmatic changes that were implemented and served as a guide for the development of the neural network model. As discussed in the methodology chapter, the findings from the first two AR phases lead to the creation of an innovative university to strategically align programs in a meaningful and data-driven way to make progress towards broader regional economic development concerns.

The quantitative instrument (BR&E survey) provided insight on the research questions in this thesis, which were guided by scholarly literature in my field, to play a role in contributing towards economic growth through educational programming for my local community. The following research questions guided this study:

- i. What is the primary workforce issue in Texarkana that creates a barrier to regional growth?
- ii. Do Texarkana businesses and workers have the resources they need to bring ideas to fruition?
- iii. What are the regional needs that can be addressed with SCM programming?

To begin analyzing the quantitative data collected from the survey administered for this study, I first examined my hypothesis by conducting an F test, which determined if the data supports or rejects the hypothesis. Through hypothesis testing, the BR&E survey respondents felt that:

1. Education plays a role in regional growth.
2. R&D is an overlooked resource.
3. Programmatic changes to business curriculum are needed.

Table 11 below provides a summary of the hypotheses, null hypotheses, R, R squared, p-value, alpha, variables, and results from the BR&E survey.

**Summary of Regression Analysis from BR&E Survey**

Hypothesis	R	R Squared	p-Value	Alpha	Goodness-of-Fit	Results
<p><b>H1: The lifecycle of the organization (L) is associated with current (HeD) and expected (Ed) education.</b></p> <p><b>H0: The lifecycle of the organization (L) is not associated with current (HeD) and expected (Ed) education.</b></p> <p><math>lifecycle_i = a_0 + a_1 CurrentEducationLevel_i + a_2 ExpectedEducationLevel_i + e_i</math></p> <p><b>Model: <math>L \sim HeD + Ed</math></b></p> <p><b>Lifecycle (y) = .1527 + .543 * (educational level) + .457 (expected education level)</b></p>	.73	.53	<p>B1=1.79E-06</p> <p>B2=5.98E-06</p>	*.05	<p>Chi-Square Pearson: 25.204 Sig=.009</p> <p>Chi-square deviance 20.658 Sig=.037</p> <p>F=63.89 Sig=.000</p>	<p>Accept H1 and reject H0.</p> <p>A strong positive relationship between Y1 and B1 and Y1 and B2</p> <p>Results are significant and reliable</p> <p>Data is homoscedastic</p>
<p><b>H2: The current resources (I) and the satisfaction level of resources (Ca) are associated with local businesses' ability to bring ideas to fruition with R&amp;D (P).</b></p> <p><b>H0: The current resources (I) and the satisfaction level of resources (Ca) are not associated with local businesses' ability to bring ideas to fruition with R&amp;D (P).</b></p> <p><math>R\&amp;DAvailability_i = a_0 + a_1 Resources_i + a_2 ResourceSatisfaction_i + e_i</math></p> <p><b>Model: <math>P \sim I + Ca</math></b></p> <p><b>R&amp;D Availability (y) = 1.869 + -.017 *(Resources) + .634 *(Resource Satisfaction Levels)</b></p>	.58	.33	<p>B1= .874</p> <p>B2= 8.96E-09</p>	*.05	<p>Chi-Square Pearson: 3.873 Sig=.042</p> <p>Chi-Square Deviance 5.551 Sig=.023</p> <p>Chi-Square Model Fit 23.53</p> <p>F=18.453 Sig=.000</p>	<p>Accept H2 and reject H0.</p> <p>Moderate positive relationship between Y1 and B2</p> <p>The interaction between Y1 and B1 were not significant</p> <p>Model data is homoscedastic</p>
<p><b>H3: Education (HeD) (Ed) is associated with economic growth and expansion in this region (St).</b></p> <p><b>H0: Education (HeD) (Ed) is not associated with economic growth and expansion in this region (St).</b></p>	.79	.64	<p>B1=2.312E-15</p> <p>B2=1.11E-12</p>	*.05	<p>Chi-Square Pearson: 1.696 Sig=.001</p> <p>Chi-Square Deviance 1.92 Sig=.001</p>	<p>Accept H3 and reject H0.</p> <p>Strong relationship between Y1 and B1 and Y1 and B2</p>



<p><b>GrowthExpansion</b>= <math>a_0 + a_1 \text{EducationImportance}_i + a_2 \text{BusinessGrowthStrategy}_i + e_i</math></p> <p><b>Model:</b> <math>S \sim EI + Gs</math></p> <p><b>Growth Expansion (y)</b>= .2.20+.443* Education Importance +.425* Business Growth Strategy</p>					<p>Chi-Square Model Fitting 77.83</p> <p>F=62.84 Sig= 0.00</p>	<p>Results are significant</p> <p>Data is homoscedastic</p>
<p><b>H4:</b> Skills, knowledge, and abilities (<i>GHR</i>) isolated by the supply chain industry (<i>I</i>) is associated with regional growth and expansion (<i>St</i>).</p> <p><b>H0:</b> Skills, knowledge, and abilities (<i>GHR</i>) isolated by the supply chain industry (<i>I</i>) is not associated with regional growth and expansion (<i>St</i>).</p> <p><b>Salesvolume</b><math>e_i = a_0 + a_1 \text{CurrentKSA} + a_2 \text{SCMWorkforceRatings}_i + e_i</math></p> <p><b>Model:</b> <math>St \sim GHR + I</math></p> <p><b>SCM Sales Volume (y)</b>= 1.764+.836*Current KSA + .916 SCM Industry Workforce Ratings</p>	.91	.812	<p>B1=8.72E-30</p> <p>B2=5.62E-26</p>	*.05	<p>Chi-Square Pearson:0.00 Sig= .001</p> <p>Chi-Square Deviance.000 Sig=.000</p> <p>Chi-Square Model Fitting: 72.597</p>	<p>Accept H4 and reject H0.</p> <p>Very strong relationship between B1 and Y1</p> <p>Results are significant</p> <p>Data is homoscedastic</p>
<p>**P&lt;0.01 *N =23</p>						
<p><b>Variables:</b></p> <p><b>HeD</b>=Current Education Level <b>Ed</b>= Expected Education Level <b>L</b>=Regional Growth <b>I</b>=Resources <b>Ca</b>=Resources Satisfaction Levels <b>P</b>=R&amp;D Ability <b>St</b>=Growth and Expansion <b>M</b>=Industry <b>GHR</b>=Skills, Knowledge, and Abilities</p>	<p>* The residual check confirmed the models are free from heteroscedasticity, and the Ramsey test revealed no specification error. Thus, the outcomes were reliable.</p>					

Table 11: Summary of the Regression Analyses from the BR&E Survey

Source: Data Collected from the BR&E Survey for this Thesis

The four research hypotheses corresponded to the research questions to examine how I can revamp antiquated supply chain programming and university models. The model aimed to capture the impact of selected variables within the scope of my control within my workplace context, not to develop a good fit model; therefore, a few low R-values are present in this analysis. Countless variables impact economic growth and need consideration; however, this research focuses on the role that local education plays on the economy as a key player in a region's economic landscape. The quantitative hypothesis testing outcomes are in sections 4.3, 4.4, and 4.5, which is where the themes emerging from the data are detailed.

Also during the construction phase, seventy-three percent of the respondents from the BR&E survey participated in open discussions about the issues facing community stakeholders during a key-informant interview (Teddlie and Tashakkori, 2009; Cappelletti and Baker, 2010; O'Cathain, et al., 2010; Creswell, 2013; Guinan et al., 2013; Pugh et al., 2016; Motoyama and Mayer, 2017). The interviews helped me make sense of the economic landscape and understand how I can incorporate changes in my department to be adaptive to community needs. I found that mutual learning took place between the participants and myself as we were mutually trying to unearth ways to enhance the local economy (Elden and Levin, 1991; Honey and Mumford, 1996; Caldwell, 2003; Hart and Sharma, 2004). These findings play a crucial role in how I can contribute towards solving a small piece of a more significant economic phenomenon. Figure 11 below represents the NVivo overarching themes and subthemes that emerged from the interviews.

Interview Questions and Answers		Search All Codes and Cases	
Name	Files	References	
Education plays a role in regional growth		1	20
Adapt curriculum to industry needs		0	0
Center education around soft skills		1	23
Internships		1	1
Mechanical engineering programs		0	0
More lunch and learn opportunities		1	1
Recruit more members to local community		0	0
Vocational training opportunities		0	0
R&D is an overlooked resource		1	20
Need assistance with government regulations		1	2
Need curriculum development		1	1
Need internship programs		1	1
No		1	3
Yes		1	9
The Role of Technical Supply Chains		1	20
Adapt curriculum to the needs of the local business		1	3
Career centered elementary and middle school programs		1	4
Civic Involvement		1	2
Funding for employee referrals, recruitment and internships		1	2
Know the needs of local businesses		0	0
Worker knowledge, skills, and abilities (soft skills)		1	1
Workforce, on-the-job training and higher education		1	2

Figure 11: Summary of the NVivo Overarching Themes and Subthemes

Source: King, 2004

Table 12 offers the overall themes and subthemes that emerged from the qualitative analysis. More details on the qualitative analysis are provided in sections 4.3, 4.4, and 4.5.

Overarching Themes	Subthemes
Participants felt education plays a role in regional growth	<ul style="list-style-type: none"> <li>Soft skills are needed</li> <li>Middle school and high school curriculum need to develop soft skills and training that local companies need</li> </ul>
R&D is an overlooked resource	<ul style="list-style-type: none"> <li>There is a call to update BR&amp;E Program</li> <li>Respondents reported a need to hire Chamber member specifically for BR&amp;E</li> </ul>
The role of technological SCM	<ul style="list-style-type: none"> <li>Internships</li> <li>Adapt curriculum to the needs of local businesses</li> <li>Vocational training opportunities needed</li> </ul>

Table 12: Overarching Themes and Subthemes from Key Informant Interviews

#### **4.2.2 MIXING METHODS: THEMES FROM TRIANGULATION OF NEURAL NETWORK**

From a geometric perspective, the quantitative findings from the regression models provide parameters that guided the areas that needed further exploration from a neural network. The regression findings served as the basic building blocks or perceptrons, which were given to a binary classifier to build the neural network. Phase one and two connected during the intermediate phase, which is the neural network triangulation phase. Neural networks became instrumental in mixing and triangulating the quantitative and qualitative data for this research study. The neural network was vital to verify the themes revealed during the qualitative and quantitative data collection that informed the research questions. The aim of mixing the data was to discover ways I could develop adaptive SCM programs and university interventions that incorporated changes informed by data. Doing so allowed me to better understand the complexity of the interconnected systems that impacted this region's economic landscape. Therefore the neural network was guided by the parameters set forth from the regression analysis and interview findings to focus the output on the areas that matter to the local community and business leaders.

The core issues revealed became the action items that needed to be addressed in SCM programming to facilitate educational growth. After the neural network cross-checked the data and coded and weighted the variables in SPSS, the following thematic tree (see Figure 12) provided a broad overview of these relationships centered around education.

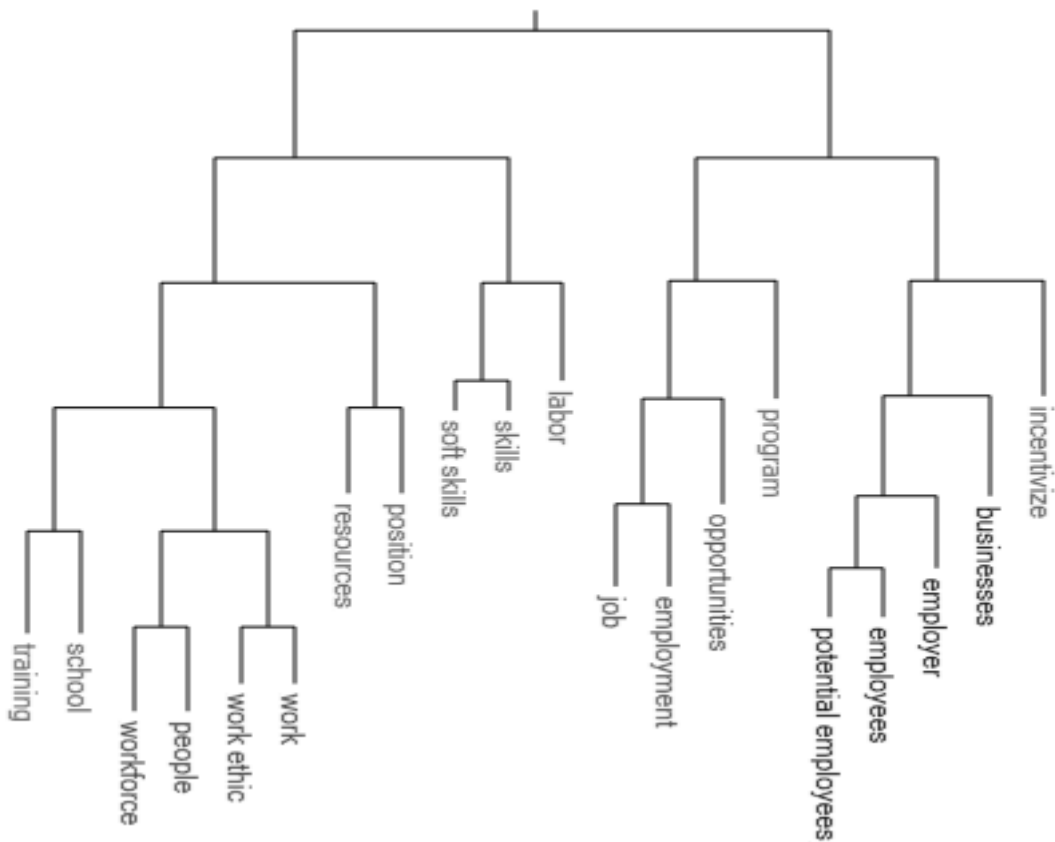


Figure 12: Thematic Tree Produced by the Neural Network in this Thesis

Source: Qual and quant data collected for this thesis

According to the neural network, triangulated findings from the interview and survey indicated that soft skills, technical training, prescriptive educational program opportunities, work ethic, critical reflection, and internships are needed.

The next sections present the overall themes revealed from the quantitative, qualitative, and neural network triangulation phases.

### 4.3 THEME ONE: THE ROLE OF EDUCATION

Theme one in this section is organized by stating the findings, outcomes, reflections, and implications of the quantitative analysis first, then the qualitative analysis, and finally the triangulation from the neural network. The first outcome from the quantitative findings is that the Texarkana workforce does not have the education needed for regional growth, which is a problem for economic development (Gibbons et al., 1994; Uyarra, 2010). To understand the

impact that education has on local business growth and begin programming the beginning parameters of the neural network analysis, I ran a regression analysis on the BR&E survey data. The regression determined that a significant positive relationship existed between an organization's lifecycle ( $Y_1$ ), the current education level of the organization's employees ( $B_1$ ) (p-value=1.79E-06), and the expected education level ( $B_2$ ) (p-value=5.98E-06). Thus, an organization's lifecycle may be predicted by the current educational level and expected education level in the Texarkana area by the following formula: Organization's Lifecycle ( $y$ ) =  $1.527 + .543 * (\text{educational level}) + .457 (\text{expected education level})$ ,  $R^2 = .58$ . When the linear regression predicted an organization's lifecycle, it found that education level ( $\beta = .58$ ,  $p < .05$ ) and the expected education level ( $\beta = .62$ ,  $p < .05$ ) were important predictors. While using a chi-square Pearson test on H1, the significance level was .001, which is less than the alpha .05. A goodness of fit test found that the explanatory variables in the regression analysis were multivariate normal and no autocorrection was present. A scatterplot of the regression standardized residual on the y-axis and the regression standardized prediction value on the x-axis found the analysis was homoscedastic. The chi-square Pearson test indicated that there was a statistically significant interaction between the dependent variable and both of the independent variables. From this analysis, I deduced that the explanatory values (i.e., current education and expected education) impact the business' lifecycle (i.e., growing, maturing, or declining), which affects regional growth.

To further understand the role of education and to discover the critical areas for the neural network analysis, I ran a regression analysis to understand the interaction of education importance ( $B_1$ ) as an independent variable and growth strategy ( $B_2$ ) as an independent variable to economic growth and expansion ( $Y_1$ ) as the dependent variable. The regression found a strong significant relationship between  $Y_1$  and  $B_1$  (p-value=2.312-15), and an insignificant relationship between  $Y_1$  and  $B_2$  (p-value= n.s.). However, the model fit was  $R^2 = .64$ . Thus, business growth and expansion may be predicted by education importance and business growth strategy (i.e., downsize, stay the same, or expand) as stated by the following formula: Business growth and expansion ( $y$ ) =  $2.20 + .443 * \text{Education Importance} + .425 * \text{Business Growth Strategy}$ . The residual check revealed that the data is homoscedastic. When the linear regression predicted business growth, it found that business growth strategy ( $\beta = -.064$ ,  $p = .252$ ) was not a predictor, however educational importance ( $\beta = .655$ ,  $p < .05$ ) was a significant predictor. Hence, the regression analysis revealed that the emphasis placed on educational importance might predict economic growth and expansion in the Texarkana area.

With these results in mind, I analyzed the current educational levels in the area with a gap analysis between the current and expected education levels, as reported by the participants in the BR&E survey. As Figure 13 shows, there is a 15-45% gap between the current and expected levels.

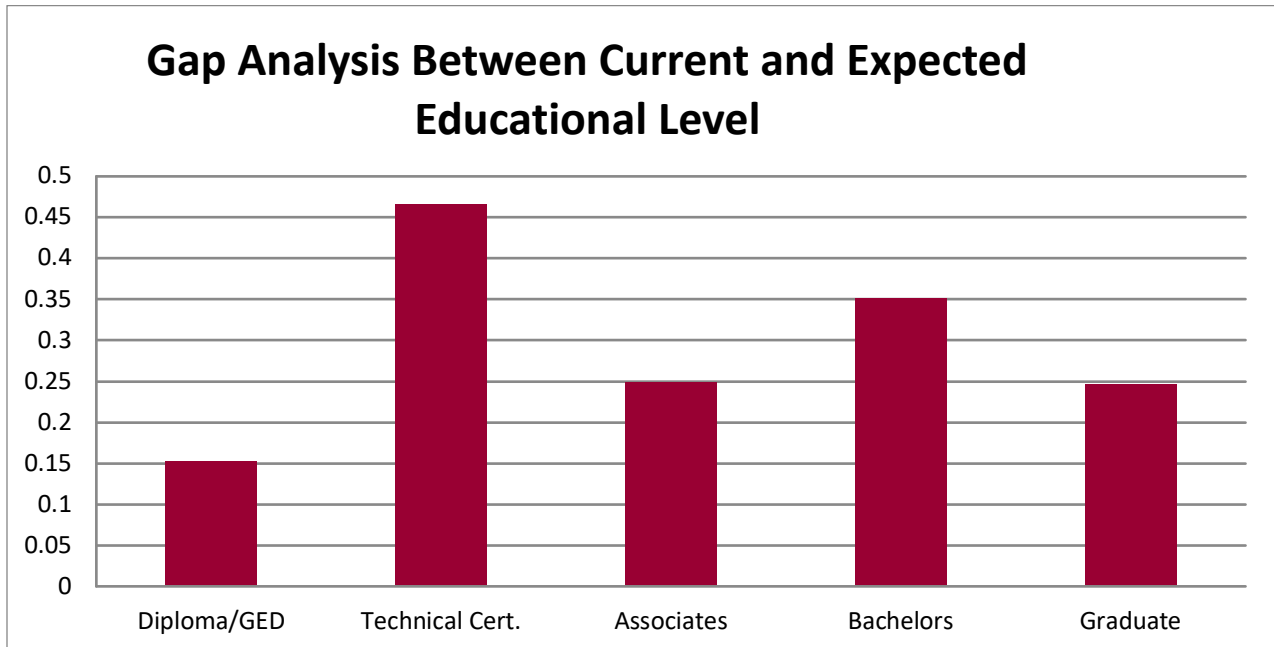


Figure 13: Gap Analysis Between Current and Expected Educational Level

Source: Data Collected from the BR&E Survey for this Thesis

Hence, business and civic leaders are needing the local universities to step in and provide more certificate and bachelor's degree opportunities or tailor the current offerings to the open vacancies in the region, as workers are not educationally equipped for the needs of local businesses. From my past engagement with stakeholders, I took a dialectical stance encompassing multiple mental models, reflective of diverse viewpoints, to critically understand the complexities of the local economic landscape (Thomas, 1977; Honey and Mumford, 1996). From my experience with stakeholders and given my pragmatic perspective, which incorporates an amalgamation of diverse perspectives, it does appear that technical certifications and a broader degree offering are significant needs in this area, which may be one of the underlying issues in local education levels. The findings of Kirby (2004) and Motoyama and Mayer (2017)

helped me to focus on TAMUT's lack of SCM certificate offerings, centering on the respondents' gaps between the current and expected education levels in the industry.

From the regression and gap analysis, it was reasonable to assume that not having enough educated workers is seen as a barrier to regional growth. The survey revealed that 35% of community leaders felt that the local workforce is debilitating. One possible cause of this is because economic landscape changes require a higher level of technical, social, and analytical skills. The survey responses also indicated that small-town dilapidation may be from an undereducated workforce. Educated workers arguably raise productivity, provide more creative approaches to thinking, and promote technology innovation and entrepreneurship (Nickoli, 2013; Valero and Reenen, 2016; Karpov, 2017; Porter et al., 2016). The finding that fifty percent of participants replied that there is a need for educational opportunities for local workers leads me to believe that there are enough available workers. Still, they do not have the necessary education to satisfy local businesses.

The findings suggested an alignment was needed between the local population, education, government, and businesses to align college and university programs relevant to local businesses. Reflecting on the six university models under consideration for this alignment, Etzkowitz and Leydesdorff's (2000) triple helix model and Dubb and Howard's (2012) anchor institution model are suitable to support these findings as the models provide guidance on using the outcomes of this study to refocus the business school agenda to disseminate knowledge centered around gaps in education. The results from civic and government leaders were instrumental in positioning the university and its relationships with outside stakeholders to build partnerships to make an economic contribution. Huff and Huff (2001) contend that expanding educational knowledge impacts local communities and upskills workers, which suggests that adaptations in current programs or adopting additional programs may help progress the workers and the economy.

The qualitative findings substantiated the quantitative outcomes as respondents felt that the lack of knowledge, skills, and abilities (soft skills) was preventing businesses from growing. During the critical key informant interviews, the first question was, "What is the main workforce issue in Texarkana that creates a barrier to regional growth?" This question aimed to understand areas where SCM programming could help with workforce development. Ninety percent of respondents revealed that soft skills were one of the barriers to business retention and expansion, as shown in Figure 14 below.



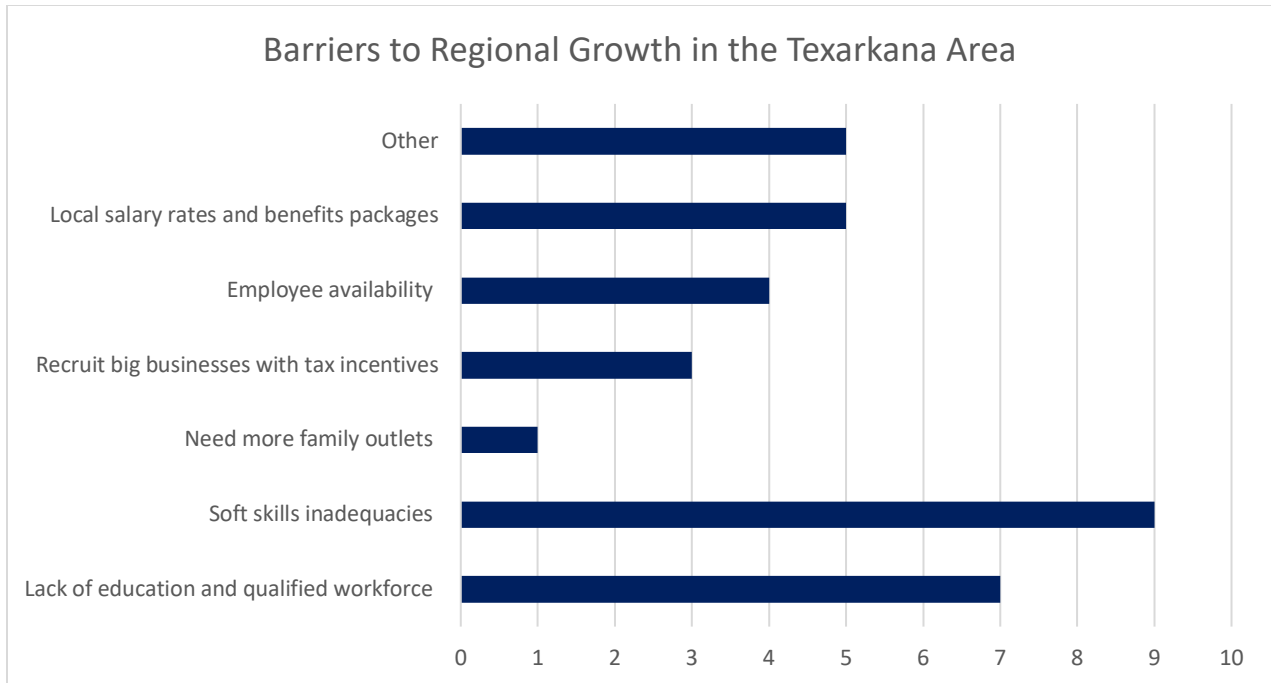


Figure 14: Barriers to Regional Growth as Reported Interviews

One overarching theme that emerged from the first interview question was that there is a lack of educated and qualified professionals in the region. An important implication of this study is that a significant gap between the education levels needed and those that are in the local employment pool creates an economic barrier. The interview findings verify the survey outcomes that there is a significant lack of educated and qualified workers. The responses shared below unfold a story of frustrated local civic and business leaders in dire need of a pipeline of skilled and educated business professionals.

The interview informants became agents for change by helping me “learn to unlearn” to provide a change in how SCM programs are developed (Lewin, 1947). Table 5 in the methodology chapter indicates the pseudonyms used in this study and defines each participant’s organizational role. While reading the interview narratives below, referring to the information contained there may be helpful to the reader.

When I asked Charles, a commander at Red River Army Depot, my first interview question, he stated:

*“The main barrier that impedes regional growth is the lack of education, soft skills, and training.”*

This interview interaction inspired me to think about what the issue was, specifically in Texarkana, that caused local businesses not to be satisfied with the soft skills of our local workforce. When using metacognition on this issue, I reflected on an observation that I had while working with a local high school to recruit SCM students. This interview indicated a lack of soft skills training in the curriculum and a system-wide issue in that state, local, and federally mandated curriculum targets have no regard for developing these skills. Reflecting on the critiques of the locals offered by Charles, my impression is that there is a strong case for colleges and universities to fill this gap by working with local businesses to understand the soft skill divide. Reflecting on my nine years of experience teaching higher education, I find that the interdisciplinary requirement to teach students soft skills is missing. It is assumed that it is taught in elementary, middle, and high school education. This can lead to grade school educators assuming that the responsibility to teach soft skills falls on higher education and college educators presuming that primary schools shoulder this responsibility. Echoing Mintzberg (2004), business students become knowledgeable about business, but when soft skills are lost, the students are not sure what is needed most to succeed in daily tasks on the job.

Next, I interviewed Ben, a civic leader on the Arkansas side of the Texarkana community, who mentioned schools needing to be accountable to make locals more employable.

*“We need to galvanize a collective body that will stay the course to develop a systemic process that will make our people more employable. There needs to be a method developed that will hold people, schools, and other organizations accountable for developing our students into future employable employees.”*

Ben further elaborated by stating the importance of teaching towards local careers, starting in elementary and middle school.

*“We also need to do a better job of teaching geared toward careers in a fast-changing job market. Potential employees should obtain degrees that are reflective of the current job market in Texarkana so that when they graduate, they can return to Texarkana for employment opportunities.”*

When interviewing Ben, I observed the passion that he felt about the locals and the push that he was making as a civic leader to create more employable workers for our local businesses by underscoring the need to refocus school curriculum, starting with elementary and middle schools.

Through this passion, I felt connected to his intrinsic depth of authenticity to expose the phenomena of an educational divide. He presented tactful information that inspired institutional action (Weick, 2001). The findings also revealed an opportunity to incorporate soft skills instruction in my classes through my role as an SCM instructor.

Similarly, Angel, a civic leader on the Texas side of Texarkana, suggested soft skills and technical training were an employment issue in Texarkana.

*“We don’t have enough technically qualified employees in Texarkana to recruit big businesses. Our employee pool has a significant weakness in demonstrating the use of soft skills.”*

Angel’s interview served as a point of verification on the findings that soft skill inadequacies exist in the region. While conducting Angel’s interview, I observed that he did not hesitate when asked about barriers to regional growth. He was steadfast in his convictions and confident that not having enough qualified employees or employees with soft skills is a recursive problem that he has noticed. It was evident that my interviewees felt free to speak about economic issues without hesitation, which is a critical concept articulated within my research methodology (Nielsen and Lyhne, 2015). While interviewing Angel, I reflected on Ben’s answer and found that soft skills are a complaint across both Texas and Arkansas civic leaders in the Texarkana community. The implication is that local education practitioners must take ownership of soft-skill development.

Similarly, Breanna, a leader of a large local manufacturing firm, corroborated the importance of a skilled labor force in the area, underscoring soft skills as being a primary issue. She defined the problem as:

*“The nonviability of a skilled labor force with adequate soft skills to acquire a job and be able to maintain it past the probationary period.”*

The interview with Breanna gave me the impression that once job candidates are employed, they have a hard time keeping their positions past the probationary period due to inadequacies in political entrepreneurship, which is a component of soft skills attainment. During the interview, I noted the importance of incorporating reflection on political pulls, domination, and power distance from the literary works of Bunchanan and Bryman (2007), Coghlan and Shani (2014), and Honey and Mumford (1996). I journaled that Breanna felt comfortable speaking candidly during her interview session and even said that teaching the locals could have a positive impact on her profitability.



From the interviews with community business and civic leaders, it was clear that participants felt that soft skills and qualification inadequacies were barriers to regional growth in Texarkana, Arkansas, and Texarkana, Texas. The interviewees provided new knowledge gained in real-time for reflection and action. As a business education practitioner, the interview observations and self-reflections made me aware that I am part of the problem and the problem is a part of me, which makes discovering solutions to the soft skill epidemic a key focus (Colghlan and Brannick, 2014). Self-reflecting on the problem made me aware that I do not focus on soft skills, as I assumed the curriculum in primary and secondary schools incorporate this instruction. The interview responses suggested that the implication is that local colleges and universities must implement interventions to refocus the curriculum around soft skills, technical skills, and critical reflection. "We need more soft skills" are the top five most frequent words used during the key informant interviews, per the NVivo software, with a frequency of 80% of the interviewees using those five words. An additional implication is that educational institutions must take ownership of soft skill development in the Texarkana region.

The overall theme revealed from the triangulation of the quantitative (survey) and qualitative (interview) data from the neural network analysis conducted in this study verified that existing knowledge, skills, and abilities (KSAs henceforth) are inadequate for economic growth. The neural network analysis indicated that the most important factor for regional growth, specifically in Texarkana, was worker competency development. The implication for practice is how the neural network findings unearth upskilling local worker competencies as the most important factor for regional growth within a small-town economy. Figure 16 represents a sample of neural network coding programmed for this study.

```

*Multilayer Perceptron Network.
MLP SalesVolume05015150025003 (MLEVEL=N) BY
TexarkanasAbilityforTechnologyITservices
    TexarkanasAbilityforPeopleEducatedprofessionals
TexarkanasAbilityforAblTechnologyITservices
    TexarkanasAbilityforPeopleWorkeravailability
TexarkanasAbilityforPeopleEducatedprofessionals_A
    TexarkanasAbilityforAvailabilityoffinancingandcapital
Abilitytodrawgrantfunding WITH
    CurrentCompanyAbilitytoExpandandGrowITAvailabilityofthisresource
    CurrentCompanyAbilitytoExpandandGrowITNeedmorecapabilityinthisre
    CurrentCompanyAbilitytoExpandandGrowITNeedmoretraininginthisreso
    CurrentCompanyAbilitytoExpandandGrowITNeedahigherlevelofeducatio
    CurrentCompanyAbilitytoExpandandGrowITFundingorfinancingsourcesa
    CurrentCompanyAbilitytoExpandandGrowITCostsofthisresource
    CurrentCompanyAbilitytoExpandandGrowITManagerteamimpedesthis
    CurrentCompanyAbilitytoExpandandGrowGovernmentorpoliticalactions
    CurrentCompanyAbilitytoExpandandGrowHRAvailabilityofthisresource
    CurrentCompanyAbilitytoExpandandGrowHRNeedmorecapabilityinthisre
    CurrentCompanyAbilitytoExpandandGrowHRNeedmoretraininginthisreso
    CurrentCompanyAbilitytoExpandandGrowHRNeedahigherlevelofeducatio
    CurrentCompanyAbilitytoExpandandGrowFundingorfinancingsourcesava
    CurrentCompanyAbilitytoExpandandGrowCostsofthisresource
    CurrentCompanyAbilitytoExpandandGrowManagerteamimpedesthis
    CurrentCompanyAbilitytoExpandandGrowHRGovernmentorpoliticalactio
/RESCALE COVARIATE=STANDARDIZED
/PARTITION TRAINING=7 TESTING=3 HOLDOUT=0
/ARCHITECTURE AUTOMATIC=YES (MINUNITS=1 MAXUNITS=50)
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALED CONJUGATE LAMBDAINITIAL=0.0000005
    SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK ROC GAIN LIFT PREDICTED
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15)
MAXEPOCHS=AUTO
    ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

```

Figure 16: Coding Used to Program the First Neural Network

The code produced the following neural network model with a 100% validity rate and with a 63% training, prediction, and testing rating. Reflecting on the validity and prediction percentages of the neural network model, I found the results probable that upskilling KSAs can grow the current business capacities, which will positively impact the local economy.

The neural network analysis output gave probable insight that focusing on KSAs within the business curriculum will help the competency divide. The implication of these findings suggested that local colleges and universities need to take a hard look at the current curriculum and programmatic opportunities to adjust delivery towards developing KSAs, critical reasoning,

and reflection. In light of these findings, Balashov et al. (2019) university 3.0 model, Etzkowitz and Leydesdorff's (2000) triple helix model, Motoyama and Mayer's (2017) entrepreneurial model, and Gibbons et al. (1994) provide insight into the commercialization, transferability, and dissemination of knowledge to make an economic impact.

The analysis revealed that non-profits, government and logistics had the most to gain by professional development opportunities. Interestingly, the impact that educated professionals make is rated the first important education variable. However, the level of importance of an associate degree and technical certification is higher than bachelor's and graduate degrees. Presumably, those with a degree higher than associates would make more impact on business operations. The findings may suggest that the technical level of skills needed in the region are low, making associate degrees and certificates valuable among employee candidates. Reflecting on my role as a leader at the Chamber, the local employers are having a hard time recruiting educated business professionals.

Table 13 below represents the output of the independent variable level of importance model produced by the multilayer perceptron in the neural network.

Neural Network Triangulation Output-Independent Variable Level of Importance	
Variable	Normalized Importance
Impact of Educated Professionals	100%
The Satisfaction of Education for Employees	96.3%
The Satisfaction of Educated Professionals	81.9%
Associate Degree	60.6%
Diploma/GED	41.1%
Technical Certificate	59.3%
Bachelor's Degree	41.2%
Graduate Degree	41.5%

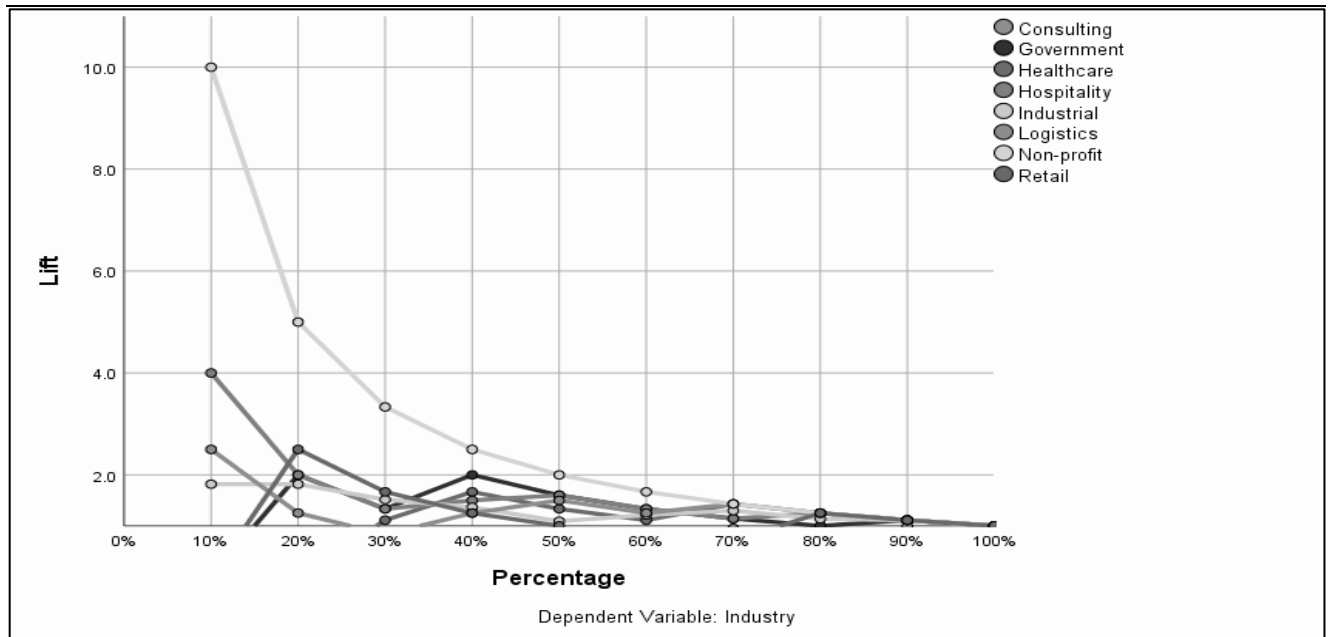


Table 13: Independent Variable Importance- Captured from Mixed Methods Data

The neural network produced a lift chart, which indicated that using the model to predict economic impact for education outperforms not using the model. The model output had a 72.7% prediction rate. Thus, as seen in the neural network analysis chart in Table 13, there is a higher emphasis of importance on an associate degree (60%) and certificate training (59%) opportunities than bachelor's (41%) and graduate degrees (42%).

The neural network model also analyzed how education will impact growth, expansion, and the stability of local businesses' human capacities. The qualitative, quantitative, and neural network analysis suggested that facilities will expand and grow if there are more certificate and associate degree options. The analysis also implied that education positively impacts growth, expansion, and stability of human capital levels. Reflecting on these findings, I think about Amanor-Boadu et al.'s (2009) outcomes that entrepreneurial supply chains allow industries of smaller communities to compete with larger cities. Thus, Amanor-Boadu et al.'s (2009) research helped me to make sense of why education positively impacts facility and human capital growth.

#### 4.4 THEME TWO: THE ROLE OF R&D

Theme two in this section is organized by stating the findings, outcomes, reflections, and implications of the quantitative and qualitative data and then the triangulation from the neural



network. One quantitative outcome was that respondents felt that they have the resources needed to bring ideas to fruition, which may indicate that R&D is an overlooked resource for competitive business advantage. In reviewing the data for H2, I found a moderate positive and statistically significant linear relationship between an organization's R&D availability ( $Y_i$ ) and research satisfaction level ( $B_2$ ) ( $p$ -value=  $1.44E-07$ ). Thus, R&D availability in Texarkana may be predicted by the current resources and resource satisfaction levels, as indicated by the following formula:  $R\&D\ Availability\ (y) = 1.869 - .017 * (Resources) + .634 * (Resource\ Satisfaction\ Levels)$ . When the regression model predicted availability, it found that resources ( $\beta = -.017$ ,  $p = .874$ ) were not a predictor; however, resource satisfaction levels ( $\beta = .57$ ,  $p < .05$ ) were a significant predictor. The chi-square Pearson goodness-of-fit test revealed a significance level of .000, which is less than the alpha .05. According to the goodness-of-fit test, the explanatory variables in the regression analysis were multivariate normal and no autocorrection was present. The residuals found the data to be homoscedastic. From this outcome, I deduced that the resource satisfaction levels are an important indicator of R&D availability (i.e., growing, maturing, or declining), thus impacting regional growth. This finding may be because it takes resources (e.g., land, access to capital, utilities) to produce a robust innovation capacity. Reflecting on these findings, I decided to bar graph the R&D satisfaction levels by industry. As can be seen in Figure 17, the survey respondents are moderately in agreement that their businesses have the resources they need to bring ideas to fruition. However, there are opportunities for R&D in government, healthcare, logistics, non-profit, and retail.

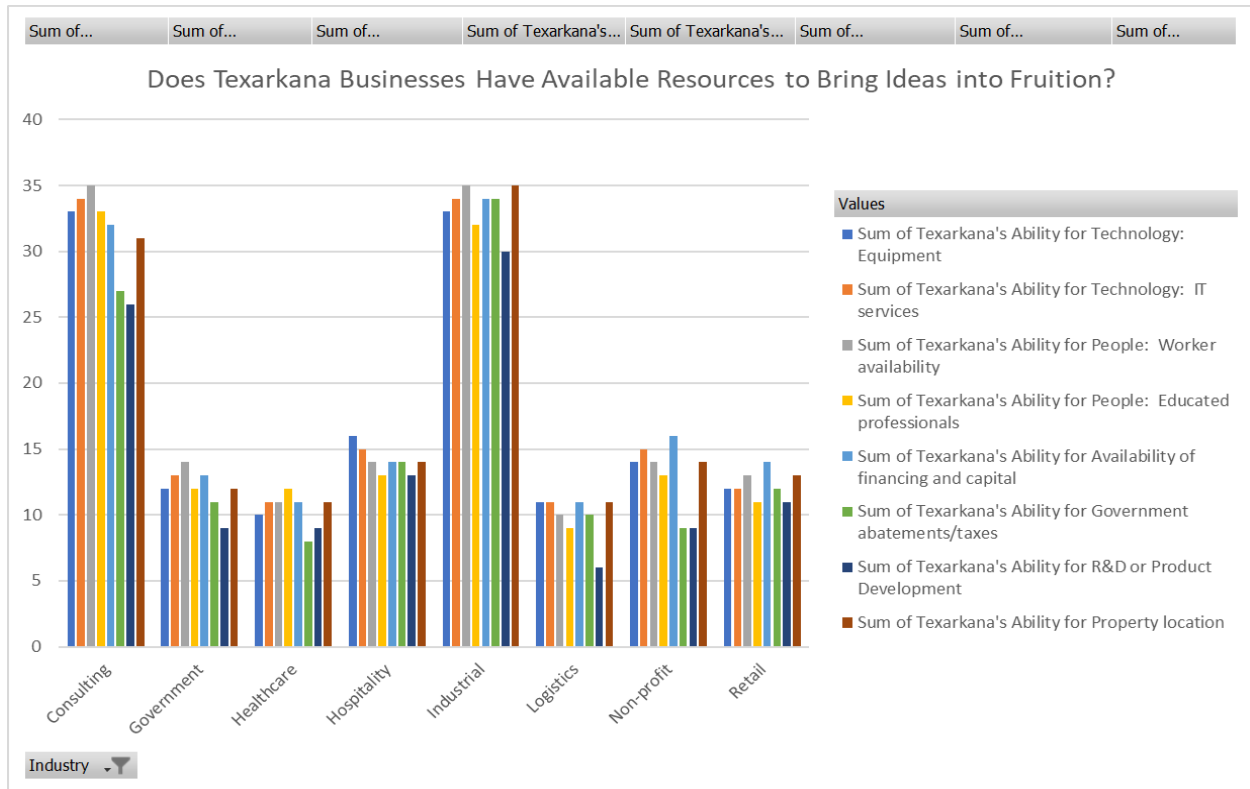


Figure 17: Do Texarkana Businesses Have Available Resources to Bring Ideas to Fruition?

Source: Data Collected for this Thesis

From my past engagement with stakeholders and through a dialectical stance, I examined the phenomena through multiple vantage points and perspectives (Thomas, 1977; Honey and Mumford, 1996). My understanding was deepened by retrodiction to increase my comprehension of the findings and the mechanisms involved that generate observable events. Thus, this engagement provided insight that the respondents did not see R&D as a professional advantage, which the literature shows is a mistake (Sonka and Chicoine, 2005; Srinivas and Viljamaa, 2008). From my experience working with the Chamber, local businesses rely on corporate R&D departments which are predominately located outside of the region. Analyzing the data guided the importance of programming the neural network to investigate areas of R&D opportunities that the community leaders may be overlooking. Figure 18 illustrates a low rating in SCM between the resources available and those needed for innovation.

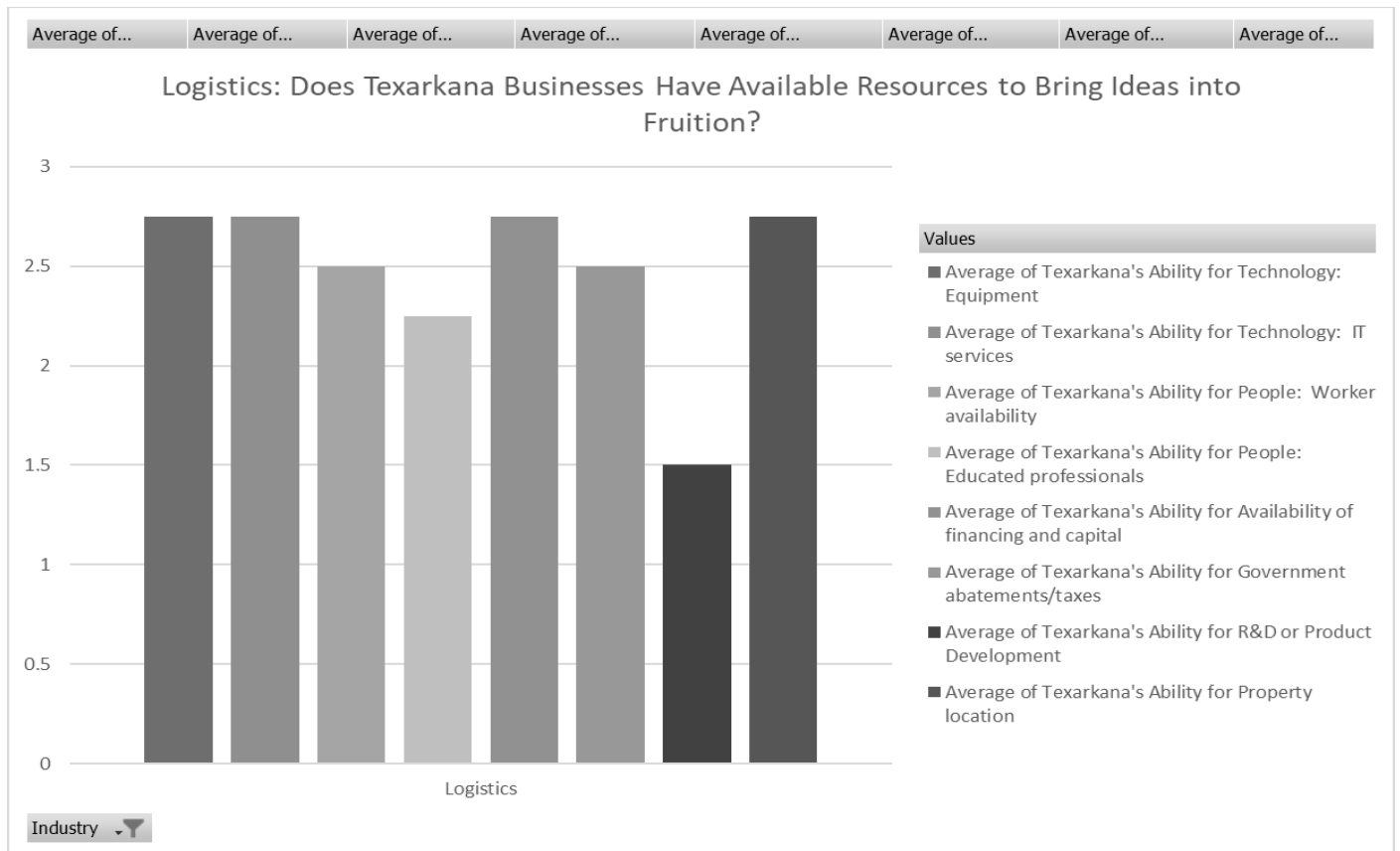


Figure 18: Logistics: Does Texarkana Have Available Resources to Bring Ideas to Fruition

In light of the literature, Sonka and Chicoine (2005) and Srinivas and Viljamaa (2008) argue that universities cannot shoulder the responsibility of providing R&D for business growth. Yet other researchers contend that orienting education around what business leaders are needing makes an impact on businesses' R&D departments (Leydesdorff and Etzkowitz, 2003; Uyarra, 2010; Duke, 2014; Dyllick, 2015; Halaby, 2016; Karpov, 2017). Figure 18 illustrates that IT training and education are two resources that are required to expand and grow, which is an area that my department must consider. In analyzing the results, I found that Leydesdorff and Etzkowitz's (2003) triple helix model is an appropriate model to consider discovering new knowledge, spark innovative environments and technologies, and commercialize products, all of which impact R&D departments. Likewise, Motoyama and Mayer's (2017) model can be applied to these findings to focus my department on areas that will increase entrepreneurial capital in this region and transform higher education into practical-based knowledge and business incubators to commercialize new knowledge through partnerships.

The qualitative analysis supported the quantitative findings. The second interview question was, “Do local businesses have the resources to bring ideas to fruition?” This question aimed to see if R&D programs within the SCM business program would play a role in helping in the local economic conundrum. Figure 19 illustrates the respondents’ answers to the interview question.

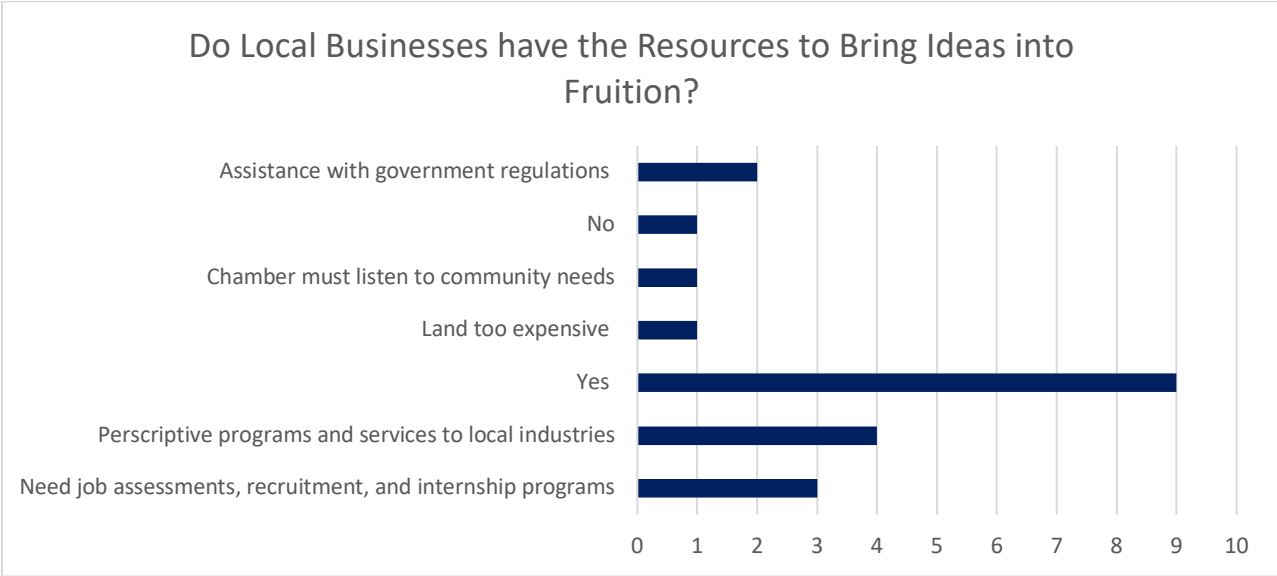


Figure 19: “Do Local Businesses Have the Resources to Bring Ideas to Fruition?”

The interview results revealed that most of the participants felt that they have the resources needed to bring ideas to fruition, which validated my survey findings. However, curriculum that is applicable to industry needs, recruitment, and internship programs are needed.

Kevin, a local manufacturing company leader, advised that he needs an internship program that funnels TAMUT students to their organization to create more human resources to further their capabilities to bring ideas to fruition. He stated:

*“We do have the resources we need since we are a government agency. SCM internships funneled by TAMUT to this organization would help. We currently have 13.5 billion in inventory, with 4135 employees. We need to move 700-800 tons in materials more efficiently and effectively.”*

Todd and Magleby (2005) argue that internships offered out of business partnerships foster a pipeline of innovation to local businesses and partners. Given that Kevin's company is the largest employer of Texarkana, this interaction gave me the impression that an internship program offered to TAMUT students is an immediate intervention that I have direct, authoritative control over.

Thus, I journaled that I must reflect on ways to harness the power of relationships to seek collaborative internship solutions.

Denny, an executive at a military distribution center, similarly argued for an internship program to help with resource capabilities by stating:

*"We only go through USAjobs.gov for employee recruits. Therefore, it would be good to have an internship program to funnel more local workers to facilitate worker retention. The average person has been here for 13 years."*

Denny's answer underscores that large employers are recruiting talent from outside of the region, and my impression is that this is a problem.

Johnny argues this point further by stating:

*"Businesses need to create more opportunities for internship programs. These programs would serve as a mutual benefit for both the intern and the business..."*

The implication is that TAMUT must embed themselves within the regional ecosystem to craft a mutually beneficial internship program to support R&D productivity and increase the value of local human capital (Hecht, 2013). Additionally, the partnership that develops from internship offerings permits stakeholders to structure educational change in a way that benefits them (Raelin, 2010).

Next, I ran a neural network analysis to triangulate the quantitative and qualitative data and found a problem with integrating technology and R&D in the area. As represented in Table 14, the sensitivity chart revealed that the survey and interview data, U.S. Bureau of Labor and Statistics, IMPLAN, and FRED data collected suggest that the local logistics businesses had the most considerable uncertainty in having the necessary resources for R&D.

These findings suggested that the logistics businesses in the region may need more R&D programs and technology integration. I deduced that either local colleges need to advance SCM

programs to include needed technologies, local companies need to consider increasing their in-house R&D departments, or local universities need to increase research requirements. Through a synthesis of the literature and analysis of the data, the implication is adapting SCM education programs to the needs of local businesses improves human capital as a means of inspiring economic development. The case processing summary in Table 14 below represents the validity of the neural network model and the sensitivity chart.

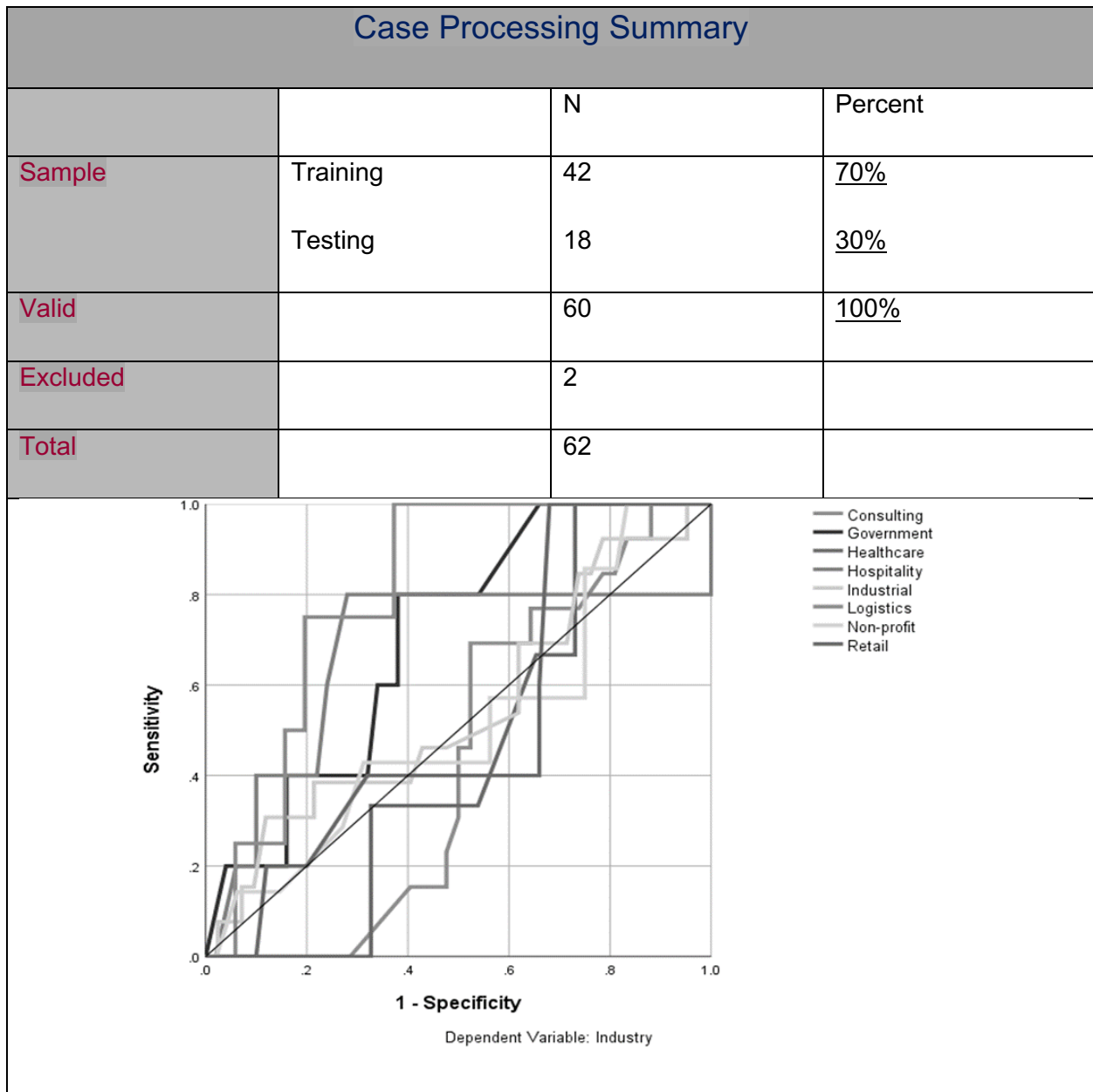


Table 14: Sensitivity Showing Logistics as Being Uncertain if They Have Resources Needed

Reflecting on the validity rate of the model, I found the results probable that the integration of research, development, and information technology would make a positive impact on the local economy.

To make sense of the areas of technology, research, and development that local education offerings are lacking, I produced an independent variable importance output by the neural network. This analysis suggested Texarkana’s ability for technological equipment, IT services, worker availability, educational professionals, R&D product development, and land availability are the topmost critical overall variables for business retention and expansion in this region.

Table 15 represents the output produced by the third neural network from this study.

Neural Network Triangulation Output-Independent Variable Level of Importance	
Variable	Normalized Importance
Texarkana’s Ability for Technology Equipment	100%
Texarkana’s Ability for R&D	95.2%
Texarkana’s Ability for Property Location	90.3%
Texarkana’s Ability for Technology: IT Services	88.5%
Texarkana’s Ability for Government Abatements	74.1%
Texarkana’s Ability for People: Worker Availability	59.3%
Texarkana’s Ability for People: Educated Professionals	68.8%
The neural network produced a lift chart, which indicated that using the model to predict economic impact for education outperforms not using the model. The model output had a 76% prediction rate.	

Table 15: SPSS Neural Network Normalized Level of Importance Results from the Quantitative and Qualitative Data

Source: Data collected for this study

Table 15 is quite revealing in several ways. First, Texarkana's ability for R&D or product development is the second most crucial factor of the variables measured. The survey and interview results moderately support that Texarkana businesses have the resources they need to bring ideas to fruition. Further, the survey and interview findings revealed a moderate relationship between the importance and satisfaction level of R&D in Texarkana. Still, their R&D efforts were not conducted locally. From my interactions with the local business community, the locals feel R&D is essential but are not associating R&D with a competitive advantage. It appears that the locals are not taking the initiative to conduct R&D initiatives in-house but are relying on locations outside of the area to shoulder the responsibility. Pugh et al. (2016) helps me to make sense of these findings by underscoring the lack of coordination between businesses and universities to guide innovation and trade schemes.

#### **4.5 THEME THREE: TECHNICAL SUPPLY CHAIN MANAGEMENT PROGRAMMING**

Theme three in this section is organized by stating the findings, outcomes, reflections, and implications of the quantitative and qualitative data and the triangulation. The outcome from the quantitative analysis is that adapting SCM department program offerings to address the soft skill divide will have a positive effect on economic development. In reviewing the data for H4, I found a statistically significant linear relationship that exists between the SCM business sales volume ( $Y_1$ ), current KSAs ( $B_1$ ) ( $p$ -value=8.72E-30), and SCM worker satisfaction ratings ( $B_2$ ) ( $p$ -value=5.62E-26). KSAs are the knowledge, skills, and abilities or competencies required to perform a job task (O'Mara, 2005). Thus, the SCM workforce may be predicted by the current level of KSAs and SCM industry workforce ratings as indicated by the following formula:  $SCM\ Workforce\ (y) = 1.764 + .836 * Current\ KSA + .916\ SCM\ Industry\ Workforce\ Ratings$ ,  $R^2 = .81$ . When the SCM current workforce was predicted, it found that current KSAs ( $\beta = .666$ ,  $p < .05$ ) and SCM industry workforce satisfaction levels ( $\beta = .79$ ,  $p < .05$ ) are important predictors. The overall fit of the model was  $R^2 = .81$ . While using a chi-square Pearson test on H1, the significance level of the regression model was .001, which is less than the alpha .05. A goodness-of-fit test found that the explanatory variables in the regression analysis were multivariate normal and no autocorrection was present. A scatterplot regression standardized residual prediction value found the data was homoscedastic. The chi-square Pearson test indicated that there was a statistically significant interaction between the independent variable and both of the dependent variables. From this outcome, I deduced that the explanatory values (i.e., current KSA level and SCM worker satisfaction ratings) impact the SCM business' sales volume, which impacts the local economy.



The findings support H4, as there was a statistically significant interaction between program changes and impacting KSAs, which positively facilitates the local economy. Figure 20 captures the respondents' views on whether capabilities and education are needed to raise the local standard of living by expanding and growing local businesses.

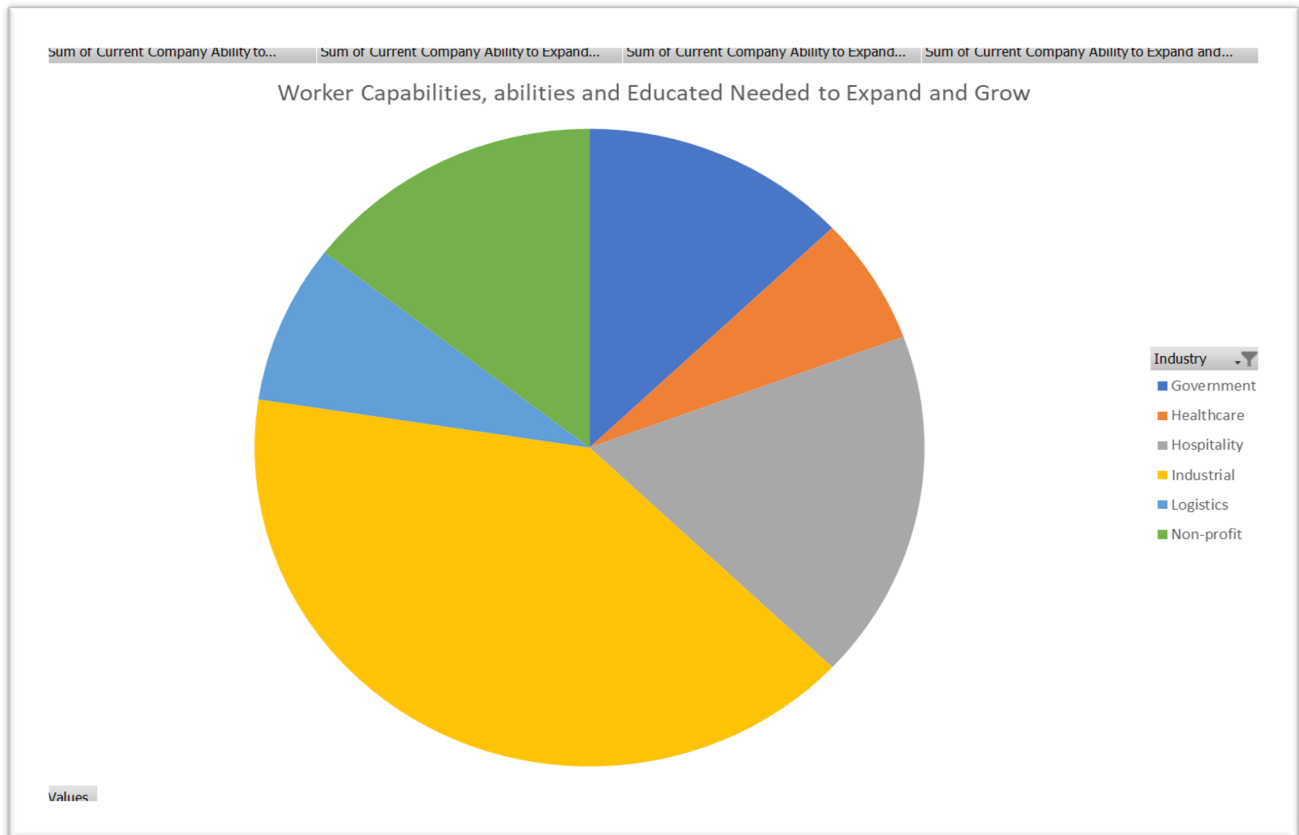


Figure 20: Worker Capabilities, Abilities, and Education Needed to Expand and Grow

Source: Data collected for this study

Through knowledge production and transfer, economic dynamism makes colleges and universities engines for economic development (Nickoli, 2013; Valero and Reenen, 2016; Karpov, 2017; Porter, 2019). Reflecting on Raelin's (2010) model for leaderful change, I noted that change is never done alone. Therefore, it is important to glean from stakeholders the specific KSAs that need educational attention for my department to center programmatic changes on local businesses' efforts.

In terms of KSAs, participants felt that education, namely having diverse degree options, more interactions with IT training, and general workforce development, are vital to economic growth and expansion in the Texarkana region. Figure 21 depicts how the respondents that indicated that their company is growing perceived education to be more critical in facilitating the growth of their business than those that are stable by 20%.

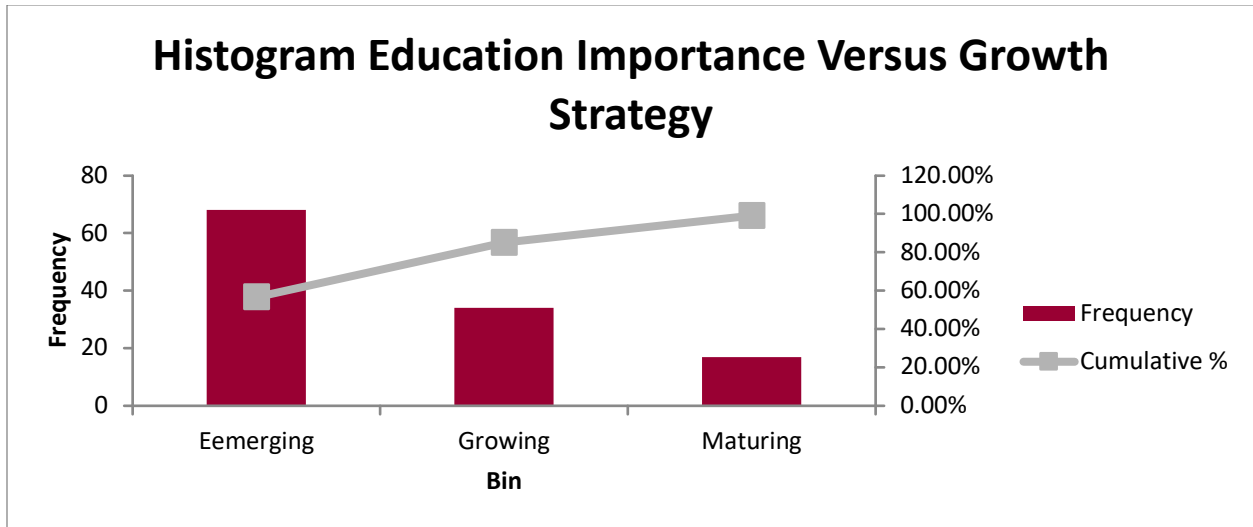


Figure 21: Histogram Education Importance vs. Growth Strategy

Source: Data for this thesis

Respondents revealed a need for more IT availability in this area, including both systems and workers. Reflecting on these findings, I can conclude that there are enough systems but not enough workers to man the technological systems in place, there are not enough available IT workers in general, the workers that are in place do not have the skills required to efficiently manage the systems or the systems are inadequate and there are enough IT workers. Duke (2014), Harrington and Maysami (2015), and Cooke (2018-2019) argue that technology is the hallmark of economic development and suggest analyzing the data to determine if IT deficiencies are due to a lack of educational opportunities, systems, costs, management, or personnel. As shown in Figure 22, these scholarly works are consistent with the views the locals had on IT human capital and equipment capabilities in the region.

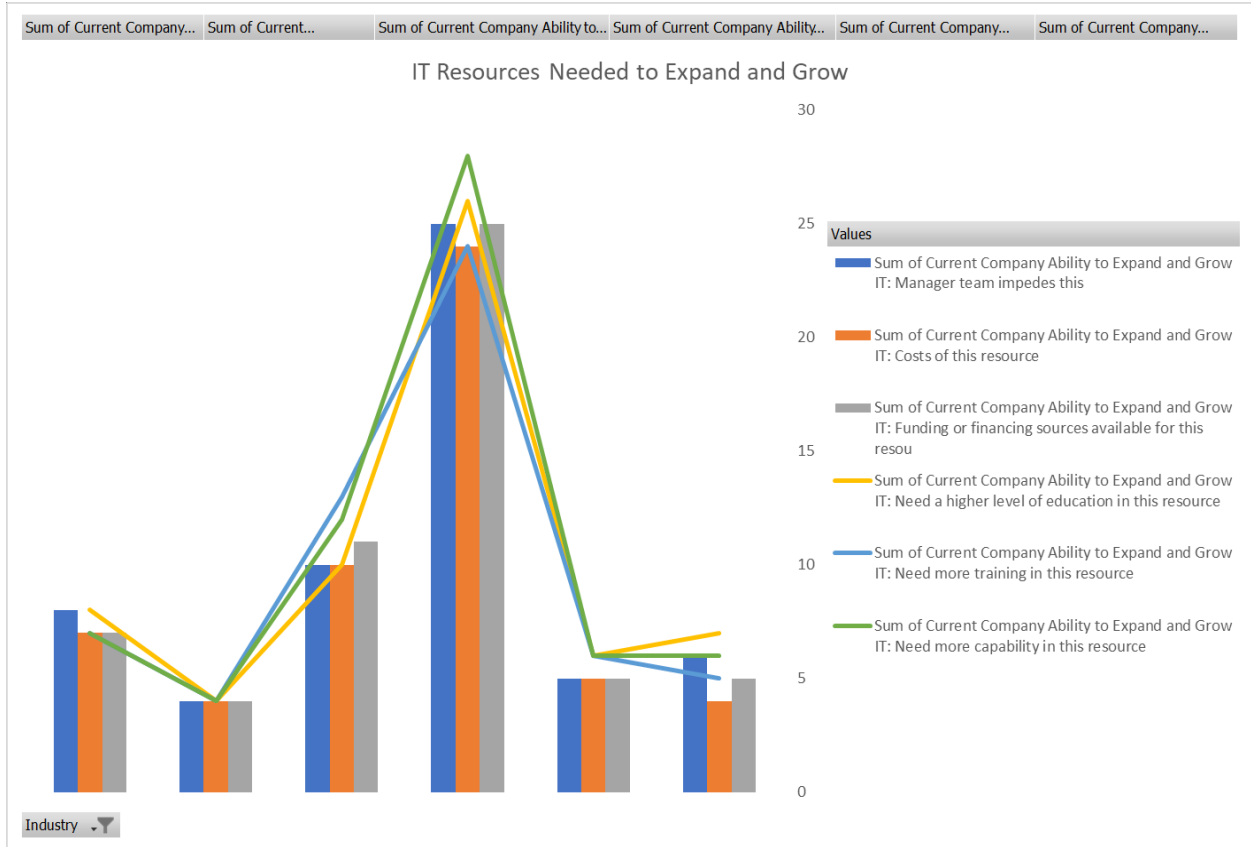


Figure 22: Texarkana Business and Civic Leader Perspectives on IT Worker Capability

Source: Data Collected from the BR&E Survey for this Thesis

The findings are consistent in that when executives feel IT needs improvement, they think the worker capability, system capability, education level, costs of the resource, and management all are the problem. The findings suggest that executives do not actively understand the underlying problem associated with IT deficiencies (Straw and Ross, 1987; Raelin, 2003). To understand

what the executives feel about IT training, including higher education, I analyzed the data with a bar chart, as shown in Figure 23.

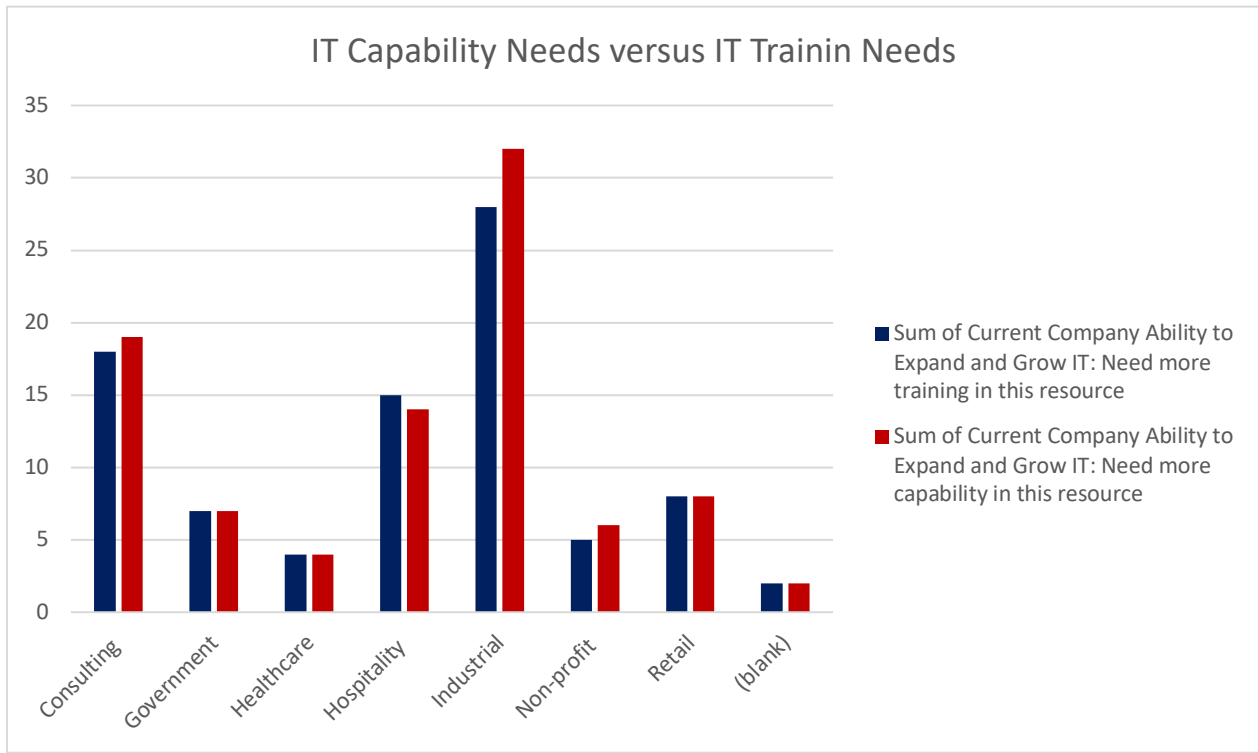


Figure 23: Training versus Capability Needs in IT for Texarkana

Source: Data collected from the BR&E Survey for this Thesis

The survey results give the impression that capability is correlated with training needs. From my experience working with logistics professionals, the employees need more understanding of technology which is essential to increase efficiencies and effectiveness across the supply chain.

In terms of adjusting SCM programs to impact the economy, Figure 24 shows that the respondents felt that workforce education, workforce training, IT education, and IT training are affecting the ability to expand and grow. Fifty percent of the respondents answered that their human resources need a higher level of education to expand and grow. Fifty-one percent indicate that IT needs more training to expand and grow. Reflecting on Gais and Wright (2012), technology transfer is critical to innovation. These findings underscore the need for interdisciplinary changes that incorporate information technology as a central theme.

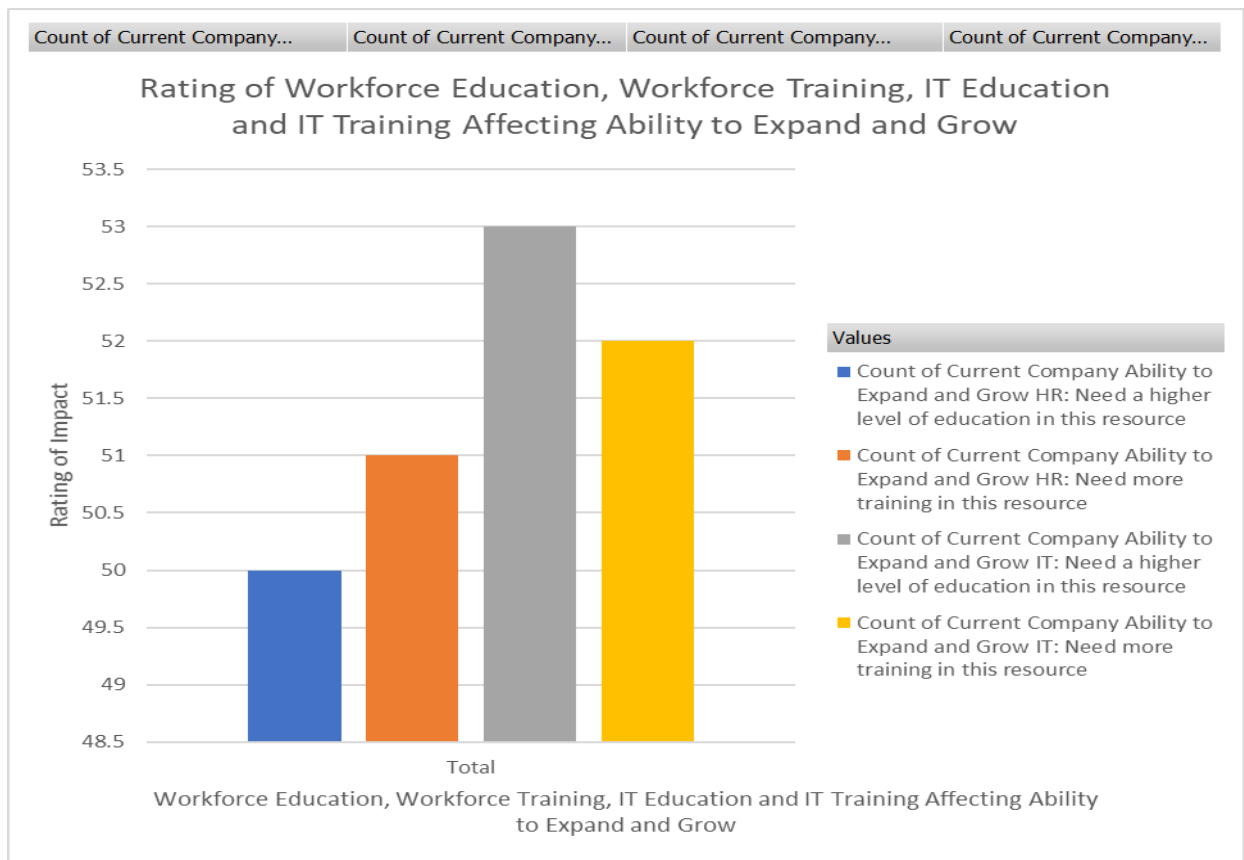


Figure 24: Rating of Workforce Education, Workforce Training, IT Education, and IT Training

Source: Data collected for this thesis

Thus, the data agrees with Dooley (1997) who suggests that programmatic changes in one department act as a cell in a multidimensional agent to inspire economic growth. Thus, the neural network parameters must be adjusted to view the spillover effects of curricular development.

Reflecting on Kirby (2004) and Motoyama and Mayer's (2017) findings that technologically savvy professionals are necessary for innovation and growth helps me understand the importance of making programmatic changes in SCM that incorporate information technology. Reflecting on the findings of Leydesdorff and Etzkowitz's (2003) Triple Helix model, socially organized knowledge production and transfer can help restructure the divide between current education levels and preferred education levels, which is a direction I must consider. From my experience, education that reaches beyond the university's walls solve real-world problems. These findings suggest opportunities in advancing the local economy by involving stakeholders

in college and university plans for programmatic offerings. One implication of these findings is underscoring TAMUT's lack of SCM certificate offerings which could incorporate a technological component to enhance the technical abilities of the supply chain.

The qualitative findings substantiated the quantitative findings outlined above. The story below illustrates the interview respondent's plea for educational programs and services to address the SCM knowledge gaps in the region.

Kevin, who employs 4,135 of Texarkana's locals, argues that having a SCM program that encourages purchasing from the local community will help.

*"Having SCM programs will help with economic development. We had SCM contracts for two years that only purchased from the locality. Organizational growth due to purchasing requirements has a major impact on local procurement. Our local depo sales increase local businesses."*

My impression of Kevin is that he is highly knowledgeable about the need to educate business students on the positive impact that local purchasing practices can make. Reflecting on my interaction with Kevin, it makes logical sense that SCM programs should encourage learners to try to procure materials from the region to make an impact on the local economy. As the strategic sourcing instructor at TAMUT, I made a note to start making this a practice. Further, as the SCM coordinator that is responsible for curriculum development, I must act on program changes that integrate local procurement. Reflecting on the current SCM program at TAMUT, there is no current curriculum to educate students on the impact that local purchasing efforts can contribute. During Kevin's interview, I journaled that through his reality, I learned to unlearn how I develop the purchasing curriculum (Lewin, 1947; Weick, 2001).

Mary suggests adopting SCM to be agile and flexible to local needs by stating:

*"Adapt the SCM curriculum to this region's economic development. Community colleges are flexible and agile."*

My impression of Mary is that she is highly knowledgeable about business retention and expansion efforts, as she was a former leader on the Chamber's Economic Development Council. In light of Lewin (1947) and Weick (2001), Mary makes a good point that adapting business educational offerings to community needs is a purposeful approach in addressing workforce issues.

These findings imply that the local colleges and universities should take a hard look at the SCM curriculum to integrate changes in purchasing behaviors that can make an impact on the local community. Thus, I must refocus on reprogramming SCM program offerings to act as an agent for change to impact the regional economy and given this study’s qualitative findings, Dubb and Howard’s (2012) anchor institution model may be the most appropriate approach. Hence, my actionable plan which is detailed in Chapter Four considers the broader economy and extends the department’s traditional role to focus on programmatic changes that can make an economic impact (Dubb and Howard, 2012; Hecht, 2012; Dubb et al., 2013; Guinan et al., 2013; Ehlenz et al., 2014).

The findings suggest that the current education offerings are not adequately developing skillsets to meet the needs of local businesses. Therefore, colleges and universities may have been blind to the needs of the local community.

To further make sense of the data, I decided to create a tree in NVivo to illustrate the words that are frequently used around the “supply chain.” The results stated that “adapt,” “management curriculum,” “Make classes more regionally...”, and “based on local” were the top phrases used around the “supply chain.” Figure 25 shows the word tree created in NVivo.



Figure 25: NVivo “Supply Chain” Word Tree Across Quantitative and Qualitative Data

Reflecting on the findings of Etzkowitz and Leydesdorff, educational programs are not impactful if they are not practical to the region’s workforce. Therefore, Etzkowitz and Leydesdorff (2000) adapted the curriculum to make a significant impact by creating a series of hybrid relationships between government, university, and industry. Considering these findings, I decided to create a cluster tree to find the most utilized phrases around “programs.” The results showed “expand to incorporate more,” “diversify the type,” “continue to promote,” “create more internship opportunities,” “having SCM,” “installation of more technical degrees,” “opportunities for

employers to develop,” and “employee referral programs” as the top phrases utilized around the word “programs.” Figure 26 depicts the word tree results generated from NVivo.

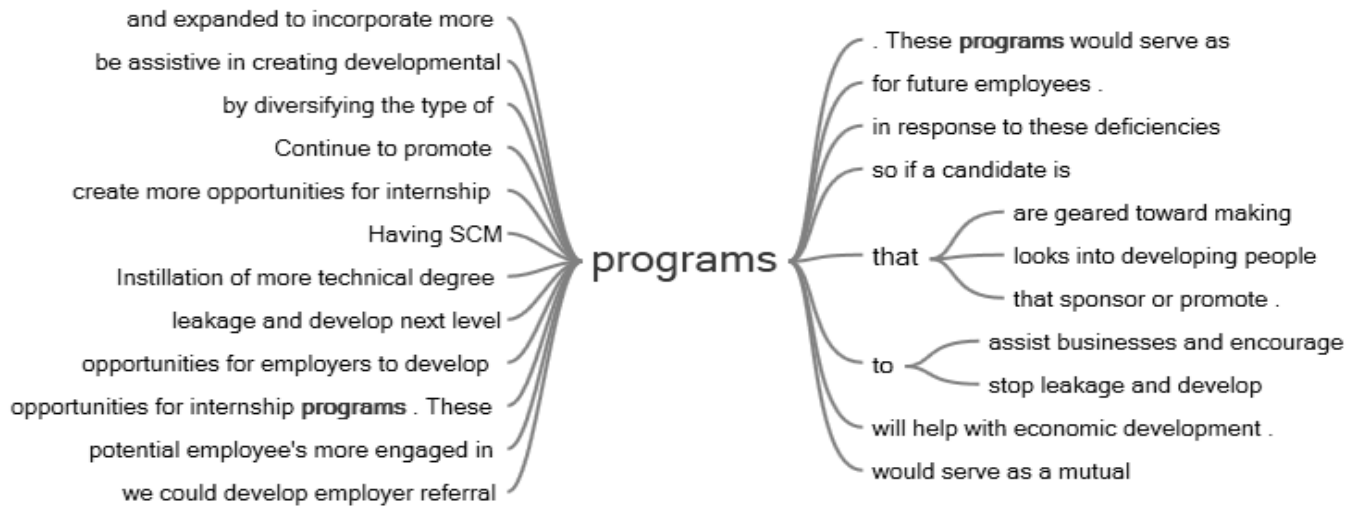


Figure 26: NVivo word frequency surrounding “programs”

These findings show the relationship between programs and the need to diversify them, incorporate more technical curriculum, the importance of SCM, and the need for more internship opportunities. In light of these findings, I reflected on how the triple helix model guides interaction with the dynamics and sub dynamics of the industry, government, and university to understand the university’s role and its relationship to other actors in the local economy (Etzkowitz and Leydesdorff, 2000; Uyarra, 2010; Karpov, 2017; Lendel and Qian, 2017). Thus, these findings suggest that a gap currently exists between the public and private domains and the sought-after education required for socially organized knowledge production, innovation, and productivity. This finding implied that the Texarkana area colleges must rethink their business school agendas to make curriculum practical to local industries. Thus, these findings may resolve the existing controversy in the literature, which suggests that there is not a clear and practical application of the triple helix model to orient prescriptive business education to the local economy (Uyarra, 2010; Lendel and Qian, 2017).



#### **4.6 SUMMARY AND CRITICAL REFLECTIONS**

The findings from the qualitative, quantitative, and triangulated data revealed several opportunities for business education to refocus program offerings to support broader economic development. The findings, outcomes, and reflections confirmed that education plays a role in the local economy and provides rich insight that R&D is an overlooked resource. Thus, the outcomes strongly support that the Texarkana community is needing local colleges and universities to take a closer look at business program offerings, specifically in SCM. Other researchers and practitioners have explored the problems identified in this study and create a logical extension of the existing literature. The identified themes became part of my actionable plan to drive change in how my department adapts programmatic changes for economic impact.

As a researcher and practitioner, I reflected on the outcomes from the triangulation of the quantitative and qualitative data; thus, I found three actionable themes that are addressed in Chapter Five with continuous improvement initiatives for SCM program changes within a departmental action plan. The analysis of the quantitative and qualitative results provided findings that gave rich insight into educational hot spot issues that are creating a barrier to economic growth. Chapter Five presents the practical implications of these research findings for small-town universities in economically depressed regions.

# CHAPTER 5: ACTION RESEARCH

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## 5.1 INTRODUCTION

This thesis unfolds the story of a small-town economy in the financial crisis that challenged traditional university norms and caused a sense of urgency to rethink university models to contribute towards building up the local economy. As the locals turned to TAMUT to rescue its damaged economy, the university had to act fast to involve civic and governmental leaders, inter-departmental teams, and the organization as a whole to make meta inferences to plan actions and interventions. This multilevel analysis serves as a framework that a program coordinator implemented at a regional institution to shed light on the various levels of complexity. This framework was successful in informing the research questions in this study and in developing a targeted action plan enriched with stakeholder perspectives to drive change regarding how the university sparks economic prosperity (Lewin, 1947; Coghlan, 2003; Kash and Rycroft, 2002; Caldwell, 2003; Coghlan and Rashford, 2006; Andres and Jose, 2017). As pressure continued to bubble up from community and government leaders for the university to drive changes, I also faced bureaucratic hurdles in driving departmental changes. As I grappled with making sense of these hurdles, I looked towards the literature and reflected on my institution's values and norms during the sensemaking progression. After a period of sensemaking and sensegiving, I gained actionable knowledge, which refocused programmatic changes central to regional growth. Following Balashov et al.'s (2019) university 3.0 model, Etzkowitz and Leydesdorff's (2000) triple helix model, Dubb and Howard's (2012) anchor institution model, and Motoyama and Mayer's (2017) entrepreneurial models, I encouraged civic and government leaders to consider the broad impact of curricular changes on economic development (Coghlan, 2001; Degan, 2014). First, this chapter reflects on the application of AR methods and the AR cycle implemented in this study to contribute to the knowledge economy. Next, I reflected on my development as an action researcher and how the thesis journey provided me with the impetus to drive change for CBET at TAMUT. Through this scholarly pursuit, I reflected on the insights that I offered the Chamber and TAMUT about the current state of the economy.

## 5.2 TAILORING ACTION RESEARCH METHODS

There are multiple conceptual models of AR in the literature; however, there is an agreement that AR involves a cycle of reconnaissance, taking critical action, and discovering actionable

results in practice to create organizational change (Lewin, 1947; Coghlan and Brannick, 2010; ). Regardless of the researcher's practical, professional, or epistemological position, when following an AR model, identifying the problem, developing an action plan, and implementing, monitoring, and evaluating the action are components of the methodological selection. Guided by the AR cycles of Lewin (1947), Elliott (1991), Kemmis and McTaggart (2007), and Coghlan and Brannick (2014), this thesis follows a model that has one cycle of constructing, planning, acting, and evaluating phases. Figure 27 below outlines the AR cycle within the context of my practice, community, and the stakeholders impacted by this research.

# Planned Change through Action Research for the Supply Chain Management Department

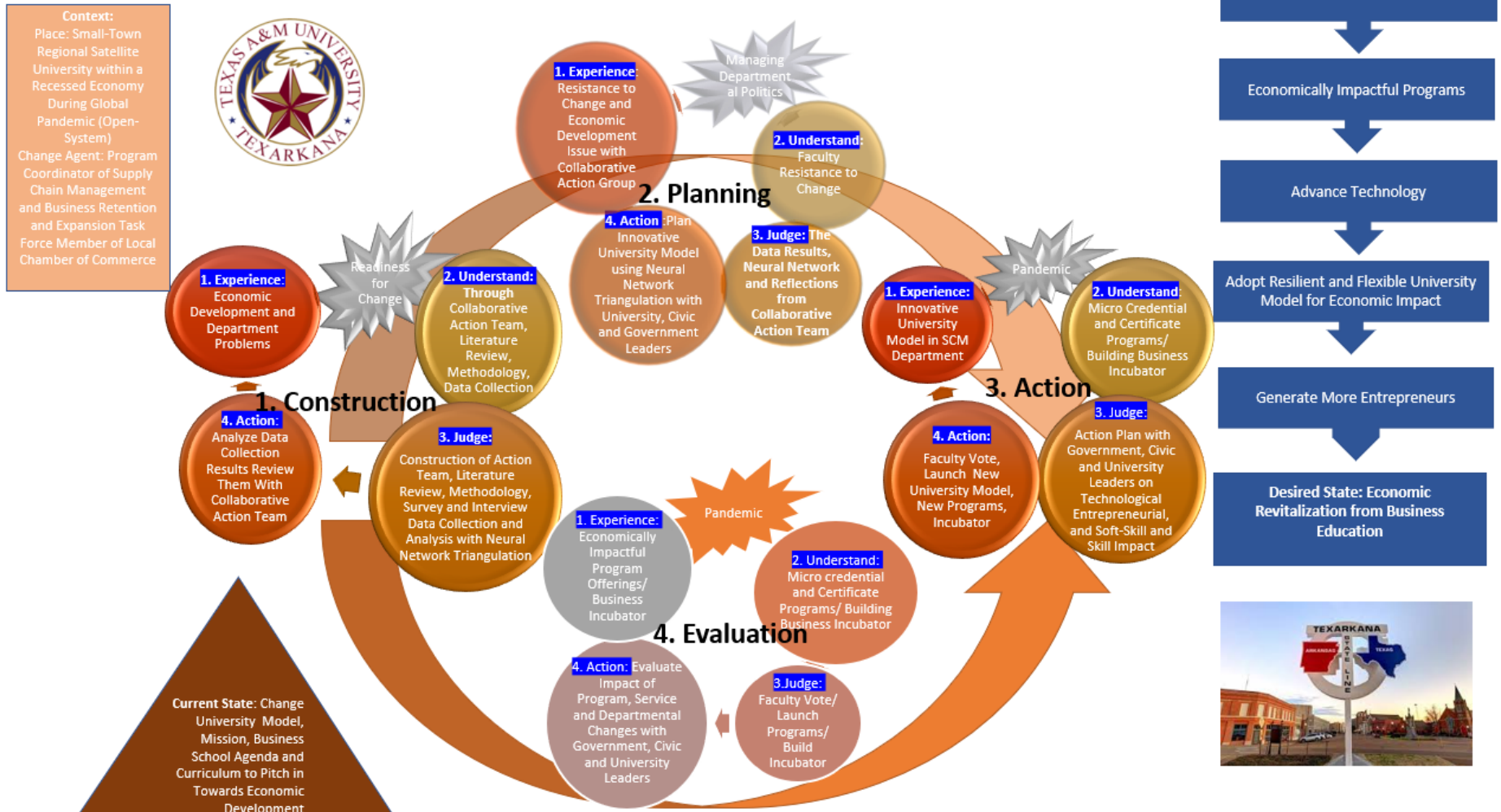


Figure 27: Planned Change Through Action Research

Source: Adapted from Lewin (1947), Elliott (1991), Kemmis and McTaggart (2007), and Coghlan and Brannick (2014)

Hence, this thesis engages in four action research phases in one action research cycle. Some of the phases occur linearly, while others do not. The phases are also cyclical in that they include experience, understanding judgment, and action (Coghlan and Brannick, 2014). The model's utility allowed adjustments to the original goal and encouraged action, observation, a reflection of the action, and prescriptive planning for the next iteration. The AR model unfolded a logical and practical space for learning and reflecting on the complex nature of the socio-economic, political, cultural, and organizational ecosystems unique to this study. Thus, the tailored model provided utility in refining the problem and improving the original plans, which augmented the creation of actionable knowledge for the development of the action plan (Argyris, 1994).

### **5.2.1 WHY ACTION RESEARCH?**

During this thesis, I served as an insider researcher at the Chamber local university in a small town dealing with economic deterioration. I aimed to construct, plan, act, and evaluate regional economic development concerns that were occurring pre-COVID-19 pandemic. Then, the wake of the COVID-19 health crisis arrived, which caused an economic lockdown, which exacerbated the local financial crisis. To contribute towards regional growth, I had to prescribe adaptive to changing economic landscapes (Lewin, 1947; Kotter, 1996; Weick, 2001; Caldwell, 2003; Raelin, 2003; Luscher and Lewis, 2008).

By engaging in the literature, I found that AR requires collaboration between myself, as the researcher, and the community through joint planning, action, evaluation, and implementation, which is a similar approach taken by former university economic impact scholars (Lewin, 1947; Cappelletti, 2010; O'Cathain, et al., 2010; Guinan et al., 2013; Pugh et al., 2016; Motoyama and Mayer, 2017). The core insights of the studies, presented in Figure 27 previously, guided me in creating a reflective community of practice that extends to Texarkana business leaders involved with this study to harness the power of relationships and collaboration (Greenwood and Levin, 2007). Hence, engaging in a self-learning process among participants and myself as a researcher while fostering a climate where each participant adopts a reflective practice contributed to the rigor and relevance (Lewin, 1947; Coghlan and Brannick, 2010). Further, exposing the issues to a multiplicity of perspectives formulates more inclusive approaches to problem-solving (Raelin, 2010; Weick, 2002). Through this practice, I developed a university economic development model and SCM programs that were both relevant and rigorous and met the needs of a workforce in crisis.

The AR methodology created knowledge in action through collaboration and reflection and acted as a catalyst for change (Greenwood and Levin, 2007; Coghlan and Brannick, 2014). The complex nature of the educational ties to the local economy is a multifaceted situation that required both sensemaking and sensgiving (Weick, 1995; Rouleau, 2005; Luscher and Lewis, 2008). Thus, this research uses AR to generate actionable knowledge that is also applicable in a scholarly world. Therefore, this thesis began with a pre-pandemic collapsed economy; however, decisions and the way forward must consider the current health crisis and the higher levels of economic uncertainty.

### **5.3 THE EMERGENCE OF ACTIONS AND PLANNING**

Amid fiscal havoc in a small town in East Texas, I brought forth a bold university model to TAMUT's leadership team. The Dean approved my plan of action to refocus the business school agenda for economic development. While university leaders wrestled with ways to build resiliency and not buckle under financial pressures. The model gained traction as it was structured with the agility to consider industry and community needs while making curriculum relevant after the new economic realities surfaced. Basing the model off of the knowledge gained from the outcomes of the neural network analysis, this university model took an innovative approach in dissecting the interactions between data variables to discern how to be a driver in economic growth ( Karpov, 2017; Balashov et al., 2019). The COVID pandemic inspired a sense of urgency in my dean to review the findings of this research study and pitch my proposed model to TAMUT's executive leaders. Hence, I inspired progress in refocusing the university's attention towards a sustainable university model for economic growth by initiating the conversations necessary to drive change in how the university expands its role to provide a socio-economic impact. Changing the university model that the institution follows takes time to materialize; however, refocusing the model to focus more efforts on programs and services that make a more robust economic impact is a long-term goal for this research.

In April 2020, post-pandemic, TAMUT funneled refunds to students for housing, dining, and parking after campuses were forced to close and university leaders become nervous about the fiscal position for Fall 2020. Even after the university doors open, there is a concern that large numbers of students will not resume face-to-face classes. Focusing on programmatic changes that can lessen the financial burden, I proposed, developed, and implemented an SCM micro-credential to "level up" the workforce to provide them with cost-effective and immediate knowledge that can enhance job prospects during unprecedented times. Figure 28 below

represents the core milestones and timeline for future change in realigning the business school agenda for economic revitalization.

## Timeline of Implemented Actions to Realign Business School Agenda for Economic Revitalization

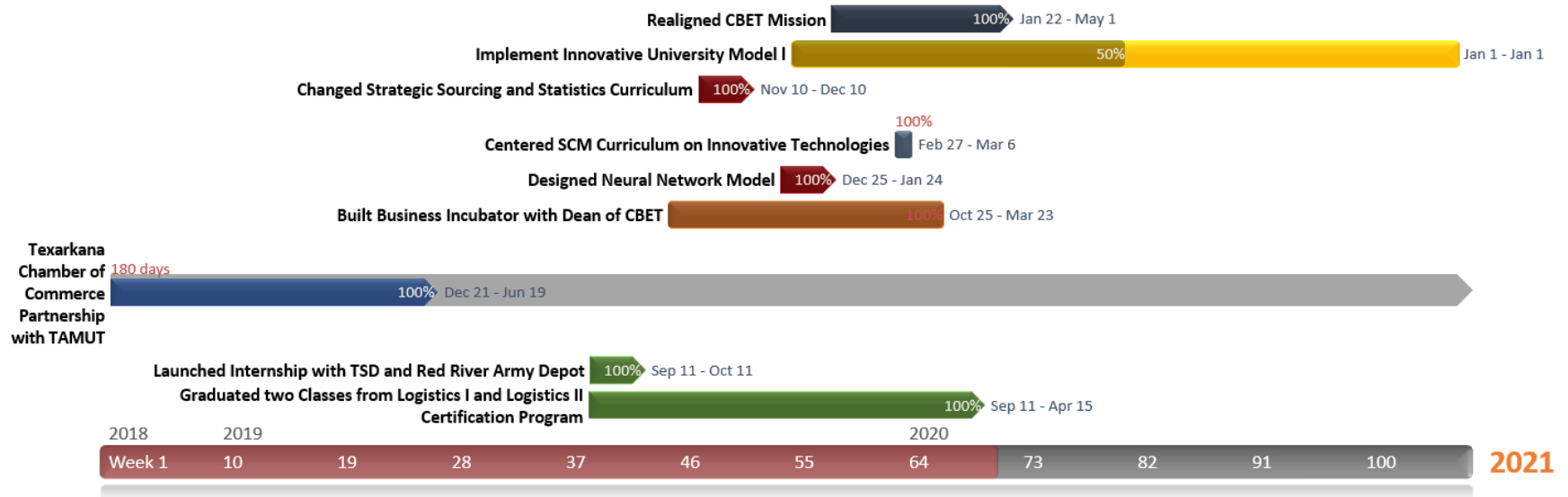


Figure 28: Timeline of Implemented Actions to Realign Departmental Agendas

Source: Leydesdorff and Etzkowitz, 2003; Sonka and Chicoine, 2005; Dubb and Howard, 2012; Hecht, 2013



The AR process, which involved the shared inquiry of civic, government, and industry leaders, questioned how our departmental vision, business curriculum, and university model was framed around economic development, which initiated actions to refocus some of the university's agendas and strategies. Table 16 below represents the action plan derived from the learning outcomes of this study.

The Emergence of Actions and Planning from the Learning Outcomes of this Study

Core Learning Outcome One: Education is a barrier to regional growth

Link to University Plan	Link to SCM mission	Collaborative Actions Based on Shared Inquiry	Feedback Medium/ Process	Anticipated Challenges	Consequence of Inaction	Current Status and Timeframe
<p>“Become a first-choice partner of community organizations to meet community needs.”</p> <p>“Develop and expand degree and certificate programs guided by the unique environment and the needs...within the region.”</p> <p>“Our relationship with the community is ‘reciprocal and demands that we, in turn, be a resource to our community, providing expertise to address local issues as well as opportunities for cultural and intellectual enrichment.” (Texas A&amp;M University-Texarkana, 2018)</p>	<p>CBET’s mission did not include regional growth</p>	<p>Refocus department agenda to disseminate knowledge centered around gaps in education by following Etzkowitz and Leyesdorff’s (2000) triple helix model and Dubb and Howard’s (2012) anchor institution model</p> <p>Add a socioeconomic focus to the traditional role of the university by involving community stakeholders in the strategic planning process (Uhl-Bien et al., 2007; Karpov, 2017; Balashov, 2019).</p> <p>Change CBET’s mission to include “We are a community-centric university, pursuing thoughtful interactions between the business community and the academic community. These interactions will foster relationships, which will build business connections between the ArkLaTex community and the global marketplace, to grow innovation and economic development further” (Etzkowitz and Leydesdorff, 2000; Hecht, 2012; Raelin, 2003; Karpov, 2017)</p> <p>Develop technical certifications, which are a significant need in this area Kirby (2004) and Motoyama and Mayer (2017)</p>	<p>Involved civic, government, and educational leaders in a collaborative action group to serve as a feedback loop cycle to determine if the university is offering programs centered on the needs of the locality</p> <p>The collaborative action group served as a feedback loop to refocus the business school mission for a broader socioeconomic focus</p> <p>A neural network triangulated the survey data to the interview data to verify the findings and outcomes of this study</p>	<p>The challenge of refocusing the departmental mission was gaining a majority vote of the faculty</p> <p>The challenge of developing certification program offerings is gaining approval from the program coordinators, dean, and curriculum committee</p>	<p>Not aligning the department’s mission to the university mission may cause the overarching vision to get lost</p> <p>May be difficult for CBET to make an economic impact without incorporating this vision in the departmental mission</p> <p>Not developing technical certifications may miss educational opportunities to educate community members who do not desire to obtain associate’s or bachelor’s degrees. Failure to build certificate offerings will miss opportunities to contribute to the Texas Higher Education Coordinating Board’s mission and Governor Abbott’s executive order to educate 60% of adults older than 24 by 2030 in East Texas</p> <p>Not creating an SCM micro-credential will fail to help the unemployed in this region find jobs in the SCM sector</p>	<p><u>Complete:</u> Designed a neural network model to triangulate what local businesses are needing out of university programming</p> <p><u>Complete:</u> Realigned CBET mission to the university strategic plan to partner with local businesses to meet the needs of the community for regional growth</p> <p><u>Complete:</u> Created SCM micro-credential designed to give students an educational background in logistics to benefit local employers who require logistics skills for business retention and expansion</p> <p><u>In-Progress:</u> Continuous improvement to add socioeconomic focus to the traditional role of the university at TAMUT. The strategic planning committee must revisit annually to continue alignment with the university model that emerged from the outcomes of this thesis</p> <p><u>Complete:</u> Logistics Level I and Level II Professional Vocational Certificate</p> <p><u>Complete:</u> The economic development council reviewed the findings of this study and created a partnership, which is used for business retention and expansion in the area</p> <p><u>In Progress:</u> Drive change in reconsidering the university’s socioeconomic focus to adapt the flexible model offered in this thesis (Especially after the COVID-19 crisis): Need one year to materialize</p>

**Core Learning Outcome Two: R&D is an overlooked resource**

Link to University Plan	Link to CBET mission	Literature Guided Actions	Feedback Medium/ Process	Anticipated Challenges	Consequence of Inaction	Current Status and Timeframe
<p>“developing new understandings through research and creativity.”</p> <p>“Provide support needed by our faculty to be effective and innovative teacher-scholars.” (Texas A&amp;M University-Texarkana, 2018)</p>	<p>“It is important that we select faculty and staff who are dedicated to teaching and research as well as engaging with all stakeholders.” (Texas A&amp;M University-Texarkana, 2018)</p>	<p>Foster university partnerships to create a space to reflect on the best ways to develop a tech-savvy local workforce</p> <p>Investigate areas of R&amp;D opportunities that the community leaders may be overlooking (Sonka and Chicoine, 2005; Srinivas and Viljamaa, 2008).</p> <p>Discover new knowledge, spark innovative environments and technologies, and commercialize products, which impact local R&amp;D initiatives (Leydesdorff and Etzkowitz, 2003)</p> <p>Focus department on areas that will increase entrepreneurial capital in this region and transform higher education into practical-based knowledge (Dubb and Howard, 2012)</p> <p>CBET must be embedded in Texarkana’s ecosystem to craft a mutually beneficial internship program to support R&amp;D productivity and increase the value of local human capital (Hecht, 2013).</p>	<p>Involve the community, government, and university leaders to drive change in university programs to impact local R&amp;D departments</p>	<p>Scheduling time to meet with local government and business leaders</p> <p>Focus faculty attention on following the new university model</p>	<p>Failure to collaborate with local communities will miss opportunities to drive the innovation economy</p> <p>Not engaging with local businesses will fail to follow the new economic university model, which provides a framework to anchor innovation activities needed by the regional ecosystem</p>	<p><u>Completed:</u> Two SCM internship programs were created. One was with a local trucking company, and the other was with the largest employer in the region</p> <p><u>Completed:</u> Built a business incubator for entrepreneurial activities on the first floor of the Academic Advising building; however, it is underutilized</p> <p><u>In Progress:</u> The strategic planning committee is marketing ways the local community can utilize the business incubator for entrepreneurial activities</p>

**Core Learning Outcome Three: Adaptions to SCM offerings are needed**

Link to University Plan	Link to CBET mission	Literature Guided Actions	Feedback Medium/ Process	Anticipated Challenges	Consequence of Inaction	Current Status and Timeframe
<p>“Develop and expand degree and certificate programs guided by the unique environment and the needs...within the region.” (Texas A&amp;M University-Texarkana, 2018)</p>	<p>Focus on academic programs needed by the region</p>	<p>Add a socioeconomic focus to the traditional role of SCM program offerings by following a model mix that incorporates best practices as offered by the triple helix model, the university 3.0 model, and the anchor institution model (Etzkowitz and Leydesdorff, 2000; Dubb and Howard, 2012; Balashov et al., 2019)</p>	<p>Incorporate leaders from local industries to develop vocational and professional programs to educate the local workforce with</p>	<p>Obtaining a majority faculty vote from the curriculum development committee and program</p>	<p>Not developing an SCM professional development certificate program that can be delivered on-site at local businesses will miss opportunities to educate business professionals that lack time to commit to educational programs offered outside working hours of operation</p> <p>Failure to offer on-site training programs will lose the chance to</p>	<p><u>Complete:</u> Created a Logistics Level I and Logistics Level II Professional Certificate Program, which is offered as a vocational certificate at Red River Army Depot, the largest employer in the region. The certificate program has graduated two successful classes since its development.</p>

		<p>Build an SCM certification program that can be offered on-site, which injects soft skills and innovative technologies</p> <p>Teach SCM students to appropriate technologies to increase productivity to make an economic impact</p> <p>Refocus my strategic sourcing curriculum on the importance of local purchasing and procurement efforts</p>	<p>the insight to make an impact on regional advancement</p>	<p>coordinator board</p>	<p>augmenting the soft skill and technical divide to local business professionals</p> <p>Not teaching the community about the economic impact that local purchasing efforts can contribute may shift local company purchasing departments to buy outside of the region</p>	<p><u>Complete</u>: Change the Strategic Sourcing curriculum to integrate the importance of procuring locally for sustainability.</p> <p><u>Complete</u>: Incorporated blockchain, artificial intelligence technology, and WIP tracking education to the current SCM curriculum.</p>
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Table 16: The Emergence of Actions and Planning from the Learning Outcomes

Source: Included within the table above

### **5.3.1 CLARIFYING RESEARCHER BIAS**

As the critical action collaboration unfolds, understanding oneself as a theorist and revealing underlying bias inevitably improves the theories that are discovered in this research (Weick, 2002). Weick (2020) contended that management researchers must be informed of their philosophical positions; therefore, I followed my epistemological framework to distinguish between reliable and unreliable knowledge (Bhaskar, 1975). Retroduction helped me to link the evidence and social theory as a continually dynamic learning process, which unearthed underlying pulls, agendas, bias, and the motivation of research participants to discover meaningful answers to my research questions. One recursive statement that I heard from interview respondents is that the Chamber needed to hire someone specifically for business retention and expansion to solve the local economic phenomena. When it occurred to me that the respondents were stating this similarly, I started to question why they felt that way. At first, I, too, was subject to the bandwagon effect, relying on initial information and the consensus of the locals; however, when writing my observations in my reflective journal, I began questioning my initial impression, preunderstanding, and the impressions of the respondents (Coghlan, 2003). I uncovered that the head of the Chamber stated this same idea in a town hall meeting, which was the underlying political reason why this was most of the participants' answers. Thus, I was able to determine that this finding was not an observable notion by the respondents. This response was an opinion of a leader in the area that told and retold this to the community. Hence, understanding the respondents' complex nature and societal connection allowed me to understand this linkage in the participants' answers and guide inquiry to determine situational relevance. Through sensemaking, I connected cues with cognitive mental models to unfold the story of how this information became a societal regurgitation of one individual preaching's (Weick, 2002; Mills, 2011).

Throughout the research process, I practiced reflection through journaling my thoughts, feelings, and observations in my AR journal. I found this practice critical to ensure that my own biases of the phenomena would not thwart my research study. I cross-checked the themes revealed during data collection against my perceptions (Creswell, 2009; Mills, 2011). I critically considered and utilized reflexivity to acknowledge my assumptions and socio-economic values to expose bias at the epistemological level. I focused on what the data revealed and what it meant for the local community.

### **5.3.2 PRAGMATIC ANSWERS THROUGH SENSEMAKING AND SENSEGIVING**

Throughout this research process, I ascribed to the pragmatic paradigm, which grounded my observations in empirical and rational knowledge by collecting multiple data sources to engage in goal construction and the strategic management process. The increasing focus on being responsive to the local economy and on strategy inspired my university's deans to construct leadership teams to assist them with making decisions to which they are held accountable (O'Mara, 2005). As an elected program coordinator of the SCM department, I act as a strategic manager for the business department's dean who must make tough decisions amidst an economic crisis to reform programs and departmental missions while implementing university missions and visions (Meek et al., 2010; Degan, 2014). Thus, I ascribed to the methodological procedures so that data collected was contextually embedded and exposed to collaborative sensemaking and theory (Weick, 1995; Weick et al., 1999; Luscher and Lewis, 2008; Degan, 2014). Apart from this strategic management assignment being new to many professors in academia, this role is further complicated by managing the political system and maintaining the respect and legitimacy required for garnering faculty and leadership votes to initiate change. The complexity of the strategic management role requires the sensemaking and sensegiving process to lead to strategies through the valuable insight of processes rather than examining the strategy itself (Degan, 2014).

With the pandemic tearing through Texarkana and collapsing an economically struggling small town, TAMUT's leaders faced disruptions of existing practices, which permeated a space for individual departmental actors to rethink how they perceive themselves and their role within an organization. Pre-pandemic, lower-level leaders were politically afraid to voice their opinions and ideas. The societal norm was for those with long-standing tenure to have a voice in strategic decision-making. General societal cues in academia generate the notion that only those who have "paid their dues" or "know what it takes" are taken seriously (Degan, 2014). Grappling with economic ambiguity and the anxiety of making the best decisions for the broader economy created a paradigm shift of rethinking the power differences in tenure and fostering openness to individual ideas to embody a collective genius to guide the new way forward. Hence, self-efficacy was generated by all leaders, regardless of years in service, as individual strengths were seen as meaningful to the collective whole. The identity of newer leadership actors changed during the ongoing circumstance of the pandemic as they extracted social cues where everyone was looking to each other for answers, regardless of tenure. When thinking about who we are as an organization and how we do things, this underscored a need to refocus

our university model to connect with the societal needs of helping the local economy and working together to make this happen (Mills, 2011). Thus, I discovered a positive sense of self and belonging amidst the pandemic and gained the courage to pitch my bold university model to offer a framework to focus agendas on economic development.

Embarking on the key informant interviews gave me insight that allowed me to "learn to unlearn" how I delivered my procurement curriculum (Lewin, 1947). The respondents reported that the locals were not learning the importance of purchasing materials from regional businesses. This outcome gave me an "aha" moment, as I had not considered that this was something that needed to be taught and had regarded it as common sense. As the SCM coordinator responsible for curriculum development, I took immediate action on program changes that integrated sustainability education and began teaching the locals about the importance of home-grown procurement practices. The pandemic underscored the need for this education, as face masks were procured internationally, which caused a shortage of personal protective equipment in the local hospitals. This SCM upheaval inspired local furniture manufacturers to produce facemasks in response to local hospital needs. The COVID-19 health crisis and the findings from this study brought awareness to the amount of outsourcing conducted in the region and the importance of strategic sourcing and procurement education. Strategic sourcing is vital so that local businesses can be better equipped to manage the current and future crises. Thus, this AR impacted individuals across organizational and societal levels, both indirectly and directly. The next section presents the impact that this thesis made on my department and the leadership at TAMUT.

#### **5.4 SUMMARY AND PERSONAL REFLECTIONS**

This thesis created a space for questioning and challenging personal, departmental, and organizational assumptions through shared inquiry, reflection, and action. As a result, this refocused my department's strategies to ramp up interactions with societal players in order to strengthen internal governance to play a role in economic development. Acting as an agent for change after the faculty and dean accepted my approach to coordinate the department's mission to align with the university's mission to impact the local economy drove progression on redefining my department's agendas and created a model for actionable results. This alignment was derived from the natural progression of the AR phases by reconnecting with governmental, civic, and business leaders who have a mutual goal of saving a floundering economy. The implication was that TAMUT must embed themselves within the regional ecosystem to craft a

mutually beneficial internship program to support R&D productivity and increase the value of local human capital (Hecht, 2013).



## CHAPTER 6: CONCLUSION

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### 6.1 INTRODUCTION

This chapter focuses on the scholarly contributions that this AR study made on current and future learning of how a small-town university can contribute to sizeable growth (Reason and Marshall and Reason, 2007; Raelin, 2003; Caldwell, 2003). This MMAR study applied interval dynamics and stochastic methods to focus on how a small-town regional institution took action to contribute to revitalizing a recessed economy. This was achieved by embodying shared inquiry and reflection to challenge individual, departmental, and organizational paradigms. This study contributes to the field by weaving an innovative neural network within the action research cycle to diagnose community workforce issues and build a practical university model that is prescriptive and malleable to the unique needs of local businesses. Rethinking the connection between civic, university, and government leaders is integral to understand the complexity of local economic and workforce phenomena enriched with stakeholder perspectives to quickly respond to the changing needs of regional economic landscapes (Lewin, 1947 Coghlan, 2012; Kash and Rycroft, 2002; Caldwell, 2003; Coghlan and Rashford, 2006; Andres and Jose, 2017).

The conclusion chapter unfolds the research voyage of a mid-level leader at a university that has a mission to achieve large-order economic development during unprecedented environmental and economic constraints through managing change and its implementation. Out of urgency, a small town in east Texas built a local university with a purpose to fiscally revitalize the area. Thus, embarking on driving change in how the institution reacts to economic needs is achieved impact by bringing forth a university economic development model that communicates local economic information in real-time across the university, government, civic, and business leaders. One notable contribution of this thesis was the realignment of my department's mission and university strategy for regional growth, which includes community and business partnerships. This realignment began with developing a partnership between the university and the Chamber. Through this partnership, I realized the importance of generating more entrepreneurs in the area to drive regional growth. With the findings of my research in hand and a good argument for a business incubator, my department gained approval to build a business incubator that speeds up the growth and impact of new start-ups in the area (Duke, 2014; Harrington and Maysami, 2015; Cooke, 2018-2019). In terms of departmental changes, the findings pre-pandemic led to the development of two logistics certification programs offered on-site at Texarkana's largest employer. Also, two SCM internship programs were launched to

generate a pipeline of skilled workers to two of Texarkana's largest employers. Although on-site programs had to go online during the pandemic, the certification programs were still able to graduate two successful classes of students.

This study documents living amidst the theories of action research, economic and knowledge transfer theories as a guide to inform practical approaches for my department to positively impact a deteriorating economic region. More broadly, this thesis presents a story relevant to practitioners in a college setting and researchers in the field desiring to influence the local standard of living.

Hence, this chapter presents an overview of the research process, the scholarly-practitioner implications, actionable knowledge gained from this study, reflections of action learning, and the action research process. Moreover, this chapter critically analyzes the validity and limitations of this study before discussing a way forward, both personally and professionally. Then, this chapter presents areas to consider for future research and concludes with finalizing remarks and personal reflections on the whole action research process.

## **6.2 RESEARCH OVERVIEW**

The research questions in this study aimed to uncover workforce issues that created a barrier to regional growth to determine how one department within a larger organizational institution and broader societal ecosystem could play a role in economic development. Dyllick (2015) argues that business schools seeking to address crises in local economies must rethink their traditional educational roles by tailoring services and programmatic offerings to meet the needs of twenty-first-century businesses. Thus, this research voyage began with collaborative sensemaking across civic, government, and university leaders to explore individual, departmental, and organizational areas of impact on the broader local economy through practice-mediated actions grounded in the scholarly literature. To drive actionable change, I found it essential to understand the richness of Texarkana's workforce through MMAR as one methodology could not capture the complexity of the interconnected systems that impact regional prosperity (Hibbert et al., 2010; Herr and Anderson, 2005; Greenwood and Levin, 2007). Scholars and practitioners in the field argue that pragmatism and action research are highly compatible. In this research, each action research phase follows a period of reflection to generate practical new knowledge in management research. I used the symbiosis between action and practice to provide insight on adapting supply chain management programs and services to local business needs. Thus, this study provides practical and actionable knowledge in how a small-town

regional university contributes towards stimulating a small-town economy (Dewey, 1938; Lewin, 1997; Greenwood and Levin, 2007; Coghlan and Brannick, 2010).

Using multiple sources of evidence and with the guidance of the literature, this approach proved valuable in my journey of living theories to drive actionable change in how my department manages programmatic changes within a complex economy (Hibbit et al., 2002; Herr and Anderson, 2005; Greenwood and Levin, 2007). This thesis makes a significant contribution by creating a university model for economic reactivation in action while connecting to quantitative research design elements.

The construction phase of the action research cycle identified Texarkana's barriers to regional growth and education hot-spot areas to improve to make an immediate impact on aligning the business curriculum to respond to local workforce needs. This diagnostic phase involved developing a survey instrument and gaining approval of my research protocol and data collection instruments by the UOL's ethical review board. Using a purposeful sampling technique that followed rigorous methodological criteria, this thesis surveyed twenty-three of the largest fifty businesses in the Texarkana area. This research phase also engaged in acting by disseminating and collecting a survey, observing the results, and critically reflecting on the process and outcomes (Lewin, 1947; Greenwood and Levin, 2007). Thus, empirical, and rational knowledge was gained through retroduction to connect meaning to observable events within my practice to understand the mechanics by which individual players within a college or university are a part of a broader socioeconomic ecosystem (Dewey, 1938; Buchanan and Bryman, 2007; Creswell, Plano, and Clark, 2018).

Also, during the construction phase of the AR cycle, I developed an interview to follow up on the significant findings from the survey to establish a more vibrant picture that encompassed shared learning experiences and sensemaking to understand and connect with the socioeconomic landscape fully (Elliot, 1991; Coghlan and Brannick, 2001; Greenwood and Levin, 2007; Kemmis and McTaggart, 2007). Hence, the reflective interview inquiries brought forth through the interview process acted as a fulcrum of understanding and growth (Coghlan and Brannick 2001). Following Weick's (2002) guidance, I noted the importance of the reflective interviews to capture the confluence of realities, which encompass the complexities of modern societal interactions, to originate a story that unfolds through sensemaking. Then, I used four simple linear regression models to analyze the data collected via the survey. The survey questions were guided by my research questions, the reviewed literature, and my hypotheses. These four

regressions became the building blocks that guided the parameters of the supervised neural network model, which contained both quantitative and qualitative data. By implementing changes within my department (CBET), TAMUT acts as a cell in a multidimensional agent to inspire economic growth, which can be easily illustrated by a neural network (Dooley, 1997). Thus, the neural network layers data from the Integrated Postsecondary Educational Data System (IPEDS) and the Federal Reserve Economic Data (FRED) with the survey and interview results to triangulate the variables responsible for economic fluctuations in this region (McHenry et al., 2012; Vecoven et al., 2018). Moreover, the neural network constructed a visual representation of the survey results, which enabled me to connect deeper meaning to the data through double loop thinking. The neural network highlighted important variables to economic variances that may otherwise have been seen as abstractions in my data.

During the planning phase, Double loop thought occurred as I reflected on the neural network with the community and governmental leaders by embodying a collective understanding of the current state of the economy. Thus, knowledge and action through active collaboration and reflection became the catalyst for change in rethinking the business school agenda and program offerings. The goal of such changes was to mediate the soft-skill and technical divide discovered during data analysis that was contributing to economic deterioration. The critical reflective practice that my department adopted provided middle-level leaders with a voice among the faculty and facilitated nebulous mindfulness. With the outcomes, data-driven actions and immediate, mid-range, and long-term planning took place. This action plan drove immediate results in centering the business school agenda on managing economic crises through programmatic changes. Involving government, civic, and university leaders during every phase of the planning process, through an action research cycle, provided a critical space to collaborate and unfolded practical planning through sensemaking and sensegiving (Weick, 1995; Rouleau, 2005; Luscher and Lewis, 2008)

During the action phase, the collaborative action team consisting of civic, university, and government leaders reflected on the neural network results, and I initiated the steps towards adopting the innovative university economic model. Everyone involved mutually felt a need existed to make the current university adaptive to economic fluctuations in real-time, especially after the COVID-19 pandemic.

Breaking away from the vicious and repetitive cycles of university models in higher education, the innovative model provided a modernized approach that shook the mantra of antiquated

knowledge generation practices (Masuch, 1985; Andres and Jose, 2017). Figure 29 below illustrates the stages of the research process and identifies the core elements of knowledge generation in action research and actionable knowledge.

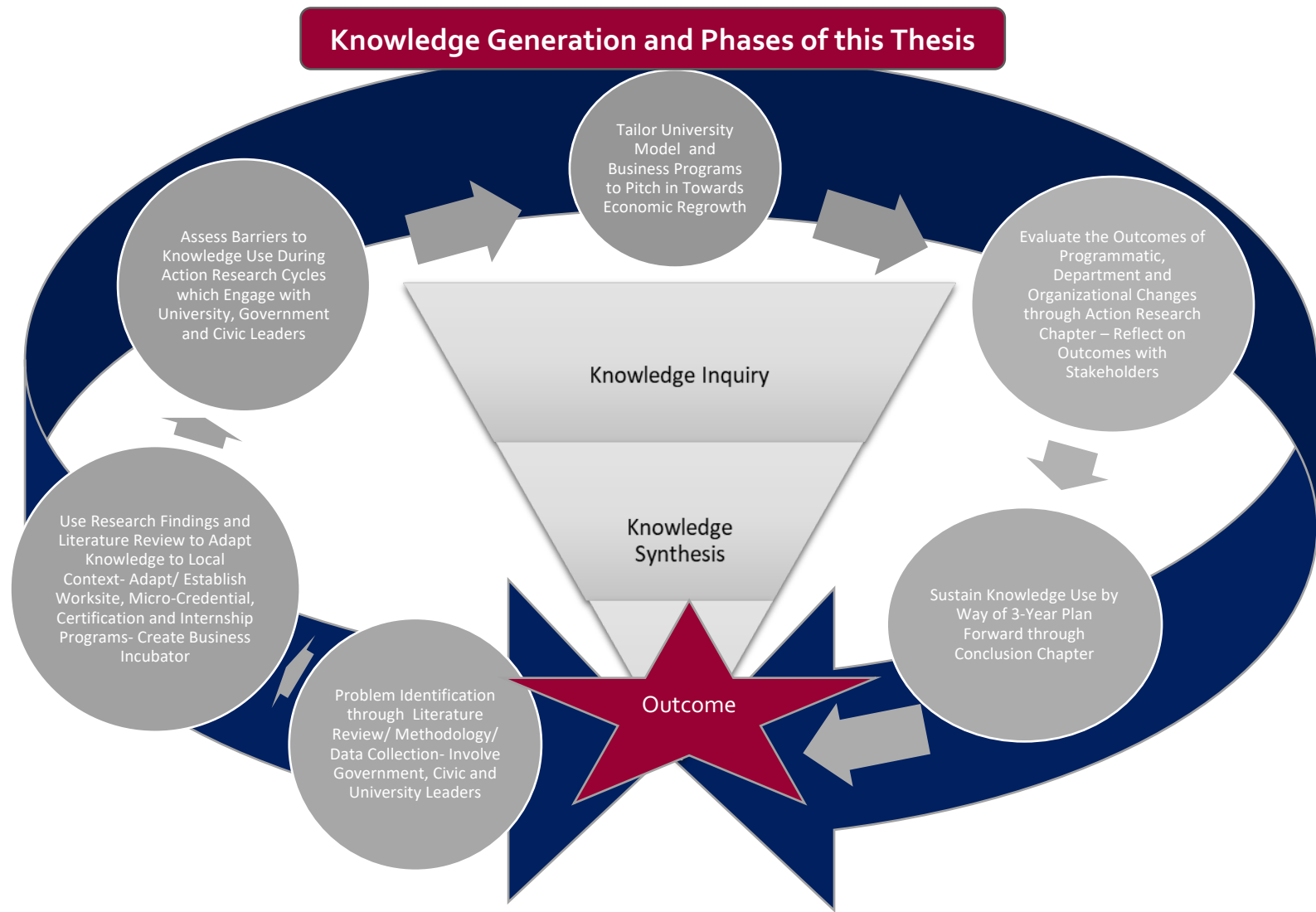


Figure 29: Knowledge Generation and Phases of this Thesis

Source: Argyris, 1994; Weick, 1995; Greenwood and Levin, 2007; Coghlan and Brannick, 2011

### **6.3 CORE CONTRIBUTION TO MY DEPARTMENT AND ECONOMY**

This research has refocused the leadership team at TAMUT to underscore its core reason for existence, which is economic development. Over the years, the focus has shifted away from its underlying expectations due to legislative distractions, unaligned research endeavors, and accreditation demands that disturbed the trajectory of focus. This research has made a considerable contribution to my university by creating a model that extends the traditional university role to focus on programs and services useful to the local economic landscape. Thus, this research adds value to the higher-education industry by offering a model based on neural logic that extends university services to develop local economies by sharing information-rich data across government, university, business, and community members.

This research has made a considerable contribution to my university by creating a model that extends the traditional university role to focus on programs and services useful to the local economic landscape. Thus, this research adds value to the higher-education industry by offering a framework based on neural logic that extends university services to develop local economies by including real-time economic data and government, university, and community members' perspectives on workforce development needs. I found that extending the conventional action research to focus on quantitative elements, as offered in this thesis, presented an opportunity for data-driven decisions that positively impacted strategic choices in the university's alignment to economic development initiatives. Extending action research into quantitative areas that researchers in the field often ignore made a positive impact by faculty "buying into" the strategic changes that were driven from the findings of this thesis. Figure 30 below illustrates the university model developed for this thesis and implemented by my department to refocus its mission towards economic development. This model was adapted from Dubb and Howard's (2012) anchor institution model, Etzkowitz and Leydesdroff's (2000) triple helix; Gibbons' (1994) knowledge dissemination, and a university neural network approach from Guohong (2020).

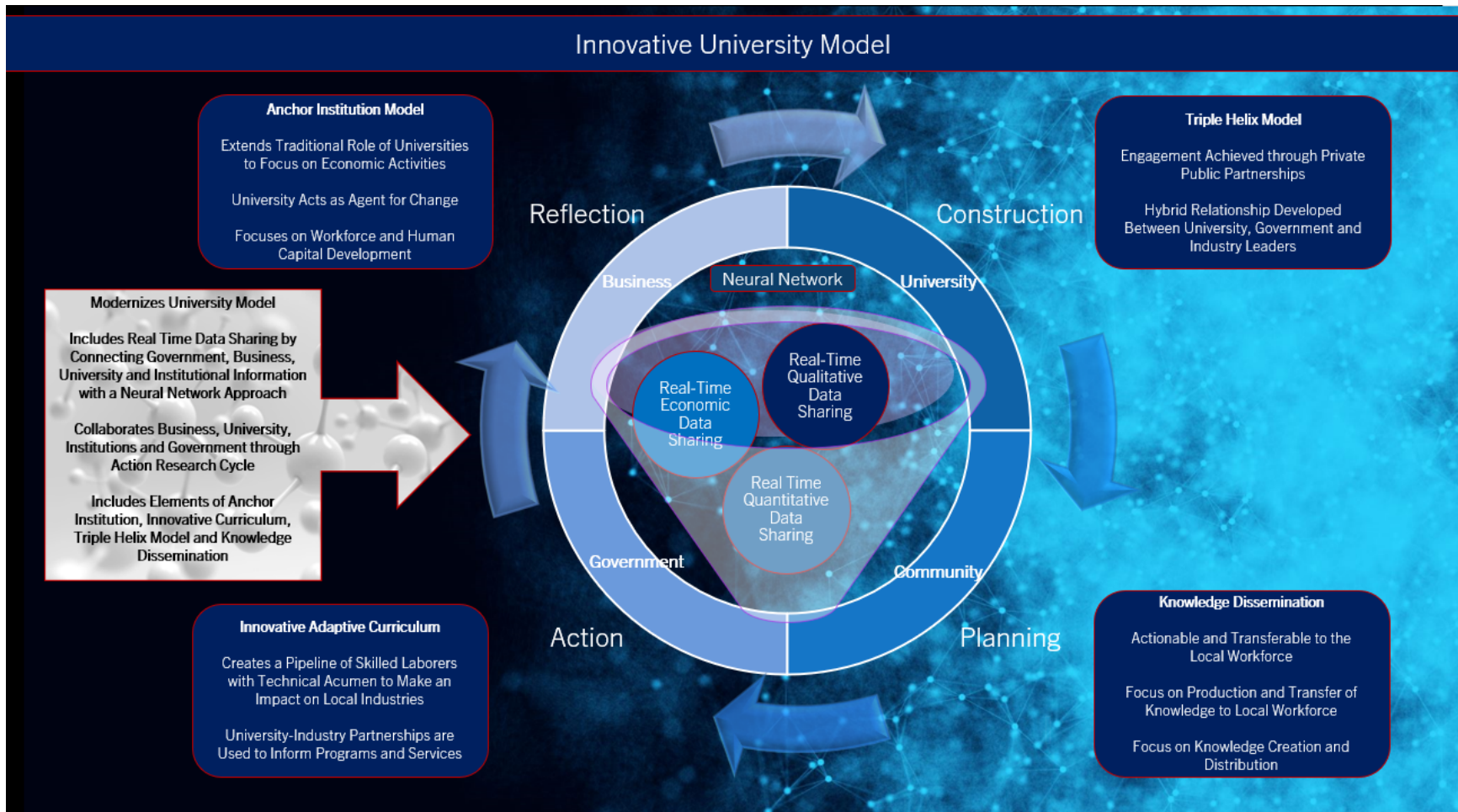


Figure 30: University Model Developed by this Thesis

Source: Adapted from Dubb and Howard (2012), Etzkowitz and Leydesdorff (2000), Leydesdorff and Etzkowitz (2003); Guohong (2020)



Table 17 below represents the key changes made to the traditional university model to understand how the model integrates robust data from a neural network and contributes to modernizing the university models in place.

Traditional University Model Versus Innovative University Model for Economic Reactivation	
<i>Traditional University Model and Economic Reactivation</i>	<i>Innovative University Model and Economic Reactivation</i>
Centers mission on rigid scientific knowledge creation (Srinivas and Viljamaa, 2008)	Extends the traditional role of the university to focus on economic activities, actionable and transferrable knowledge for the workforce, and human capital development (Karpov, 2017; Pugh et al., 2016; Motoyama and Mayer, 2017)
Economic development is a by-product of teaching and research (Gibbons et al., 1994)	Considers a broader economy that extends the traditional role to focus on economic activities by triangulating areas of impact through a neural network approach (Thorpe and Holt, 2008; Vecoven et al., 2018)
Collaboration across government, university, civic, and business leaders is not a real-time interaction	Provides access to information-rich data across government, university, business, and civic leaders in real-time
Guides scientific knowledge creation (Srinivas and Viljamaa, 2008)	Provides a practical application to understanding the local economy through a framework for university leaders to refocus agendas towards economic growth (Luscher and Lewis, 2008)

Table 17: Traditional University Model Versus Innovative University Model

Source: Enclosed within the chart above

The departmental and economic development contributions of this study are as follows:

- A practical model to connect economic information sharing in real-time across the university, business, government, and community leaders. This provides a unique way to

update program and service offerings in real-time, making them adaptive to changing economic landscapes. Enrolment in both the university and my department's program grew by 2.4% despite the COVID-19 pandemic. The active collaboration between government, business, university, and community leaders contributed to this growth.

- Realigned the SCM mission to broader economic development initiatives – the Texarkana Chamber of Commerce hired a Business Retention and Expansion expert as a full-time employee because of this study.
- Created a SCM Micro-Credential to upskill the locals in SCM. This program launches in the Fall of 2022.
- Created and Graduated two Successful Classes from a Logistics Level I and Logistics Level II Professional Certificate Program, which is offered as a vocational certificate at Red River Army Depot, the largest employer in the region.
- The collaborative action team of this study, consisting of the Chamber, university, business, and community leaders, developed a 501(c) 6 to continue to carry out mutual economic revitalization goals.
- Contributed to building a business incubator for entrepreneurial ideas to take shape.

Table 18 below represents how the triangulated outcomes from the neural network led to research contributions, core changes to the traditional university model, and future planning.

## Research Contributions and Future Planning

Outcomes	Contributions of this Research	Core Changes Made to University Model	Future Planning
<b><i>Neural Network Theme 1: The Role of R&amp;D</i></b>			
The Role of R&D on Economic Growth	Two SCM internship programs were created  Built a business incubator for entrepreneurial activities	Considers a broader economy that extends the traditional role to focus on economic activities by triangulating areas of impact through a neural network approach	The strategic planning committee is marketing ways the local community can utilize the business incubator for entrepreneurial activities
<b><i>Neural Network Theme 2: The Role of Education</i></b>			
The Role of Education on Economic Growth	<p>Realigned CBET mission to the university strategic plan to partner with local businesses to meet the needs of the community for regional growth</p> <p>The economic development council reviewed the findings of this study and created a partnership for business retention and expansion. The Texarkana Chamber of Commerce hired a BR&amp;E full-time employee as a result</p> <p>Continuous improvement to add socioeconomic focus to the traditional role of the university at TAMUT – The strategic planning committee must revisit annually to continue alignment with the university model that emerged from the outcomes of this thesis</p>	<p>Designed a neural network model to triangulate what local businesses are needing out of college and university programming</p> <p>It extends the traditional role of the university to focus on economic activities and actionable and transferrable knowledge for the workforce</p>	<p>Continuous improvement to add socioeconomic focus to the traditional role of the university at TAMUT – The strategic planning committee must revisit annually</p> <p>Continue driving change in reconsidering the university’s socioeconomic focus to adapt the flexible model offered in this thesis (especially after the COVID-19 crisis)</p> <p>Continue to upskill the local workforce</p>
<b><i>Neural Network Theme 3: The Role of Technical Supply Chains</i></b>			

<p>Technical Supply Chain Programs and Economic Development</p>	<p>Created SCM micro-credential designed to give students an educational background in logistics to benefit local employers who require logistics skills for business retention and expansion</p> <p>Established a Logistics Level I and Logistics Level II Professional Certificate Program, which is offered as a vocational certificate at Red River Army Depot, the largest employer in the region</p> <p>Changed the Strategic Sourcing curriculum to integrate the importance of procuring locally for sustainability</p> <p>Incorporated blockchain, artificial intelligence technology, and WIP tracking education to the current SCM curriculum</p>	<p>Focuses on economic development, teaching, research, and community involvement</p>	<p>Continue to adapt business programs and services to the needs of the local economy and workforce</p>
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Table 18: Research Contributions and a Way Forward

Source: Leydesdorff and Etzkowitz, 2003; Sonka and Chicoine, 2005; Dubb and Howard, 2012; Hecht, 2013

## **6.4 REFLECTIONS OF THE FIRST-, SECOND-, AND THIRD-PERSON CONTRIBUTIONS AND IMPACT**

During the action research process, the experience of shared inquiry and critical reflection challenged interpersonal, departmental, and organizational paradigms to collaborate vertically and exchange ideas to combine individual strengths and problem solve as a nebulous mind. As a spillover effect of this shared inquiry and exchange of ideas, this research capitalized on the knowledge and experience from the pre-understandings that individual actors in the socioeconomic landscape possess. The action research cycle connected government, civic, and university leaders to pursue a mutual purpose for economic development, which inspired rich partnerships that helped refine the problem-solving process and a new collaborative way forward. Hence, this study evidences that it is possible for a mid-level university leader to manage the unique politics in faculty environments to gain legitimacy and traction from higher-level leaders to shake antiquated paradigms of organizational learning and provide a new tangible way forward for collaborative problem-solving, knowledge in action, and organizational change. This section will detail first-, second-, and third-person reflections of what was done, its impact, and the implications for me as a researcher-practitioner.

### **6.4.1 FIRST-PERSON IMPACT: PARADIGM SHIFT FROM ROOKIE TO INTERNAL AMBASSADOR FOR CHANGE**

I assumed a leadership position at TAMUT where I must inhabit a strategic management role to make sense of departmental challenges that I face while trying to negotiate old ideas with new ones during the sensemaking process (Degan, 2014). The rising demand for economic responsiveness from governmental leaders amidst the COVID-19 pandemic and the resistance of departmental changes with faculty caused me to turn to Weick's (1993) theory of retrospective sensemaking. Weick's (1993) theory focused on where the organizational sensemaking breaks down, while Mitroff (2005) argues that actors are enacted rather than encountered by the crisis environment that constrains them. It was tough managing the political entrepreneurship of going against university paradigms and models that are not flexible in considering local business community needs. To add to these complications in managing change, I found it challenging to have a voice at the table to communicate the data and

outcomes of this research pursuit to drive economic impact through programmatic changes. As a rookie leader, I felt that I had limited influence over the business faculty. Mills (2010) regards my perspective for not vocalizing key findings to tenured faculty as a script that I adopted for appropriate conduct within my department. Vocalizing organization change to tenured faculty felt threatening, as the societal norm for non-tenured faculty is to only voice perceptions when asked a specific question. Reflecting on Gioia and Chittipeddi (1991) who contend that strategies are designed to reflect the values of top leaders, I decided to communicate privately with the Dean of CBET about my research findings in rethinking the business school agenda towards economic contribution, as an effort to release some of my personal confinements of social identity (Ashforth and Mael, 1989; Dutton and Dukerich, 1991; Degan, 2014). After the Dean accepted my argument from my research, he voiced the importance of my scholarly work to other program coordinators, which caused the departmental business faculty to see me as an internal voice and ambassador for change. Speaking at the table became the new normal as faculty began to appreciate my expertise on programmatic change to contribute towards rebuilding the local economy. I was impacted as a researcher through this experience as I found that the sensegiving process reframes the sensemaking practice and can reverse dysfunctional societal norms through change.

This research contributed to me personally in meaningful ways. One notable contribution was giving me a space to perform research in my workplace practice that garnered colleague respect. Suddenly, because of this thesis, I noticed my colleagues looking towards me for answers during program coordinator meetings. These meetings consist of program coordinators (also known as department chairs) of each discipline within CBET. As community leaders were increasingly pressuring TAMUT to shoulder the responsibility of supplying growth to the region, my colleagues would turn to my thesis literature review and findings to provide answers to develop a workforce capable of making a sizable economic impact. I was producing knowledge transferable to other departments within CBET. Further, I provided insight that served as a sensemaking and sense checking system cross-departmentally. The collaborative inquiry promoted critical consciousness when problematizing the university's role within a depressed economic region that needs revitalization (Honey and Mumford, 1996; Raelin, 2003).

#### **6.4.2 FIRST-PERSON IMPACT: REFLEXIVITY, INTROSPECTION, AND METACOGNITION REFLECTIONS**

This thesis has given me insight into the importance of embedding reflexivity, introspection, and metacognition throughout the research process to increase quality, validity, and reliability (Onwuegbuzie and Johnson, 2006; Brannick and Coghlan, 2007; Creswell, 2010; Maxwell and Mittapalli, 2010; Tashakkori and Teddlie, 2010). While engaging in research from inside the organization as an "insider," it is essential to be reflective. Stringer (2014) and Herr and Anderson (2005) argue that AR is reflexive as it occurs through research spirals that include systematic and purposeful reflection and action. The dialectical nature of AR and mixed methods requires reflection and exchange among all participants of the study (Greene, 2007; Kiel, 2014). Since I am deliberately experimenting with my practice, monitoring actions, and reflecting on their circumstances in action, I must assume a reflective perspective to embark on personal self-development while being empowered to drive necessary organizational changes. One of the challenges that action researchers face is keeping a reflective distance since participants are innately involved with the organization. Cunliffe (2004) and Weick (2002) suggest improving reflexivity through a reflective journal to identify the scholar's influence on scholarly contributions.

#### **6.4.3 SECOND-PERSON IMPACT: DEPARTMENTAL AND ORGANIZATIONAL REFLECTIONS**

As institutions are expected to extend their traditional roles to develop their regions economically, university leaders must shift their focus to frame the local economy and challenges through a cycle of sensemaking and sense giving. This reframing and innovative model allows a space to reidentify the university framework to focus actions on incubating economic growth. Thus, leaders must focus and reflect on what locals are reporting as economic and educational barriers to regional growth by identifying civic and government leaders that can provide insight through sensemaking and sense giving. Then, leaders must improve workforce knowledge by triangulating the hotspot issues that can be addressed with university services. Then, the alignment of the departmental mission and vision to the reidentified university model is needed to restructure agendas that make sense to make an

economic impact. This study found that the alignment is best achieved by establishing a real-time connection with governmental, civic, and business leaders to communicate and contribute to a knowledge economy for economic impact.

Through collective sensemaking and sensegiving process, my department started to reorganize and rethink program coordination and how we see our role within the organization (Weick, 1995; Rouleau, 2005). For instance, those that did not speak at all at meetings began to see their roles as valuable contributors to a more significant departmental space to make decisions that impact the organization. Thus, the AR process bestowed individual empowerment through the framing process, which built a nebulous departmental mind to progress toward the more significant economic problem. This observation aligns with Weick's (1995) argument that challenging mental models through positive self-image, continuity, and competence facilitates the problem-solving process. Essentially, I observed that fostering a departmental positive sense of space where each of us feels empowered motivated all of the departmental players to exude problem-solving behavior and creative thinking (Bunchanan and Bryman, 2007).

One implication derived from the findings is that Texarkana area colleges must rethink their business school agendas to make curriculum practical to local industries. While planning actions to focus on TAMUT's business school mission towards economic growth, I grappled with staying within the confines of budget constraints. Changing curriculum and building curriculum takes time and access to funding. Hence, more instructors are needed when certificate programs and degree offerings are implemented, which requires larger allocations of funding. After knowledge was gleaned from three feedback loops within this study, I discovered an area of opportunity to provide a SCM certificate program to the largest employer in the region. From this discovery, I came up with a plan of action that created an income stream for my department, which gave us access to the funding needed to develop more business programs. I discovered that if we offered an SCM level one and level two certificate as an unaccredited certificate, we could collect 100% of the revenue gained from the program. This filled the local vocational need to educate the workforce on SCM while fulfilling our departmental need to gain funding to drive a more considerable economic impact. Further, I was able to gain acceptance for my idea because it was in alignment with TAMUT's 2018 strategic plan, which states that the organizational goals are to: "Focus on academic programs needed by the region," "Engage and



partner with local business groups," "Develop and expand degree and certificate programs guided by the unique environment and the needs...within the region", and "become a first-choice partner of community organizations to meet community needs" (Texas A&M University-Texarkana, 2018). This became an annual revenue stream for our department, which was undesignated and assigned funding, meaning there were no limitations as to how we had to spend it. The additional revenue gave us leverage on using this money to launch more programs to impact the local economy.

A few months later, I created a proposal to offer an on-site SCM certificate program at the largest army depot in east Texas. Since launching the certificate offering and graduating two successful classes, I have noticed that this has inspired other departments to create similar programs. For instance, the engineering department created an energy leadership certificate offered at a local large energy company. Hence, it is arguable that such educational offerings at our largest firms in the region help our local economy compete with larger economies by training large volumes of locals within their workplace setting to become adaptive to the demands of competing against firms outside of the region. Offering on-site certificate programs impacts the broader community as it provides educational access to larger groups of locals.

During the third action phase of this research, I took steps towards driving change within my department based upon the mixed-methods inferences from the neural network model in phase two of the action research cycle. The implication of my research findings suggested that local colleges and universities need to take a hard look at the current curriculum and programmatic opportunities to adjust delivery towards gaps in education that contribute to economic deterioration. Considering these findings, Karpov's (2017) university 3.0 model, Etzkowitz and Leydesdorff's (2000) triple helix model, Motoyama and Mayer's (2017) entrepreneurial model, and Gibbons et al. (1994) provide insight into the commercialization, transferability, and dissemination of knowledge to make an economic impact. Therefore, I was approved by the program coordinator board at TAMUT to add a socioeconomic focus to the traditional role of SCM program offerings by following a model mix that incorporates best practices as offered by the triple helix, university 3.0, and anchor institution models. After I successfully implemented changes to the SCM curriculum, I found that this developed a pipeline of skilled logisticians to the local workforce. Cross-departmental faculty members started taking notice of this

implemented change. This inspired a university task force to reframe and reidentify the university's anchor institution model considering the literature review and findings. The implication provided a way to reorient the supply chain business school agenda of economic development by incorporating the triple helix model, action research, and knowledge dissemination.

#### **6.4.4 THIRD-PERSON IMPACT**

The action research process, the experience of shared inquiry, and critical reflection challenged interpersonal, departmental, and organizational paradigms to vertically collaborate and exchange ideas to combine individual strengths and problem solve as a nebulous mind. As a spillover effect of this shared inquiry and exchange of ideas, this research capitalized on the knowledge and experience from the pre-understandings that individual actors in the socioeconomic landscape possess. The action research cycle connected government, civic, and university leaders to pursue a mutual purpose for economic development, which inspired rich partnerships that helped refine the problem-solving process and a new collaborative way forward. Hence, this study evidence that it is possible for a mid-level university leader to manage the unique politics in faculty environments, to gain legitimacy and traction from higher-level leaders, to shake antiquated paradigms of organizational learning, and provide a new tangible way forward for collaborative problem-solving, knowledge in action, and organizational change. This section will detail first-, second-, and third-person reflections of what was done, its impact, and the implications for me as a researcher-practitioner.

#### **6.4.5 ACADEMIC AND SOCIETAL CONTRIBUTIONS**

This AR study observes the experiences and perceptions of the university stakeholders in a small, economically recessed town to produce knowledge in action and learn ways that the university can contribute towards economic growth through programmatic change. This thesis uses a stochastic and innovative approach by integrating neural networks within the AR cycles to understand the changing needs of the local workforce to refocus the business school agenda to build SCM programs that are adaptive to the local economy. Thus, the neural network helped determine which curricular changes impact larger complex societal ecosystems (Kash and Rycroft, 2002). Enriching the AR process with quantitative data provides new perspectives into old phenomena. Hence, this research frames how micro changes (within SCM curriculum)

respond to macro-level developments within the business ecosystem through action research and the neural network approach. By implementing program changes within the SCM program, TAMUT became a cell in a multidimensional agent within an economic landscape that takes steps to drive positive change (Dooley, 1997). Consequently, the story articulated in this study can be extrapolated by analogous institutions facing a similar economic landscape. However, it is essential to underscore that this research does not intend to claim that all small-town colleges will behave the same. Still, the innovative university model, illustrated in Figure 30 of this research, created for TAMUT, may pose useful in broader or comparable economic studies.

To consider this model, it is important to understand this research's context. To briefly recap, this research unfolds the story of a dilapidating Texas-Arkansas border town that built a regional university to stimulate the economy in East Texas. With civic and government pressure to supply growth to the region, the university leaders grappled with how to best meet these lofty stakeholder expectations within the context of the community's unique bi-state area engrossed with political rivalry. With the added hurdle of navigating competing governmental leaders with opposing political agendas across the Texas and Arkansas state line, university leaders were faced with the complexity of establishing partnerships for economic development projects (Greene, 2002). The political upheaval disrupted the local economy and stagnated prosperity (Rowe, 2008). Historically, universities provide economic benefits as spillover effects; however, building a university for economic development and expecting results before and during a pandemic is a new paradigm. This research aspires to progress change in reconsidering the university model with a long-term goal of making a sizeable economic impact. Thus, this thesis has initiated the change process by opening the door to conversations to reconsider the university approach towards economic development. Guided by scholars that are experts in knowledge creation, complex and adaptive systems, leaderful practice, change management, and university engagement models for economic development, the AR process and the literature provide promising guidance for creating an approach that is innovative and malleable to my university and the unique needs of the local ecosystem (Argyris, 1993; Gibbons et al., 1994; Coghlan, 2003; Buchanan and Bryman, 2007; Karpov, 2017). As a program coordinator of SCM, I drive change in refocusing the business school and programmatic agenda by voicing the importance of civic and governmental influence to produce knowledge and insight to reduce

supply chain management educational barriers of regional growth. The belief that positive economic change occurs through homegrown relationship building, not just the development of new buildings or revitalizing civic, government, and university relationships, is core to this AR study (Dubb, 2019). The AR process coordinated horizontal and hierarchal social constructions by breaking down rigid unspoken rules and tensions, which synergized organizational learning and empowered fellowship, mutual goals, creativity, and innovation (Honey and Mumford, 1996; Uhl-Bien, 2007). Scholars thematically look at economic development models through the perception of the Dean or President who acts as a strategic manager making tough decisions and being held accountable for their economic contribution (Clark, 1998; Huff and Huff, 2001; Axelroth and Dubb, 2012; Bozie and Dunlap, 2013; Degan, 2014; Duke, 2014; Halaby, 2016; Karpov, 2017). However, this research contributes by illustrating how community and legislative pressure to make an economic contribution trickles down to a Dean's leadership team and analyzed the issue through the eyes of a program coordinator running a SCM department. Thus, this research elucidates power differences among faculty and how those differences created a workspace that was slow to achieve the university's mission. Through the AR process and working mutually to make sense of the economic landscape and how the university services can help, antiquated bureaucratic ideologies were released and collaborative respect became the new normal. Through the cycles of action and reflection, my department found a recursive theme of learning to unlearn how business programs were developed, which refocused us on working together to fill the local soft-skill divide (Firestone, 2016). The confluence of realities across the organization, locality, and governmental leaders provides insight into an amalgamation of realities and the context by which my department became a leading arm for our economic anchor institution to rethink the business school agenda to make an impact on a larger economic problem (Buchanan and Bryman, 2007). Following Raelin's (2003) leaderful change paradigm, my department participated in the change process, which I found reduced the natural resistance that festers among cross-departmental business faculty. With opposing political pulls and competing forces for funding and budget appropriations, natural resistance was the norm before introducing the AR process. Thus, we worked cross-departmentally towards a mutual goal to meet stakeholder expectations to create a pipeline of skilled laborers that had the institutional capacity to make a positive economic impact (Raelin, 2003). This research underscores the importance of community relationships and real-time collaboration to

align and coordinate individual programmatic contributions to drive new knowledge and change to make a wider-spread economic impact. To contribute to the knowledge economy, this research makes an academic and practitioner contribution by:

- Unfolding an innovative research approach- This mixed-methods AR thesis contributes to university economic development models that connect the quantitative side of the research that is frequently left out of AR studies. This research bridges the conceptual models of Etzkowitz and Leydesdorff (2000), Gibbons et al. (1994), Lopez (2013), Motoyama and Mayer (2017), Pugh et al. (2016), Srinivas and Viljamaa (2008), Uyarra (2010), and Guohong (2020) with the quantitative models of McHenry, Sanderson, and Siegfred (2012) and Valero and Reenan (2016).
- Illustrating the innovative university model developed for a small-town regional university with a mission for economic development to reorient the SCM business school agenda to drive contribution towards the overall mission. The model synthesizes the anchor institution and triple helix models while incorporating innovation curriculum and community knowledge dissemination considering the literature and regional data through a neural network (Etzkowitz and Leydesdorff, 2000; Leydesdorff and Etzkowitz, 2003; Dubb and Howard, 2012; Guohong, 2020).

This thesis offers an example of a sound MMAR study that provides contributions from inside a small-town regional university by a program coordinator and faculty member. Conducting a study on centering SCM programs to make an economic contribution to align with the university mission to drive economic development through the perspective of a program coordinator contributes to the academic debate on AR (Schultz et al. 1998; Tashakkori and Teddlie, 2010; Mertler, 2012). This study demonstrates my journey as a pragmatic, introverted, and hard-working woman that leveraged the AR approach to discover personal value and finding my voice to hold a seat at the leadership table to drive actionable results. This research showcases that antiquated faculty practices can promote the breakthrough of bureaucratic ideologies through role negotiation through political entrepreneurship and collaboration to progress towards an economically-centered organizational mission. This research presents a rich

scholarly contribution by building on existing literature and offering a university economic model that connects to the qualitative data that is often excluded in economic development studies.

## **6.5 VALIDITY OF THIS STUDY**

The purpose of this MMAR thesis was to produce meta-inferences about the local economy to make university and departmental decisions that were grounded in extrapolations from valid qualitative and quantitative data strands (Onwuegbuzie and Johnson, 2006; Creswell, 2010; Maxwell and Mittapalli, 2010; Tashakkori, and Teddlie, 2010). This research study was mindful of methodological rigor in qualitative and quantitative methods in each study strand and documented quality issues related to the action research cycle and meta-inferences derived from data collection. The framework for determining validity, in this action research study, adhered to Coghlan and Shani's (2014) principles of framing the economic development problem and the university's role in its revitalization. This was achieved by collaborating with stakeholders to maintain relevance and significance to the research question while inquiring with participants and conducting the action research cycle with rigor, reflexivity, and relevance. Equally important, the validity of this study is guided by Reason (2006), who argues for the importance of transparency and clarity of the first-person (yourself), second-person (participants), and third-person (written context) point of views within the research study. Thus, this research involves university interventions and its evaluation of the action. To do this, reflection on the relationships observed within the data (internal validity) and how much this study can be useful for other universities aspiring to lead change in local economic development (external validity) is important (Mills, 2011).

Reflecting on the action research cycle and data collection methods, one problematic area was forcing this research endeavor to remain neutral from the institution. When turning to the literature and data to guide theory-mediated actions, leadership would often challenge the results and try to influence outcomes. It is important to note that validity is the appropriate interpretation by using tests and data collection mechanisms to measure what they are supposed to be measuring. Thus, remaining true to the purpose of generating new knowledge in the field, I held steadfast to the rigorous methodology and methods to hold a neutral stance in this research endeavor and to interpret the findings without political pulls or underlying influence. I was mindful of accurately reflecting on the dialogic interactions and views of the

participant stakeholders, which aligns with the rigorous methodological procedure provided in this thesis (Tashakkori and Teddlie, 2003). Thus, one of the most challenging constraints to manage was role-duality between generating knowledge for academia and politically managing organizational bureaucracies (Greenwood and Levin, 2007).

## **6.6 LIMITATIONS**

Despite my recursive attempts to include the entire sample that I identified as key-informants, some of the identified participants in my sample were not available to interview or survey. Leaders in the area were grappling with the economic collapse that was occurring in my region pre-pandemic. Due to the time constraints of my research, I could not wait any longer to gain additional views and points from participants. However, having a smaller sample size in this small region did not affect the quality of the data findings. As an implication, the data collected may be too narrow to represent a broader range of industries. Although having a smaller sample of participants was statistically significant in my region, it may not be in other institutions. However, this research is a significant starting point for further studies. It provides practitioner insight that other academic institutions can extend to create a prescriptive SCM program to contribute towards economic revitalization in their region.

Despite the rigorous action research methodological guidelines presented in this study, balancing rigor and relevance for both researchers and practitioners in the field is especially challenging for mid-level leaders in academia. Thus, knowledge creation amidst the dual roles of being both a practitioner in the field where legitimization of ideas is directly proportional to years of experience and publications and managing change related to the outcomes of this study to make a scholarly contribution was complex at times. For instance, during this research journey, my theory-mitigated actions were put on hold, as university leadership did not see the urgency in following a bold new university model to play a role in economic development since the economy had been dilapidated for some time. However, after I recursively advocated for change, I gained traction and became the go-to faculty member when the COVID-19 pandemic tore through an already challenged economy. As a result, I picked up the research activities already underway, which inspired the critical action plan and implementation of programmatic changes to restructure department initiatives towards regional development.

## 6.7 A WAY FORWARD

My journey of living theories to drive actionable change in how my department rethinks programs and services consumed my life and most of my thoughts for the last four years. Therefore, this research has shaped my professional and personal identity. Furthermore, this research has brought forward new paradigms in departmental behavior that are more productive and sustainable for the future. Moreover, living theories in action have begun a new way forward to connect the practitioner and scholarly world through my academic publications.

From a professional standpoint, I have gained confidence through my new identity as a scholarly practitioner, which has affected my credibility and advancement in my faculty and community leadership roles. The high-level leaders at my institution have gained a deeper connection through the living theories documented in this study, which has given me a sense of purpose at my organization. This scholarly practice provided pragmatic, critical, and academic arguments to shake up the way we followed archaic university models. This deviation from the norm allowed for an action research plan to be initiated and significantly impacted the local economic landscape. With a research background with publications in top-tier journals such as the *European Journal of Management and Business Economics*, I historically ignored data that had embedded bias or emotions, which is typical during traditional research pursuits.

Throughout this research journey, I have changed my axiology to consider multiple perspectives and evaluate these individual experiences objectively and subjectively to discover new knowledge to pursue pragmatic answers. Thus, my axiology aligns with Mills et al. (2010) who argue that a sensemaker is never alone in creating meaning. Hence, I have been pleased with the data collected through sensemaking, which is a social process where I consider and reflect on others and how they perceive their own social identity within broader societal constructs.

Changing the university model that the university follows takes time to materialize; however, implementing the model to focus on programs and services that make an economic impact is a long-term goal for this research, and measuring the economic impact that the model makes is a five-year plan for personal research. However, measuring the impact must consider that the COVID pandemic plummeted an already staggering economy. This will add complexity to the measurement of the model's impact. Thus, the results of the model integration may take time as the global economy is heading towards unprecedented economic times.



The future recommendations for this research are to conduct a broader study on how mid-level university strategic managers make sense of the political entrepreneurship involved, particularly in gaining traction for new ideas for education governance concerning the economic impact that conflict with established ideas and traditional norms. The implication of this research to this sub-field is that the action research cycle actively involved collaborative problem solving across hierarchical domains, which fostered a space for all levels of leadership to work towards mutual objectives. A secondary implication from this research on this subset field of interest is that economic crisis and external governmental and community pressures bring faculty together in pursuit of answering a more significant phenomenon. Although this study illustrates how a mid-leader in a small-town university navigated the political waters of managing change along and against more tenured faculty, broader research across multiple universities is needed.

## **6.8 SUMMARY AND PERSONAL REFLECTIONS**

This thesis used a stochastic and innovative approach by integrating neural networks within the action research cycle to understand the local workforce's changing needs to refocus the business school agenda by building SCM programs that are adaptive. Hence, this research frames how micro-changes (within the business school department) respond to macro-level developments within the business ecosystem through an innovative university model that leverages a neural network (Guohong, 2020). By implementing program changes within the business department, TAMUT becomes a cell in a multidimensional agent situated in a broader socioeconomic region that takes steps to drive positive change (Dooley, 1997). This study may apply to analogous institutions if enough details are provided about the context and consumers of this research (Stringer, 2014). However, it is essential to underscore that this research does not intend to claim that all small-town colleges will behave the same; therefore, adaptations to the workforce's unique complexities and socioeconomic construct are needed. Equally important, this study does not endeavor to offer generalizable results but does offer insights by providing evidence on how action research can provide knowledge that is applicable to practitioners and scholars in studying business schools and their ability to impact small-town economies. Still, by tailoring this research and the university model created for this study, scholars and practitioners can rethink the role of programmatic initiatives and university services to serve more considerable economic efforts. Thus, this thesis is useful to both scholars and practitioners

working towards economic progress by making sense of the way that each actor, self, department, and organization can lead changes to respond to economies in crisis.

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