THE SEARCH FOR SKILLED TECHNICIANS: THE PERSPECTIVE OF ALABAMA’S AUTOMOTIVE MANUFACTURERS

by

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A DISSERTATION

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ABSTRACT

The state of Alabama has been very successful and fortunate in recruiting the automotive industry, as well as other manufacturing industries. With this success comes a massive need for skilled employees. Economists predict that the state of Alabama will continue to be successful in recruiting of manufacturing industries, which causes many to be concerned about the already shrinking pool of skilled workers. The Alabama Community College System is undergoing changes to strategically position the colleges to meet the growing need for a skilled workforce. However, many leaders in industry are already very critical that the skills with which students graduate are not aligned to their specific needs. This qualitative research presents an analysis of the alignment between industry expectations for workforce preparedness and community college workforce training programs.
DEDICATION

This dissertation is dedicated to my wife Lynn, who sacrificed so much of our time together and still supported me regardless of the cost! Lynn is my soulmate, thank you for always believing in me! Thank you for all of those long hours transcribing my interviews! My children and grandchildren who I am sure are so tired of hearing Papa say that he has got to work on his paper. I would like to thank Dr. Vicki Karolewics and all of my colleagues at Wallace State Community College who constantly encouraged me. Thank you to Laura Teal for reviewing my work. Thank you to Harriet Mayo for helping me with Microsoft Word. Dr. David Hardy and all of The University of Alabama higher education faculty and staff, thank you! Thank you to all of my friends, church family, and most of all God who is always so good! Thank you Lord for your grace and mercy to finish!
### LIST OF ABBREVIATIONS AND SYMBOLS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACCS</td>
<td>Alabama Community College System</td>
</tr>
<tr>
<td>ACE</td>
<td>American Council on Education</td>
</tr>
<tr>
<td>ATN</td>
<td>Alabama Technology Network</td>
</tr>
<tr>
<td>AWC</td>
<td>Alabama Workforce Council</td>
</tr>
<tr>
<td>BEOG</td>
<td>Basic Educational Opportunity Grants</td>
</tr>
<tr>
<td>CCRTF</td>
<td>College &amp; Career Ready Task Force</td>
</tr>
<tr>
<td>CETA</td>
<td>Comprehensive Employment and Training Act</td>
</tr>
<tr>
<td>EOG</td>
<td>Educational Opportunity Grants</td>
</tr>
<tr>
<td>G.I. Bill</td>
<td>Servicemen’s Readjustment Act of 1944</td>
</tr>
<tr>
<td>HEA</td>
<td>Higher Education Act of 1965</td>
</tr>
<tr>
<td>JTPA</td>
<td>Job Training Partnership Act</td>
</tr>
<tr>
<td>MDTA</td>
<td>Manpower Development Training Act</td>
</tr>
<tr>
<td>NDEA</td>
<td>National Defense Education Act of 1958</td>
</tr>
<tr>
<td>OEM</td>
<td>Original Equipment Manufacturers (Honda, Hyundai, Mercedes-Benz)</td>
</tr>
<tr>
<td>Tier 1</td>
<td>An automotive parts manufacturer who supplies parts directly to the OEM</td>
</tr>
<tr>
<td>TRIO</td>
<td>Federal outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds</td>
</tr>
<tr>
<td>WIA</td>
<td>Workforce Investment Act</td>
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<td>WIOA</td>
<td>Workforce Innovation and Opportunity Act</td>
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CHAPTER I

INTRODUCTION

Mercedes-Benz announced in 1993 that they would build a plant in Alabama. It was a surprise to many, because up until this time the dominant industries in the state were agriculture and textiles. Before 1993, there were no automobiles manufactured in the state of Alabama. Twenty-six years later, in 2019, there will be more than 1 million automobiles manufactured in the state, and the number increases annually. Alabama has become home to four Original Equipment Manufacturers (OEM): Mercedes-Benz, Honda, Toyota, and Hyundai (Azok, 2017). Alabama has also become home to numerous Tier 1 suppliers. Tier 1 suppliers are manufacturing companies that provide parts and or assemblies of parts directly to the OEMs. Some examples of parts supplied by a Tier 1 manufacturer might be electrical wiring harnesses, exhaust systems, or even a variety of interior pieces, including the passenger seats. The Tier 1 suppliers usually locate near the OEM to reduce transportation time and expense (Hill, 2017).

The National Association of Manufacturers, in conjunction with the Center for Manufacturing Research, ranked Alabama among the top five states with the highest share of manufacturing employment (March, 2016). Business Facilities magazine (August 2014) ranked Alabama as the number one state in the nation in automotive manufacturing strength, and in 2015 Alabama earned Business Facilities’ coveted State of the Year award (Rogers, 2016). According to Southern Business & Development Magazine (spring 2007), Alabama has become the “Center of the Southern Automotive Universe” (p. 50). For the state’s major industries to transition from a low skilled textile and agriculture industry base to high skilled, high wage
advanced manufacturing industry base is an unheard of transformation (Randle, 2013). One of the tools economic developers use to attract or recruit new businesses to an area is a commitment to supply a skilled workforce and or the ability to provide whatever training needs that the company may deem a priority (Area Development Magazine, 2012). The state economic leaders in Alabama could have never recruited these industries without the promise of a skilled workforce. Jenkins and Boswell (2002) found in their national survey that Alabama, along with eighteen other states, indicated that community colleges are designated as the lead agency for providing workforce training (Jenkins, Boswell, & Education Commission of the States, 2002). The Alabama Community College System was noted as one of Alabama’s top three economic development assets according to a poll taken at the 2015 Southern Economic Development Roundtable (Southern Business & Development Magazine, Spring 2015).

According to Cohen and Brawer (2008), technical education and specialized training are a fundamental part of community colleges and can provide individuals opportunity for social mobility to which they would otherwise not have access. As far back as 30 years ago, Katsinas and Lacey (1989) recognized that community colleges were vital to sustained economic growth, workforce development, and the fact that community college workforce training was not something that would soon pass. The Alabama community colleges have served a vital role in training the workforce in this state. Even still, there is criticism about the quality and relevancy of higher education and the skills and competencies that business and industry expect from community college graduates (D’Amico, Morgan, Katsinas, & Friedel, 2014). There are some who would say that Alabama cannot keep up with the constantly growing need for skilled workers (Accenture & The Manufacturing Institute, 2014).
The Governor’s College & Career Ready Task Force was established by an executive order signed by Governor Robert Bentley on January 18, 2013 (Fitch, 2013). Bentley charged the task force comprised of representatives from K-12 schools, two-year colleges, four-year universities, and business leaders to “work together on the task force, helping the state offer a more coordinated approach to workforce development” (p. 1). Bentley stated (2013), “By coordinating our workforce development efforts, we can give more students a seamless transition from the classroom to the workplace” (p. 1). According to him, “The goal of this task force is to make sure our efforts are reaching more students across Alabama” (p. 1). After more than six months of collaboration, the Governor’s College & Career Ready Task Force (CCRTF) presented a report with several recommendations that prompted responsive actions, the first of which was the creation of the Alabama Workforce Council (AWC) (CCRTF, January 3, 2014).

The recommended Alabama Workforce Council, comprised of appointed business and industry leaders from around the state, work together with educational leaders to promote organization and teamwork across all educational entities along with business and industry to develop innovative educational workforce programming (CCRTF, January 3, 2014; Sharpe, 2015). The CCRTF report also recommended that legislation be adopted that would eliminate any fragmentation among the existing departments and agencies in an effort to make more efficient the workforce development efforts and align them with business and industry needs (January 3, 2014). Consequently, according to the Associated Press (2015), the Alabama Legislature passed a bill in March of 2015 that allowed for the creation of a newly appointed Board of Trustees to provide guidance and governance to the Alabama Community College System (ACCS). This action would remove the ACCS from the oversight of the Alabama State Board of Education (ALSDE) (AP, May 27, 2015). Community college systems across the
country that report to their own board are better positioned to negotiate, coordinate, and influence legislation, funding, and change (Cohen & Brawer, 2008). According to Al Thompson (June 17, 2016), vice president of the Board of Trustees for the Alabama Community College System, “the board is strategically focused on directing the colleges in meeting the needs of business and industry and hopefully helping to position the state to not just meet the current need of skilled workers, but to attract additional manufacturers and continue to grow the state’s economy.”

Kay Ivey was sworn in as Governor of the State of Alabama on April 10, 2017. In an interview on May 10, 2017, Governor Ivey commented, “Community colleges have a tremendous influence and impact on our workforce development, especially in a time when new technologies are coming on rapidly. It’s hard to keep up with all the rapid changes that technology brings, but when education and business are going to mesh and marry together, it’s just essential that we have a very effective vehicle which the community college system provides to stay abreast to those changing technologies” (as cited in Williford, 2017, p. 2). Governor Ivey’s “Strong Start, Strong Finish” education initiative has an emphasis on workforce preparedness (Ivey, 2017). The final stage of Ivey’s initiative is advanced training for better jobs. The governor plans to address the education-attainment and skills gap by developing policies and promoting programs that are available at Alabama community colleges in a continued effort to move Alabama forward toward becoming a manufacturing powerhouse (Ivey, 2017).

Statement of the Problem

In 2017 the National Skills Coalition, a group who advocates for raising the skills of America’s workforce, reported that there are thousands of jobs across Alabama that remain
unfilled because businesses are unable to find qualified workers, and yet there are thousands of unemployed people in Alabama that do not have the skills needed to fill the open jobs, hence the “skills gap.” According to Carnevale, Strohl, and Smith (2010), as the economy continues to recover and manufacturing jobs are created, nearly two-thirds of these good paying jobs will require some form of postsecondary education or training. The United States Bureau of Labor Statistics (BLS) notes that the unemployment rate for the state of Alabama has been on a downward slope for over nine years. The unemployment rate has gone from a record high 11.8% in 2009 to a record low of 3.7% in 2018, which means there are an additional 188,439 individuals are working and the pool of skilled workers is shrinking (USBLS, 2018). There is growing concern not only among the economic development leaders in Alabama, but also across the United States and even the world, regarding the lack of skilled workers. Many believe that while a lot of manufacturers are locating in the southeastern United States and specifically Alabama, when the availability of skilled workers fails to meet the demand, businesses will go elsewhere (Accenture & The Manufacturing Institute, 2014). According to a report conducted by Richmond (2014), the jobs which applicants do not have the skills to fill are most often referred to as “middle-skills jobs.” Middle-skills jobs are found in variety of career fields and usually require some postsecondary training but not a four-year degree (Richmond, 2014). “Middle-skills jobs account for 59% of Alabama’s labor market, but only 47% of the state’s workers are trained to the middle-skill level” according to an analysis of Alabama’s labor market information performed by the National Skills Coalition (2017, p.1). The National Skills Coalition’s study further predicts that the demand for middle-skills jobs will remain strong at 55% thru 2024 (National Skills Coalition, 2017). Community colleges are a great source of middle-skills training and high demand career training programs. Additionally, Carnevale,
Smith, Melton and Price (2015) report that, “Thirty percent of associate’s degree holders make more than the average four-year degree holder” (p19). *Industry Week* magazine published “The four hottest jobs in factory maintenance,” in October 2015 in which Laura Putre describes the Maintenance Technician as a highly specialized trained professional in very high demand and very hard to find (Putre, 2015).

The Alabama Community College System (ACCS) is comprised of 24 separately accredited community and technical colleges and the Alabama Technology Network (ATN). The campuses are strategically located across the state and provide their respective communities with educational opportunities and cultural events to enhance their lives. The colleges offer a variety of educational programs in which students are trained in academic, health, and technology career fields. The majority of the graduates of these programs go to work and experience very rewarding careers (Lynn, 2018). However, there are concerns that colleges are not producing enough graduates to fill the growing demand for skilled workers (Accenture & The Manufacturing Institute, 2014).

Elebash and Lynn (2017) comment regarding the state of Alabama, “This skills gap is crippling to individuals who miss out on job opportunities. But it is also crippling to business and economic growth. Companies that lack an adequate supply of workers can't succeed and grow to their full potential” (p. 1). There are also some who believe the graduates are not being taught the “right skills” or at least not the ones relevant to their specific industry (Gallup, & Lumina Foundation, 2014). The focus of this research is to determine how leaders in the automotive manufacturing industry view the workforce training being provided by community colleges in Alabama in order to help community college leaders improve workforce training programs, and determine which programs should be added or discontinued.
Governor Kay Ivey and the economic leaders in the state of Alabama are going to continue to market the state as a manufacturing-friendly environment with a skilled workforce. The Alabama community colleges are an integral part of workforce training in Alabama (Ivey, 2018). This research project will provide an in-depth understanding of how the workforce training provided by Alabama community colleges compares to the expectations of the automotive manufacturing industry currently operating in the state.

Purpose of the Study

This research is necessary in that there are no known, documented perspectives of business and industry leaders regarding the workforce training that is provided by the community colleges in the state of Alabama. In 2014, Gallup and Lumina reported that, nationwide, only 11% of the business leaders that were surveyed responded strongly agree when asked if “higher education institutions in this country are graduating students with the skills and competencies that MY business needs,” (p. 25).

This research project employed a qualitative approach in an effort to capture the multifaceted insights of Alabama automotive manufacturers as well as their major suppliers and has been encouraged in previous research (D’Amico et al, 2014). Data for this project was obtained through a questionnaire and individual interviews. The goal of this research project was to provide community college leaders with information that can be used to promote training opportunities and or improve training outcomes. The end product that this researcher endeavored to provide to readers is a comprehensive, rich description of leaders of Alabama automotive manufacture’s opinions and experiences concerning the workforce training that is provided by Alabama community colleges and the unique challenges of local automotive manufacturing. The research specifically focused on the position of advanced manufacturing
technicians (AMT). Advanced manufacturing technicians are highly trained individuals whose job is to keep the manufacturing plants operating at optimal performance. According to Richmond (2014), educators commonly feel that they are doing a great job preparing graduates for the workforce. However, education as a whole is often publicly criticized by politicians and business leaders for being disconnected from the “real world” and out of touch with the needs of business and industry (Gallup & Lumina Foundation, 2014). This research confirmed that the business and industry leaders who partner with the Alabama community colleges are satisfied with their training outcomes.

Significance of the Study

There has never been an organized assessment conducted of the manufacturing training needs in Alabama. The community colleges in Alabama work independently to grow their individual training programs and attempt to keep up with the high tech, rapidly changing world of business and industry. The individualized efforts of the colleges have resulted in a very fragmented approach to workforce training and often inhibit the development of a comprehensive state wide workforce training plan that would maximize the use of scarce resources. The results of this study has provided community college leaders in Alabama information and insight that is beneficial for developing, improving, and implementing effective workforce training partnerships. Additionally, this study is the first step toward documenting the workforce training needs of Alabama automotive manufacturers and their suppliers, establishing the need for a uniform curriculum for high demand programs, and promoting policies that are favorable toward workforce training.
Research Questions

This study was guided by the following overarching research questions:

1. What do Alabama’s automotive manufacturing employers (OEM and Tier 1) perceive as the current and future skills, knowledge, and expertise needed for well-trained and well-prepared advanced manufacturing technicians in an industry that continues to develop and change?

2. What challenges do Alabama’s automotive manufacturers face in attracting and retaining highly skilled advanced manufacturing technicians now and in the future?

3. What is the nature of the collaborative partnerships that Alabama’s automotive manufacturers have with Alabama’s community colleges?

4. What factors contribute to automotive manufacturers’ provision of work-based learning experiences such as internships or apprenticeships for community college students?

Assumptions

The researcher conducted this study with the following assumptions:

1. The researcher, being an employee of the Alabama community college system, was able to compile a bias-free analysis of the information and data gathered from the automotive manufacturers regarding the workforce training being provided by Alabama community colleges.

2. The researcher assumed that the business and industry leaders who took part in the study provided thoughtful, truthful, bias-free responses.
Limitations

In conducting this study, the researcher acknowledged a priori, the following possible limitations:

1. The business and industry leaders who took part in the study may not have taken the study seriously or dedicated time to thoughtfully answering the study questions.

2. This study was not be able to cover or present data for all types and sizes of workforce training programs. The data collected is limited to the automotive manufacturers that contribute to the study and the community colleges that provide workforce training programs for them.

Delimitations

The data utilized in this study were collected in the summer of 2019, and reflect that specific time period. The researcher delimited the scope of this study to only include all four OEM automotive manufacturers and four of their Tier 1 suppliers located in the state of Alabama. Therefore, the study’s findings may not reflect the perspectives of all manufacturers not related to the automotive industry. The researcher delimited the focus of this study to the position of advanced manufacturing technicians (AMT), and the findings may not apply to other positions in an automotive manufacturing organization. The researcher further delimited the positions chosen to interview for the study to human resources manager and maintenance/training manager. Consequently, the study’s findings may not be reflective of individuals who occupy other positions in the organization.
Organization of the Dissertation

This dissertation is organized into five chapters and also includes references and appendixes. Chapter One introduces the study. Chapter Two reviews literature relating to workforce training and consists of three main sections: Section One reviews a brief history of the community college, Section Two reviews governmental influence on higher education, and finally Section Three reviews the history of automotive manufacturing and the economic impact of automotive manufacturing. Chapter Three discusses the research design and methodology of the study. Chapter Four contains an analysis of the research data and an interpretation of the findings. Finally, Chapter Five consists of an introduction, conclusions, and recommendations.
CHAPTER II

REVIEW OF THE LITERATURE

Introduction

This literature review consists of three main sections. The first reviews the history of the community college. The second reviews the impact of governmental influence on American higher education, specifically community colleges. Finally, the third reviews automotive manufacturing including the history of the automobile, the evolution of automotive manufacturing and the economic impact of automotive manufacturing.

The History of the Community College

This review provides a brief presentation of the population growth in the United States, the history and origin of community colleges, and finally an overview of the community colleges in Alabama. Witt et al. (1995) noted, “The American community college movement is the most important higher education innovation of the twentieth century.” (p. 1). Much of the momentum for the community college movement can be contributed to the expansion of democracy in America. As the door began to open for immigrants to become full citizens, one of the benefits that the average citizen demanded was higher education for themselves and their children. Community colleges were often referred to as the people’s colleges. Community colleges offered training for the skilled trades and professional programs, consequently becoming the university for the common man (Witt et al., 1995).

As mentioned earlier, automotive manufacturing in the state of Alabama has grown substantially and received a great deal of attention both locally and nationally. Community
colleges are usually also mentioned in those discussions and reports as a source of skilled workers and or workforce training programs for employees who need to develop specialized skills. Dr. Walter Bumphus (2018), president of the American Association of Community Colleges (AACC), had this to say about community colleges:

A uniquely American concept, community colleges were started as a way to train women to enter the workforce as teachers. You could say that early community colleges were the first vocational schools. Today’s community colleges are as diverse as the students they serve. More than 1,100 community colleges across the nation serve more than 12 million students annually. By design, community colleges are local and reflect the needs of the community in which they reside. Nearly every congressional district in the United States has a community college. The students that attend are the most diverse within the higher education sector and many are the first in their family to attend college. Community college students on average are older, are working, are attending school part-time, and are saving thousands of dollars in tuition and fees while increasing their lifetime earning potential and employability. (Bumphus, 2018, p. 1).

Population Growth in the United States

Article 1 Section 2 of the United States Constitution requires that a census be taken every ten years to ensure that representation and taxation are distributed appropriately. The first census of the United States was taken in 1790 and revealed that the overall U.S. population was 3,929,214 (Gauthier, 2002). In the first several decades after the 1790 census, the United States experienced very fast growth with the population growing approximately 30% each decade from 1790 to 1860. The information gathered through the census process has evolved over time, and in 1850 the government began collecting educational data such as enrollment and attendance at
both secondary and postsecondary institutions (Snyder, 1993). The 1850 census revealed that of
the 16 million people under the age of 30, four million were enrolled in school, equating to 25% of
the population 30 years old and younger. Davis and Bauman (2013) found that 76 million
individuals less than 30 years old were enrolled in either secondary or postsecondary institutions
as of 2011, which represented 60% of the total population under 30 years of age. According to
Trow (2010), the number of students enrolled in public high schools alone between 1880 and
1930 rose from 110,000 to 4.5 million, doubling almost every decade. The massive increase in
students not only created challenges for the secondary education systems, but also because the
students came with a host of social issues. Many had no desire to be in school and were only
there to comply with state compulsory education laws, and many were from poor immigrant
families and possessed very low educational and career aspirations. The secondary educational
systems were faced with these challenges as well as a variety of cultural challenges. The focus
of the curriculum for secondary education had to change from the traditional college preparation
system to more of a mass general, even terminal, educational system and curriculum (Trow,
2010).

The American higher education system has grown considerably from the founding of
Harvard, the first American college, in 1636 and the other colonial colleges of early American
history. Nevertheless, only a small percent of college-aged American citizens were enrolled in
college by 1900. Through world events and the United States legislative involvement in higher
education, that was all about to change (Trow, 2010).

Thelin and Gasman (2011) commented:

A good way to chart the history of higher education is to keep in mind that quantitative
shifts have signaled qualitative changes. For example, from 1700 to 1900, less than five
percent of Americans between the ages of eighteen and twenty-two enrolled in college. Between World Wars I and II, this figure increased to about twenty percent, rising to thirty-three percent in 1960 and dramatically expanding to more than fifty percent in the late 1970s. These numbers define the transformation of American higher education from an elite to a mass activity, a trend that continued during the final decades of the twentieth century, as the prospect for universal access to postsecondary emerged as part of the American agenda (p. 3).

According to the United States Census Bureau (2017), as of July 1, 2017, the population of the United States was 325,719,178. The population of the United States continues to grow, and so will the need and desire for education.

**History and Origin of Community Colleges**

The founders of American higher education endeavored to replicate the Oxford and Cambridge tutorial model of higher education by making living and learning experiences the center of the pedagogy. Only privileged young men from wealthy families and those who were serious about their religious studies were allowed to attend college. Most of these social elites were expected to return home after being educated in the liberal arts and classical languages to take over the family business of building, shipping, or selling (Thelin, 2011). The growth in America’s population, as mentioned earlier, and the increased desire for higher education caused a strain on the universities to accommodate the larger numbers and yet maintain the prestige of the coveted liberal arts baccalaureate.

According Zwerling (1976), in the late 1850s many university presidents wanted to restructure the American higher education system to align with the German model of a dual education system. In a dual education system there is a distinction between vocational education
and academic education, and students must decide which path they are going to take while in their early teens. The presidents were not successful with implementing the dual system. However, it was evident that some of them wanted to move the responsibility of the first two years of college and the masses of new students down to the secondary education level. The presidents of these prestigious universities believed that the first two years of higher education were not necessarily a part of university level of instruction. Only the junior and senior level work should be the responsibility of the distinguished professors at the prestigious universities.

One of the major advocates for separating the first two years of instruction from the university was William Rainey Harper. Harper, the president of the University of Chicago, was instrumental in establishing the first junior college. The first recognized junior college was established in Joliet, Illinois in 1901 by Stanley Brown, superintendent of Joliet Township School District near Chicago, Illinois, and William Rainey Harper. Harper is credited with coining the term “junior college” and some even refer to him as the “father” of the junior college. Harper was considered by most to be innovative and not afraid to think outside of the box regarding educational delivery. However, Harper was an elitist and to credit him with promoting the junior college movement for and purpose beyond protecting the university from the masses would just be wrong (Erdman & Ogden, 2000).

Junior colleges were created in an effort to satisfy the growing demand for higher education and to relieve the pressure on the universities to provide access to higher education for a broader population (Zwerling, 1976; Brint & Karabel, 1989). Junior colleges experienced very slow growth during the early 1900s. In 1920, some of the early leaders and supporters of the junior colleges, whom will be discussed later in this chapter, formed the American Association of Junior Colleges (AAJC). The AAJC helped to organize the colleges and define their place
and purpose in the American higher education world, especially at the national level and regarding federal policy.

During the early 1930s, communities and businesses were beginning to put pressure on the universities to provide occupational training, as the economy was expanding so was the need for individuals with education and training more than high school but less than a four year degree (Zwerling, 1976; Thelin, 2011). Several universities began establishing or helping to establish junior colleges, usually located near their main campus. However, in 1930 there were only 277 junior colleges scattered around the country and in all but five states (Bogue, 1948).

During the first 30 years or so of the junior college movement, there seemed to be much confusion as to the purpose and mission of the junior colleges. Individuals connected with the universities and not associated with the junior colleges were often vocally critical and patronizing regarding junior colleges. They basically did not know what to do with these institutions, so they rejected them. As Zwerling (1976) stated, they were “a mechanism for diverting as many young people as possible away from the more advantageous liberal arts or transfer curricula” (p. 55). However, according to Cohen, Brawer, and Kisker (2014), one of the primary functions of the modern day community college is to provide training for high demand high wage careers. These high demand high wage manufacturing careers require some postsecondary training but not a bachelor’s degree, and the demand for such training is expected to steadily increase (Cohen, Brawer, and Kisker, 2014). Hutcheson (2010) so clearly stated, “Writing history is not the simple act of listing names, dates, and places” (p. 172). When discussing the events of the past one must diligently strive to avoid presentism, which is applying what is currently known to the events of the past without considering what was actually
experienced. The real struggles that were faced and all of the obstacles that had to be overcome to get to where we are today are often forgotten (Hutcheson, 2010).

There are numerous individuals who contributed to the organization, definition, focus, growth, and success of the community college movement. However, the AAJC seems to have been the primary entity that has historically served as a voice for junior colleges. Therefore, for this review the executive leaders of the AAJC will be briefly reviewed here, along with the struggles, successes, and growth of the organization as well as the colleges. The AAJC executive leaders are: George Zook, Leonard Koos, Doak Campbell, Walter Crosby Eells, Jesse Bogue, and Edmund Gleazer (Witt et al., 1995).

Dr. George F. Zook taught Modern European History from 1906 to 1920. He worked as Chief of the Higher Education Division of the United States Department of Education (DOE) for five years. During Zook’s time at the DOE, he was instrumental in the establishment the American Association of Junior Colleges (AAJC) (Brint & Karabel, 1989, p. 33). He served as the President of the University of Akron from 1925 to 1933. Zook aided on numerous Presidential commissions of education, but he best known for being the Chairman and contributing author of the 1947 Truman Commission on Higher Education (Himstead, 1951). The Commission’s famous report, “Higher Education for American Democracy,” is comprised of six massive volumes, the first use of the term community college in place of junior college, the call to establish more community colleges, the need to eliminate financial barriers for college attendance, and a number of other important issues (Gilbert & Heller, 2013). Zook served as the President of the American Council on Education (ACE) from 1934 until he retired in 1950. Located in Washington, D.C., ACE is a membership organization that represents over 1,800 colleges, universities, and educational entities. Zook enjoyed his tenure at ACE and felt that the
organization made a difference in higher education (Zook, 1947). ACE works to find solutions for higher education challenges. ACE is typically at the center of federal policy debates and provides leadership development opportunities for college administrators. George Zook was a strong advocate for the community college. He believed that it should be a part of the higher education system and was useful for the democratization of higher education. (Zook, 1947).

Dr. Leonard V. Koos spent a majority of his professional career at the University of Chicago as a professor of secondary education. He was heavily influenced by William Rainey Harper and a supporter of restructuring the American secondary education system to a six-four-four plan. The six-four-four plan included six years of elementary school, four years of junior high school, and four years of high school to include the first two years of college (Conger & Shultz, 1970). Eaton (1994) stated “Koos saw junior colleges as part of the secondary education system” (p. 18). He was never fully successful in convincing educational leaders to adopt this plan. This was mainly because it affected long standing athletic programs for both the high schools and the colleges. He wrote over 50 scholarly articles and three books on the topic of the junior college. Koos edited the “Junior College Journal” and served as the director of research for the AAJC from 1946 to 1949. Koos conducted the first extensive study of the junior college which resulted in his seminal book “The Junior College Movement” published in 1924 (Conger & Shultz, 1970). Brint and Karabel (1989) regard Koos as a “pioneer in foreseeing the potential importance of guidance counseling” (p. 39). However, they also viewed this insight negatively as a way to divert lower performing students into occupational career paths (Brint & Karabel, 1989). Koos (1983) commented, “It is essential that the junior college be taken seriously into account by all those who would shape the destinies of secondary and higher education in America” (p. 479).
Doak S. Campbell, as many of the early junior college leaders, came from hardworking families who lived in rural America, but who were somehow able to earn a college degree. The degrees most often did not come from the most prestigious universities in the nation, but nonetheless allowed them to move up the social ranks of society. Campbell started his professional career in 1916 at Central College, a small rural Baptist women’s college in Conway, Arkansas, as a chemistry teacher. He became the president of the college in 1920 and is credited for much of its success (Brint & Karabel, 1989). Campbell was actively involved with the AAJC and, in 1922, was elected to lead the organization as executive secretary, a position he held for 16 years. Campbell earned his doctorate from the Tennessee-based George Peabody College in 1930. He was hired as the dean of the graduate school at Peabody in 1938, and soon after resigned as AAJC executive secretary. Campbell wrote his dissertation on the “stated purposes of the junior college” in which he conducted extensive research on printed materials from junior colleges all across the nation (Witt, Wattenbarger, Gollattscheck, & Suppiger. 1995). Campbell (1930), repeating the AAJC’s definition and purpose of the junior college, stated:

A junior college is an institution offering two years of instruction of strictly college grade. This curriculum may include those courses usually offered in the first two years of a four-year college; in which case these courses must be identical in scope and thoroughness with the corresponding courses must be identical in the standard four-year colleges. The junior college may, and is likely to, develop a different type of curriculum suited to the larger and ever-changing civic, social, religious and vocational needs of the entire community in which the college is located. It is understood that in this case also the work offered shall be on a level appropriate for high school graduates (p. 10).

Campbell (1930) also provides an excellent definition for terminal/vocational curriculum:
Terminal curricula are those designed specifically for those students who do not anticipate further training beyond the junior college, but who desire a diploma, either in general cultural fields or in vocational courses from which they may enter directly into gainful employment in non-professional or semi-professional occupations (p. 10).

Campbell became the president of Florida State College for Women in 1941 (later to become Florida State University). He remained in that position until his retirement in 1957. Florida State University’s football stadium was named in his honor when it opened in 1950. Doak Campbell is recognized as one of the early leaders of the junior college movement who believed the junior college was a part of the higher education system but that had a much broader mission than just offering academic courses (Whitt et al., 1995).

Walter Crosby Eells was born in Union, Washington. He earned his Bachelor of Arts in Mathematics in 1908. Eells is another of the early leaders of the junior college movement who has ties back to William Rainey Harper, as he earned his master’s degree from the University of Chicago in 1911. After earning his Ph.D. Eells was hired as an associate professor of education at Stanford University in 1927. In 1930, Dr. Eells became the first editor of the *Junior College Journal* (Witt et al., 1995). Eells enjoyed his work with the journal even though he received a good bit of criticism regarding the content of the publication. Many complained that too much of the information being printed was about California junior colleges, and others complained that Eells favored the private junior colleges. However, Eells was able to still the complaints as the publication began to earn national respect (Brick, 1964). According to Eaton (1994), Eells had more impact than anyone else on the junior college movement, especially in the beginning. Eells was a very strong advocate for increasing the amount of occupational curriculum being offered at the junior colleges. He also advocated that the instruction must be at a higher level than that of a
high school, especially if the courses were to be considered for college credit. Eells is noted for recognizing four functions of the junior college: popularizing, preparatory, terminal, and guidance. The popularizing function addresses the junior college's role in providing access to higher education to most all citizens. The preparatory function addresses the junior college's offering of general education courses that prepare its students to transfer to a university. The terminal function addresses the junior college's offering of technical education in which, upon completion, students could obtain employment in their chosen career field. The guidance function addresses the junior college's role regarding teaching students to think, organize, and plan for everyday life as well as major life events (Eaton, 1994). Dr. Eells believed that, as the junior college evolved and local college leaders developed, the curriculum offerings would represent the local community's educational needs (Bragg, 2001). Eells (1931) commented, “The junior college should be the people’s college and available to all. It should provide collegiate opportunity for the mass of high school graduates who can’t, won’t, or shouldn’t become university students” (Eells, 1931, p. 192). Eells was named as the AAJC executive secretary when Doak Campbell resigned in 1938. Eells was the first full-time employee of the association. Shortly after taking over, Eells was instrumental in moving the headquarters for the AAJC to Washington, D.C. (Whitt et al., 1995). Under Eells’ leadership, the AAJC grew numerically and also matured as an organization. By the early 1940s, the AAJC began to earn some political influence. This, however, resulted in a few of the AAJC presidents believing that Eells had too much authority and ultimately led to Eells’ resignation in 1945. The parting of Eells from the AAJC was so bitter that he never attended another AAJC meeting and focused the rest of his time on junior colleges in Japan (Brick, 1964).
George Zook (1940), in an attempt to honor Koos, Campbell, and Eells, referred to these early junior college leaders with military titles such as “Generals and Colonels.” He compared their work with the junior college movement as that of “frontiersmen” forging their way through the uncharted educational landscape of America and even challenging the “New England citadel.” This “vanguard” endeavored to promote the junior college movement, to promote higher education for all, and to discover the purpose and the mission of the junior college (Zook, 1940).

The resignation of Dr. Eells and the strife that had led to his resignation caused a tempestuous divide among the AAJC members. Jesse Parker Bogue was appointed as executive secretary of the AAJC in 1946, and immediately started working on unifying the organization. Parker came from rural America and had worked his way through college performing whatever manual jobs he could find to make a living. He also preached in Methodist Episcopal churches occasionally. Bogue served as the president of Green Mountain Junior College in Vermont for 15 years before moving to the AAJC (Whitt et al., 1995). Bogue traveled the country, visiting many of the AAJC’s member colleges, renewing relationships, and building new ones. Bogue is recognized for bringing unity to the organization and growth in its membership, and for stirring interest in the junior college movement among several foundations and major businesses. Jesse Bogue retired from the AAJC in 1957, but continued to be an advocate for the two-year colleges until his death in 1960 (Brick, 1964).

Edmund J. Gleazer was approached by the AAJC board to see if he was interested in leading the organization. Before accepting the position, he met with the board to discuss their expectations of him. After much discussion, the board decided to change the title/position from executive secretary to executive director, and Gleazer was appointed as executive director of the
AAJC in July of 1957. As executive director, Gleazer felt he would be able to provide stronger leadership to both the board and the organization. His title/position was changed again in 1972 to president of the AAJC, a position he held until June 30, 1981. Gleazer had served as president of Graceland College, a private junior college, in Iowa for 11 years before moving to the AAJC. When Gleazer took over in 1957, there were 625 community colleges with a total enrollment of 585,240 students (Vaughan, 1982; Gleazer, Parnell, & Pierce, 2001). Gleazer had the good fortune of leading the organization through the largest time of expansion that community colleges have ever experienced. The 1960s and 1970s were a time of phenomenal growth and expansion for community colleges. According to Whitt et al. (1995), “By the fall of 1970 there were 1,091 junior colleges nationwide, an increase of 413 colleges in 10 years. After accounting for colleges that were dropped, America had built nearly one community or junior college per week for a decade” (p. 185). Gleazer believed in and promoted lifelong learning and community-based education, and was very instrumental in shaping the vision of the community colleges in America. Gleazer served the AAJC as executive officer for 23 years and saw the enrollments of community colleges grow from 585,240 students in 1957 to 4,887,675 students at 1,219 community, junior, and technical colleges in 1981. He resigned from AAJC on June 30, 1981 (Vaughan, 1982; Gleazer, Parnell, & Pierce, 2001). Through the leadership, passion, and vision of these and other men and women, the community college movement has grown, provided opportunity, and formed the first two years of American higher education, which these institutions continue to do today.

During the decades of the 1980s, 1990s, and 2000s, community colleges continued to evolve into institutions that provide highly specialized training and customized training programs, thereby establishing a niche that has made them extremely important to American
higher education as well as the overall U.S. economy. According to the National Student Clearinghouse Research Center (2017), 49% of all bachelor’s degree earners attended a community college at some point in their educational endeavors. Sixty-three percent of these students were enrolled at a community college for three or more semesters (National Student Clearinghouse Research Center, 2017). The community college is truly an American invention and is an extremely complex higher education institution. However, even in today’s modern world, there is no place in the academically elite’s model of higher education to fit the community college. The community college has historically and continues to provide access to higher education for those who otherwise would not have the funds for educational opportunities. The upward mobility that community colleges offer first generation college students, minorities, and economically challenged individuals has proven to be significant to those individuals and their families (Ratcliff, 1994). Cohen, Brawer, and Kisker (2014) found that community colleges reflect the needs, interest, and desires of the community in which they are located, and that most of them create and or modify curricula as the community’s needs change. Community colleges offer their students the opportunity to better themselves and to rise to their greatest potential, just as the United States of America has long been referred to as the “land of opportunity” where individuals can succeed through hard work and determination (Cohen, Brawer, & Kisker, 2014). The Carnegie Commission on Higher Education (1970) acknowledges that, “The community college has proved its great worth to American society. Community colleges should be available, within commuting distance, to all persons throughout their lives” (Carnegie Commission on Higher Education, 1970).
Alabama Community Colleges

The state of Alabama was not much different from the rest of the United States in the first half of the twentieth century regarding the establishment of junior/technical colleges. As noted in Table 1, there were only nine junior/technical colleges across the state before 1960.

Table 1: Junior/Technical Colleges in Alabama before 1960

<table>
<thead>
<tr>
<th>Original Name</th>
<th>Current Name</th>
<th>Year</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bethlehem College</td>
<td>Southern Union</td>
<td>1922</td>
<td>Wadley</td>
</tr>
<tr>
<td>Alabama Technical College</td>
<td>Gadsden State</td>
<td>1925</td>
<td>Gadsden</td>
</tr>
<tr>
<td>Snead Junior College</td>
<td>Snead State</td>
<td>1935</td>
<td>Boaz</td>
</tr>
<tr>
<td>Walker College</td>
<td>Bevill State</td>
<td>1938</td>
<td>Jasper</td>
</tr>
<tr>
<td>Tennessee Valley State Technical School</td>
<td>Calhoun</td>
<td>1941</td>
<td>Decatur</td>
</tr>
<tr>
<td>George C. Wallace State Technical Trade School</td>
<td>Wallace Dothan</td>
<td>1947</td>
<td>Dothan</td>
</tr>
<tr>
<td>Wenonah Vocational and Trade School</td>
<td>Lawson State</td>
<td>1949</td>
<td>Birmingham</td>
</tr>
<tr>
<td>Tuscaloosa Trade School</td>
<td>Shelton State</td>
<td>1952</td>
<td>Tuscaloosa</td>
</tr>
<tr>
<td>Southwest State Technical College</td>
<td>Bishop State</td>
<td>1955</td>
<td>Mobile</td>
</tr>
</tbody>
</table>

(Smith, 2012, p. 6)

Eells noted in his book, *The Junior College*, a committee from the Alabama State Education Association recommended against the establishment of junior colleges in Alabama until the state legislature could properly fund the K12 system (Eells, 1931). Many times, the most powerful opposition to the establishment of junior/community colleges came from state governments, other educational institutions, and even some powerful local citizens. The opposition was usually for selfish financial reasons (Tollefson, 1994). However, that was all about to change in 1963, when George Corley Wallace, Jr., was elected governor of the state of Alabama (Katsinas, 1994; Smith, 2012). George Wallace is generally recognized as the “father” of the Alabama community colleges. However, it also should be noted that Speaker Pro-Tem Rankin Fite and Speaker of the House Albert P. Brewer proposed the Alabama junior and trade school college program to Governor Wallace as a way to make Wallace famous and to promote higher education in their home communities.
The Alabama community college program was initially funded with a two cent beer tax that was passed in April of 1963 (Katsinas, 1994). Wallace's powerful administration was successful at getting legislation passed through negotiations and perseverance. The Wallace administration broke the second longest filibuster in state history, 107 hours, to pass the junior college bill in 1963 (Katsinas, 1994). The original proposal contained only five junior colleges and five trade schools. However, there were many more communities that applied for one of the new two-year institutions, and it seemed that every community that desired one got one (Randall, 2001). The junior college and trade school program had grown to 11 junior colleges and 24 trade schools by the end of 1964. Governor Wallace wanted a junior college or trade school within driving distance for every rural community in Alabama, which was exactly what the 1947 Truman Commission Report had suggested. All of the trade schools were elevated to technical colleges during the 1980s, and in 1987 there were 41 two year colleges under the authority of the Alabama State Board of Education (Katsinas, 1994). The Alabama Community College System (ACCS) had grown so fast during the 1970s, 1980s and 1990s that there had been many campuses merged with other campuses. As noted in Table 2, by 2018, the Alabama Community College System (ACCS) is comprised of 21 community colleges, two technical colleges and one military institute for a total of 24 institutions.

<table>
<thead>
<tr>
<th>Name</th>
<th>Established</th>
<th>Merged</th>
<th>Location</th>
</tr>
</thead>
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<tr>
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<td>1992</td>
<td>1992</td>
<td>Sumiton</td>
</tr>
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<td>Carver State Technical Institute</td>
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</tr>
<tr>
<td>College Name</td>
<td>Year</td>
<td>Year</td>
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<td>--------------------------------------------------------</td>
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<td></td>
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<td>1989</td>
<td>Alexander City</td>
</tr>
<tr>
<td>Alexander City State Junior College</td>
<td>1963</td>
<td></td>
<td>Alexander City</td>
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<tr>
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<td>1963</td>
<td></td>
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<td>1971</td>
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<td>2016</td>
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<td>1991</td>
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<tr>
<td>Reid State Technical College</td>
<td>1963</td>
<td></td>
<td>Evergreen</td>
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<td>Shelton State Community College</td>
<td>1979</td>
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<td>Tuscaloosa</td>
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<td>1952</td>
<td>1979</td>
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<td>1963</td>
<td>1994</td>
<td>Tuscaloosa</td>
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<td>Wadley</td>
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<td>2000</td>
<td>Montgomery</td>
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<td>Dothan</td>
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<td>Sparks State Technical College</td>
<td>1966</td>
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<td>Eufaula</td>
</tr>
<tr>
<td>Dothan Trade School</td>
<td>1947</td>
<td></td>
<td>Dothan</td>
</tr>
</tbody>
</table>
As previously mentioned, in 2015 the Alabama Legislature established a separate Board of Trustees to govern the Alabama Community College System (ACCS). This action was in response to the recommendations from the Alabama Workforce Council to the Governor. The new Board is very active in aligning the colleges so they can quickly respond to local business and industry training needs (Thompson, 2016). In addition to the 24 institutions of higher education, the Alabama Community College System is home to the Alabama Technology Network (ATN). ATN is a provider of workforce assessments and non-credit training initiatives for existing Alabama business and industry.

The Board of Trustees appointed Jimmy Baker as Chancellor of the Alabama Community College System in March of 2017. Columnist Steve Flowers put it this way, “Sit down with Chancellor Baker, and you will leave convinced that Alabama’s community colleges can do more to move the state forward than any other entity in the state” (2017, p. 1). Partnerships are being strengthened between community colleges and regional as well as state workforce councils to ensure that the needs of business and industry are being met. As business and industry leaders become more involved in training program design, the training being offered at community colleges will better prepare students for high wage high demand careers. These strategic decisions are helping to align the system as a whole in a much better position to meet the growing need for a skilled workforce (Thompson, 2016).

<table>
<thead>
<tr>
<th>Wallace State Community College-Hanceville</th>
<th>1966</th>
<th>Hanceville</th>
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<tbody>
<tr>
<td>Wallace Community College-Selma</td>
<td>1963</td>
<td>Selma</td>
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Note: Institutions in bold are still in operation today. Institutions in regular font were merged with the bolded institutions.

(Smith, 2012, p. 4)
Governmental Influence on Higher Education

The influence on higher education in America by the various laws and policies that have been written and enacted over the years has created a higher education system unlike any other in the world. Christopher Loss, in his book *Between Citizens and the State: The Politics of American Higher Education in the 20th Century* (2012), chose to “examine the big three federal higher education policies of the past century: the 1944 G.I. Bill, the 1958 National Defense Education Act, and the 1965 Higher Education Act.” (Loss, 2012, p. 4-5). This review will embrace the “big three” but will also include brief remarks on the Morrill Land-Grant Acts of 1862 and 1890, the Smith-Hughes Act of 1917, the 1947 Truman Commission on Higher Education, and the Vocational Education Act of 1963 and, finally, the 1984 Carl D. Perkins Vocational Education Act along with its most recent amendments.

Morrill Land-Grant Acts of 1862 and 1890

The Morrill Land-Grant Acts of 1862 and 1890 were authored by Justin S. Morrill, a long serving representative from Vermont. Morrill’s intention was to provide farmers’ sons, and others who could not afford to attend the existing colleges, access to higher education (Duemer, 2007). The 1862 legislation granted a piece of land to union states that could then be sold, and allowed the states to use the proceeds of the sale to build a college. The land-grant and state colleges that would be established would then be expected to research and teach in the applied sciences, agriculture, and engineering fields. These institutions discovered new and innovative ways of growing and building things, and increased access to affordable, practical higher education for the American public (Thelin, 2011). However, in the South, blacks were still not allowed to enroll in college, even though slavery was abolished in 1865. Brooks and Marcus (2015) noted that, “the second Morrill Act of 1890, which included the stipulation that African
Americans were to be included in United States higher education system without discrimination. Many states had at least two land-grant universities, one for whites and one for blacks” (p. 252). A major goal of the Morrill Act of 1890 was to ensure that the same benefits were extended to the states which were previously a part of the confederacy as the union states had enjoyed from the 1862 legislation. The land-grant universities “are still dedicated to being a ladder, not a filter, to opportunity and higher education” (Brooks & Marcus, 2015, p. 256). According to Loss (2012), “the legislation secured the government’s role as a key supporter of public higher education” (Loss, 2012, p. 3).

Smith-Hughes Act of 1917

The Smith-Hughes Act of 1917 is the result of a bill that was sponsored by Senator Hoke Smith and Representative Dudley Hughes of Georgia and was signed into law by President Woodrow Wilson in February of 1917 (Gordon, 2014). Friedel (2011) noted that while the Smith-Hughes Act provided funding for vocational education, it also required states to match those funds and to establish separate boards of education for vocational programs. The $7 million provided annually was earmarked for vocational programs such as agriculture, home economics, as well as trade and industry training. Smith-Hughes was the first legislation to segregate funds between academic and vocational education, and even specified that 50% of the instruction should be practical hands-on shop work (Hayward & Benson, 1993). The states had to submit plans to the federal board for approval. The plans had to demonstrate compliance regarding “the kinds of programs to be supported with federal funds; the kinds of schools; equipment; courses of study; methods of instruction; qualifications of teachers; and their plans for vocational teacher training” (Friedel, 2011, p. 39). According to Moore (2017), “The Smith-Hughes Act built a firm foundation for what we now know as career and technical education.
(CTE). In 1963, Smith-Hughes was replaced by the Vocational Education Act of 1963” (Moore, 2017, p. 21).

Servicemen’s Readjustment Act of 1944 (G.I. Bill)

As World War II was coming to an end in 1944, the thought of what to do with all of the returning veterans who did not have jobs was troubling for leaders and politicians in the United States. The U.S. economy had revolved around supplying war time goods during the war, and it would take some time to retool industry for consumer products since the war was ending. So, the Servicemen’s Readjustment Act of 1944, often referred to as the G.I. Bill was created. The G.I. Bill was designed to provide the returning World War II veterans with some form of income, funding to go to college, low interest loans, and basically to say “thank you for your service” (Thelin, 2011). Olson (1973) found that, among its originators, virtually no one expected that so many of the returning veterans would take advantage of the educational benefits of the G.I. Bill. The legislation was designed as an anti-depression measure, and was criticized by some college presidents because they feared large numbers of unprepared students would lower their academic standards (Olson, 1973). Frank T. Hines (1945), a Veterans Administration representative at the time, estimated that perhaps only 700,000 veterans would ever enroll in college, fewer than 10% of the returning veterans (Hines, 1945). However, Olson (1975) discovered that well over 2.2 million veterans utilized their educational benefits and, in the record year of 1947-48, over one million veterans packed onto college campuses. Batten (2011) noted that, during this peak enrollment, veterans made up 49% of total student enrollment at colleges and universities. “Many have even credited the G.I. Bill with democratizing American higher education and creating the American middle class” (Batten, 2011, p. 14).
The G.I. Bill did have major influences on higher education. The masses of students flocking to the college campuses changed the face of the average college student from the fresh out of high school 17-21 year old to, as Thelin (2011) remarked, “students who were married and had children, and students who were disabled veterans” (Thelin, 2011, p. 266). Serow (2004) noted, that the G.I. Bill afforded veterans the opportunity for an education at colleges and universities that, under normal circumstances, they would not be allowed to attend or could not have afforded to attend (Serow, 2004). Loss (2012) commented, “Traditional undergraduates complained about the seriousness with which veterans approached their educations” (p. 115). Loss concluded that while the younger students were frustrated with the veterans’ commitment to their studies, the college administrators welcomed it (Loss, 2012). Olson (1975) mentioned, three noteworthy impacts. First, the veterans brought to campus a mature attitude and aspirations that positively influenced the younger students. Additionally, married veteran students were accepted when, prior that time, marriage was frowned upon among students. Finally, the masses of veterans brought unheard of growth to the college campuses (Olson, 1975). In addition to the on-campus changes, Batten stated that the G.I. Bill “Title II benefits set a precedent for federal funding of higher education initiatives and transformed a system of merit-based aid into one that focused more on need-based assistance – a system that ultimately became a precursor to today’s federal Pell grants and other initiatives” (2011, p. 27-28).

The 1947 Truman Commission on Higher Education

Harry S. Truman, President of the United States from 1945 to 1953, appointed a commission of 28 educators to evaluate and make recommendations regarding the improvement of higher education. The commission was led by George Zook, the president of the American Council on Education (ACE). The 1947 report consisted of six volumes in which were described
an aggressive educational plan and recommendations for extensive changes in American higher
education. Gilbert and Heller (2013) clustered “the Commission’s policy recommendations in
two key areas: 1) improving college access and equity, and 2) expanding the role of community
colleges” (p. 418). The report’s authors note that all barriers should be removed that prevent any
able and qualified young person from receiving the opportunity to pursue higher education. The
report called for the growth and proliferation of junior/community colleges, even to the point of
establishing state-wide community college systems as a part of each state’s higher education
system, and recommending that there should be a community college within commuting distance
for the majority of the state’s population (Witt, Wattenbarger, Gollattscheck, & Suppiger, 1995).
The report encouraged the use of the term “community college” over “junior college” in an effort
to further clarify the more comprehensive mission of the community college. Community
colleges were directed to conduct frequent surveys to ensure that program offerings reflect
current community needs and interest. Community colleges were to offer and to be the center of
comprehensive adult education programs. The report suggested that federal financial aid should
be dispersed in a way that poorer states could improve their educational systems to a more
equitable level. Community colleges were encouraged to hold events that promote cultural
diversity and enrich the whole community (Gleazer, 1994). According to Gilbert and Heller
(2013), the commission also wanted the community colleges to stress the importance of
technical/terminal education programs and to offer alternative scheduling for weekend and
evening classes (Gilbert & Heller, 2013). Then, as now, workforce training offered at
community colleges prepared graduates to work in specialized occupations. These were and are
usually well paying jobs that promoted social mobility. However, for the less fortunate youth
who could not afford attending a community college and learning the technical skills that are
required for the well-paying jobs, the race and class distinctions would grow even deeper.

Therefore, the Truman Commission’s report suggested that the two years of community college should be at no cost to the student (Mettler, 2014).

National Defense Education Act (NDEA) of 1958

The Soviet Union successfully launched the first orbiting artificial satellite, Sputnik 1, in October of 1957. There was much fear that spread across United States that the Russians had achieved much superior technology and were far more advanced in science and engineering than the United States. Senator Lister Hill and Representative Carl Elliott of Alabama consistently had advocated for federal financial aid for students, especially vocational students. However, they had experienced little success in Congress with their proposals until right after the launch of Sputnik. They decided to change the title of a proposal that they had been working on to include the word “defense.” The new title suggested that an educated public would make for a stronger national defense. This legislation was the first of its kind to promote secondary and postsecondary education in science, math, foreign languages, and technical skills (Urban, 2010; Gordon, 2014). The NDEA of 1958 would probably not have become law had it not been for the support of Elliot Richardson, a Massachusetts Republican. While it still met some resistance, President Dwight D. Eisenhower signed the Hill/Elliott bill into law in September 1958 (Urban, 2010).

The National Defense Education Act of 1958 contained ten titles. Title I introduced the Act and ensured that, despite the federal government’s involvement in education, all decisions and authority would remained at the state and local level (Loss, 2012). Title II provided funds for federal government guaranteed student loans and grants. Title III provided funds to improve secondary school curricula in science, mathematics, and foreign languages. Title IV provided
funds to establish and grow graduate fellowship programs. Title V provided funds for testing, guidance, and counseling to identify and encourage gifted secondary students. Title VI provided funds to support language development centers and promote African American and Latin American studies. Title VII provided funds to support and expand technology use in the classroom. Title VIII provided funds for enhancing and expanding vocational education and workforce training. Title IX established the Science Information Service to promote science in education. Title X provided the legal details as well as miscellaneous small grant procedures (Urban, 2010; Gordon, 2014).

**Vocational Education Act of 1963**

The Vocational Education Act of 1963 expanded the funding for vocational programs and for participants who were economically and physically disadvantaged (Imperatore & Hyslop, 2017). This legislation was part of President Lyndon B. Johnson’s “War on Poverty” which intended to increase the federal government’s influence over state programs. The Act also provided funds for the construction of area vocational schools (Hayward & Benson, 1993). Programs funded by this legislation had to be based on local industry need (McCage, 2017). The Vocational Education Act of 1963 also provided funds to establish work-study programs and federal grants to help states to develop new vocational education programs. A portion of the funds were dedicated to offering pilot programs, to do research and development, to improve teacher training, and to perform program evaluations and improvements (Lafollette, 2011).

**Higher Education Act (HEA) of 1965**

The Higher Education Act of 1965 (HEA) was sponsored by Representative Edith Green and Senator Wayne Morse, both from Oregon. President Johnson signed the legislation into law in November of 1965. The HEA was one of the most important pieces of President Johnson’s
domestic agenda, commonly known as “The Great Society” (Cervantes et al., 2005). Johnson referenced “The Great Society” and his “War on Poverty” often in his speeches. President Johnson wanted to help create an environment in which a college education was available to everyone, jobs were plentiful for all who wanted to work, and citizens were not discriminated against because of their skin color (Hackett, 2016). President Johnson paid for his own college education by working as the secretary to the president at Southwest Texas State College; therefore, the HEA was personal for him. He wanted to remove any financial barriers that would prevent a student from pursuing a college education (Cervantes et al., 2005).

The Higher Education Act of 1965 is divided into seven main sections referred to as titles. Title I provided funding to strengthen community service programs at colleges and universities. Title II authorized funding for grants for college library books and supplies as well as training for librarians. Title III provided aid to developing institutions, primarily African American institutions. Aid was also available in this title to community and technical colleges to construct facilities. Title IV was the most controversial and influential piece of the Act and was divided into four parts. Part A established federal Educational Opportunity Grants (EOG) which included the “TRIO” programs. The three original programs of the HEA TRIO were Upward Bound, Talent Search, and Student Support Services, all of which targeted low-income, disadvantaged youth whose parents did not go to college. The name TRIO is reflective of those three original programs, but other programs have been added since, and eight different programs are currently funded thru this part of the Act (Cervantes et al., 2005). All of these programs still focus on low-income, disadvantaged youth in need of a college education (Balz & Esten, 1998). Part B of Title IV of the Act was the guaranteed student loan program that provided scholarships or grants and federally insured student loans to low and middle income students to help pay for
their education (Mettler, 2014). Part C supported the federal work-study program, which provided jobs to those young people who were seeking an education and needed additional income. The work-study program was strongly supported by President Johnson and is still being used today (Cervantes et al., 2005). Part D of the HEA replaced the National Defense Student Loan (NDSL) program from the National Defense Education Act of 1958, and later became part of the Carl D. Perkins Act of 1984. Title V provided funds to establish teacher corps to improve teacher education through fellowships for graduate students. Title VI provided funds to improve undergraduate instruction by way of institutional grants for technology upgrades for instructional purposes and professional development to learn how to effectively incorporate new educational media. Title VII established grant opportunities to help fund the construction of higher education facilities (Cervantes et al., 2005).

President Johnson’s desire was to “provide and permit and assist every child in these borders to receive all the education that he can take” (Mettler, 2014, p.84). President Johnson signed 60 major pieces of legislation during his administration that significantly expanded the federal government’s involvement and commitment to education. The Higher Education Act of 1965 “doubled the federal government’s annual higher education budget, while the triumvirate of opportunity enhancing student aid tools included in it – work-study, direct and guaranteed loans, and need-based grants – changed the way college administrators crafted student bodies and how all students financed their educations” (Loss, 2012, p.178). It should be noted that the 1972 reauthorization of the HEA replaced the Educational Opportunity Grants (EOG), which were given to the institutions, with Basic Educational Opportunity Grants (BEOG), which were given directly to the students. The grants are better known as Pell grants, named after Rhode Island
Democratic Senator Claiborne Pell, who successfully promoted the grant legislation that would benefit low income students (Mettler, 2014).

Kagan (2017) had this to say about the Higher Education Act of 1965 (HEA): “The Higher Education Act of 1965 is a law designed to strengthen the educational resources of the colleges and universities of the United States and to provide financial assistance to postsecondary students. The HEA, as it is known, increased federal money given to postsecondary institutions, developed scholarship programs, provided low-interest loans to students, and founded a National Teachers Corps” (p. 1). As previously stated, Pell Grants, student loans (both subsidized and unsubsidized), and a number of other financial aid options for students have been created as a direct result of the Higher Education Act of 1965 (Kagan, 2017).

Five Major Federal Employment and Training Acts

The five major federal employment and training acts that will be discussed in this section are; 1) the Manpower Development and Training Act of 1962 (MDTA), 2) the Comprehensive Employment and Training Act of 1973 (CETA), 3) the Job Training Partnership Act of 1982 (JTPA), 4) the Workforce Investment Act of 1998 (WIA), and finally 5) the Workforce Innovation and Opportunity Act of 2014 (WIOA).

The Manpower Development and Training Act of 1962 (MDTA)

The Manpower Development and Training Act of 1962 (MDTA) was signed into law March 15, 1962, by President John F. Kennedy. The MDTA was enacted in an effort to address high unemployment. According to Bachmura (1963), “Basically, the act authorized an adult education program for two classes of people: (1) those whose skills have been rendered obsolete by the advance of technology and by dislocations in the economy, and (2) those new entrants to the labor force who with further education will be able to meet shifting employment needs” (p.
61). MDTA provided funding for three areas: 1) the cost of the education and training, 2) transportation and subsistence expenses if the place of training was beyond reasonable commuting distance, and 3) unemployment compensation for the duration of the training. Approximately 1.9 million participants were served under the MDTA which was active from 1963 to 1972. The majority of the participants were enrolled in community college workforce training programs and about one-third received on-the-job training (OJT). The employers who provided the OJT opportunities usually received half of wages for up to six months as a subsidy. The classroom training provided under the MDTA was managed by the Department of Labor’s national and regional offices. The federal government was deeply involved in negotiating and managing the service provider contracts as well as funding procedures which created quite a convoluted process. State and local governments under the MDTA played a very small role (Barnow, 1993).

The Comprehensive Employment and Training Act of 1973 (CETA)

The Comprehensive Employment and Training Act of 1973 (CETA) was signed into law December 28, 1973, by President Richard Nixon. CETA, much like the MDTA, targeted individuals whose skills were out-of-date and economically disadvantaged. CETA funding provided employment training programs to individuals and utilized local businesses as advisors for the programs. CETA funding could also be used for public service employment. Unlike MDTA programs, which were managed by the federal government, CETA programs were administered by local governments (Nuckols, 1990).

The Job Training Partnership Act of 1982 (JTPA)

The Job Training Partnership Act of 1982 (JTPA) was signed into law October 13, 1982, by President Ronald Reagan. JTPA brought many changes to federal employment training
programs such as the required creation of Private Industry Councils (PICs). A majority of the PIC’s membership were required to be from the private business sector. The PICs determined the overall job training strategy, who would provide various training programs, and budget allocations. State governments were given increased authority and management responsibilities for JTPA programs. States were also required to create a State Job Training Coordinating Council (SJTCC) and develop Service Delivery Areas (SDAs). Public service employment was not allowable under the JTPA (Svorny, 1996).

The Workforce Investment Act of 1998 (WIA)

The Workforce Investment Act of 1998 (WIA) was signed into law August 7, 1998, by President Bill Clinton. WIA replaced JTPA and, as with most new legislation, brought many changes to federal employment training programs. The intent of the law was to streamline service delivery, provide universal access to services, and better engage businesses. The WIA provided increased local flexibility in an effort to better serve local business employment needs. The WIA required the creation of a “One-Stop Career Center” (One-Stop) where individuals could access a variety of services. Four of the major programs available at the One-Stop were; Employment Services, Vocational Rehabilitation, Temporary Assistance to Needy Families (TANF) (welfare), and Supplemental Nutrition Assistance Program (SNAP) (food stamps). Customers approved for WIA services were awarded an Individualized Training Account (ITA). The clients could then choose a training program from the state’s eligible training provider (ETP) list. Programs on the ETP list were required to be certified by the state and meet certain levels of performance outcomes, completion rates, and job placement rates (Decker & Berk, 2011). The WIA is known as market and consumer driven education reform and has a “work first” focus when it comes to matching clients to training programs. Depending on the management at the
One-Stop, the “work first” focus most often did not include the client earning a two-year associate degree. The very short term training options that put the client back to work the shortest amount of time most often did not satisfy the long term employment issue (Shaw & Rab, 2003).

The Workforce Innovation and Opportunity Act of 2014 (WIOA)

The Workforce Innovation and Opportunity Act of 2014 (WIOA) was signed into law July 22, 2014 by President Barack Obama. While the WIA emphasized adults obtaining employment with minimal training, the WIOA requires states to develop “career pathways.” “Career pathways” serve as on-ramps for individuals to participate in a training program while simultaneously attending adult education classes to develop their deficiencies in basic skills and eventually obtaining a postsecondary credential. The intent of the WIOA is to develop closer relationships between business leaders, state and local workforce leaders, non-profit organizations, and community colleges to deliver a job-driven approach to workforce training and basic skills development. A goal of WIOA is to offer contextualized academics in a training program so that students can move faster and farther than if they were enrolled in traditional educational programs (Jacobson, 2017).

Carl D. Perkins Vocational Education Act of 1984 (Including Amendments and Reauthorizations)

The Carl D. Perkins Vocational Educational Act of 1984 (Perkins I) was named for the Kentucky Congressman who sponsored it and strongly supported technical education. The 1984 Perkins Act amended the Vocational Education Act of 1963 and replaced its 1968 and 1976 amendments (Gordon, 2014). Perkins I had two main objectives. The first was to develop and improve vocational training programs to better prepare graduates for the workforce. The second
was to increase access to vocational training programs for individuals with special needs (Hayward & Benson, 1993).

In September of 1990, the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (Perkins II) was signed into law. The new name signified a change in governmental emphasis on applied academics in vocational and technology programs (Gordon, 2014). The main topics of Perkins II revolved around improving workforce preparation. Topics addressed in the law included incorporating academics in vocational education, public private partnerships to provide structured work-based learning, and articulation agreements between secondary and postsecondary institutions. Perkins II was a positive shift in legislation for career technical education and the beginning of a change in attitudes regarding workforce education. Perkins II also marked the beginning of student outcome-based accountability measures (Hayward & Benson, 1993).

The Carl D. Perkins Vocational and Technical Education Act of 1998 (Perkins III) was, again, a major shift away from vocational training for individuals with special needs to more career and technical training with learning outcomes and employment accountability measures in place to ensure workforce training needs were being met (Treeton, 2007). Wonacott (2003) states that, Perkins III established “four core indicators of performance: (1) attainment of academic and vocational/technical proficiencies; (2) attainment of a secondary degree of General Educational Development certificate, proficiency credential in conjunction with a secondary diploma, and a postsecondary degree or credential; (3) placement in, retention in, and completion of postsecondary education or advanced training, placement in military service, or placement or retention in employment; and (4) participation in and completion of programs that lead to nontraditional training and employment” (p. 13-14). Perkins III replaced Perkins II, but
continued the emphasis on curriculum reform, program improvement, alignment of programs from secondary to postsecondary and, finally, meeting local workforce demands (Gordon, 2014).

The Carl D. Perkins Career and Technical Education Improvement Act of 2006 (Perkins IV) reauthorized the Carl D. Perkins Vocational and Technical Education Act of 1998 for an additional six years and brought several changes to the legislation. A significant change that Perkins IV conveyed was the replacement of the words vocational education with Career and Technical Education (CTE). The change in words did not stop with the title, however. Perkins IV was very specific regarding program expectations, overall outcomes, and skill development. The authors expected the curriculum to be organized, rigorous, and relevant. Programs supported with Perkins funds were expected to produce graduates with basic program specific technical knowledge, as well as problem solving skills, and the ability to earn industry recognized credentials (Threeton, 2007). Perkins IV also contained themes of secondary – postsecondary collaborations to establish seamless pathways for students and alignment of curriculum to meet local industry employment needs (Imperatore & Hyslop, 2017). The Perkins IV legislation grouped occupations and industries into sixteen different career clusters. The career clusters share common foundational knowledge and skills. The career clusters are useful for counselors and advisors to use in helping students determine what career pathway best fit their individual interests and skillsets. The sixteen career clusters also provide an educational pathway map to assist students in navigating a seamless transition from secondary to postsecondary education and finally employment (Lafollette, 2011). According to Friedel (2011), career and technical education (CTE) “has evolved from its initial focus on agriculture and trades and industry for boys and homemaking for girls to a broad array of programs of study
linking secondary and postsecondary technical programs with the current and emerging demands of business and industry in high demand, high skill, and high wage occupations” (p. 51).

Perkins IV expired in 2012 but was kept alive by congressional reauthorizations each year until July 31, 2018, when President Donald Trump signed the “Strengthening Career and Technical Education for the 21st Century Act”, otherwise known as Perkins V (Penny, 2018). Perkins V allows funding of middle school career technical education (CTE) programs as well as implementation of innovative programs and strategies. Innovative programs and strategies by definition include dual enrollment, competency-based curricula, pay for success initiatives, and work-based learning opportunities. Perkins V identifies the need to develop employability and career readiness skills through CTE programs and students earning industry recognized certifications. The legislation also encourages aligning the curriculum to high demand career fields, setting performance standards to ensure program success. Perkins V became effective July 1, 2019, and is authorized for the next six years (Smith & Boyd, 2018).

Governmental influence through legislation has played a major role in shaping the look of American higher education. Governmental influence has also very much changed who has access to a college education and, thereby, what the characteristics of the “average” college student are.

Automotive Manufacturing.

The invention of the automobile, the evolution of manufacturing, and the advancement of technology have changed the world in which we live and the automobiles that we drive. Back in 1970s when this author was learning to drive, automobiles were not nearly as advanced as they are today. Cars in the 70s had door windows that had to be manually rolled up and down, manual door locks, seats that had to be adjusted manually, headlight dimmer switches were
mounted on the floorboard near the emergency brake pedal, AM/FM radios with an analog dial, and maybe a cassette tape player. A short 40 years later, most automobiles that roll off the assembly line in 2019 have power windows, power door locks with remote entry, seats with memory for different drivers’ preferences, and pushbutton start that does not require a key. Automobiles manufactured in 2019 will also likely offer driver assistance with parking, stopping, and even driving using sensors, headlights that sense conditions and adjust automatically, audio systems that connect with the owner’s cell phone, built-in navigation systems, and can detect issues with vehicle performance and notify the driver or even emergency responders. This section will explore the history of the automobile, the evolution of automotive manufacturing, the economic impact of automotive manufacturing in the United States, the economic impact of automotive manufacturing in the state of Alabama, and the economic impact of automotive manufacturing in a small rural Alabama community.

The History of the Automobile.

The evolution and history of the automobile is well documented. In the 1800s, attempts to create a self-propelled vehicle that could transport people from one destination to another were too many to count. The early automotive inventions included power sources such as the steam engine and electric motors, but had little success compared to the gasoline internal combustion engine. The first designs were basically horse carriages that were modified to incorporate an engine of sorts. Most literature recognizes Siegfried Marcus, a German engineer and inventor, as having built the first gas-powered vehicle for the open road in 1864 (Ashamalla, Camp, & Abel, 2011). However, it was Carl Benz, a German mechanical engineer, who received a patent for the first gasoline-powered motorwagen in 1886 and began producing them commercially. Benz took things to the next level by designing a vehicle that was solely intended for human transportation
and powered by an internal combustion engine. The three-wheeled automobile included such innovations as a tubular steel frame, electric coil ignition, rack and pinion steering, differential rear-end gears, and a three quarter horsepower engine. The 1886 patent motor car had a top speed of 8 MPH (MacRea, 2012). The shape and design of the early automobiles changed drastically as they gained popularity with the general public. Case (2013) comments on the 1901 Mercedes, “The first Mercedes was a 35 hp racing car and had a low center of gravity, pressed steel frame, high-powered engine, and a honeycomb radiator. With its innovations, it is regarded as the first modern automobile” (p. 152). The 1901 Mercedes was designed by Wilhelm Maybach in partnership with Daimler Motoren Gesellschaft and had a top speed of 53 MPH (Case, 2013).

The Evolution of Automotive Manufacturing.

Early automobile manufacturing was very labor intensive because they were handmade. Therefore, automobiles were very expensive, so much so that only the wealthy could afford them. In Germany, Daimler could only produce around a thousand vehicles per year by 1909 with approximately seventeen hundred employees (Foner & Garraty, 1991). Meanwhile, in the United States, Henry Ford, Ransom Eli Olds, and many others were busy developing the next automobile in hopes that it would be appealing, affordable, and change the way the general public traveled. Many tribute Henry Ford with creating the assembly line, but in reality it was Ransom Eli Olds, founder of Olds Motor Works. The 1900 Curved Dash Oldsmobile became a very popular automobile, and Olds had to develop some way to increase production. According to Vossler (2012), “In 1901, demand for the quality $650 ($17,600 today) Curved Dash auto soared. To keep up with demand, Olds invented a rudimentary assembly line complete with wheeled work stands easily moved from station to station. The company sold 5,000 Curved Dash
autos over the next five years, by far the highest output of any U.S. car company at that time, making the Curved Dash the first mass-produced automobile in American history” (p. 23).

Henry Ford created his first automobile known as the “Quadricycle” in 1896. The Quadricycle was made from four bicycle wheels, a two-cylinder engine, a hand full of other parts, and weighed a total of 500 pounds. The Quadricycle had two forward speeds, no reverse, no brakes, and no steering wheel. However, there was a tiller arm that turned the front wheels when it was pushed from side to side. Henry Ford was born the son of a farmer but did not like working on the farm and was determined to create power equipment that would make life easier for the farmer. The Model T was a huge success in that it was reliable, powerful, and cheap to operate.

The Model T was often referred to as the Tin Lizzie, the colloquial term Lizzie is defined as a “dependable servant” (Banham, 2002, p. 35). The Model T could be easily repaired with a handful of tools, and it could be configured to do a variety of tasks such as haul supplies, move farm animals, or fight fires. Ford was committed to mass production of the Model T, and discovered that if a worker had only one or two tasks to perform, the assembly time was greatly reduced. In 1913, Ford invented the moving assembly line where the automobile would slowly move down the 150-foot line on a conveyor and workers at different stations would attach parts. The first car assembled this way took just under six hours to complete, cutting the assembly from twelve and a half hours (Banham, 2002). The Model T was produced from 1908 to 1927. In 1927, the Model T was taken out of production, but more than 15 million units had been sold and the price had been reduced to $290 (Foner & Garraty, 1991). The automobile and mass production were rapidly becoming an integral part of the American economy.
The Big Three and Foreign Automotive Manufacturers in the United States.

Ford Motor Company, General Motors Corporation, and the Chrysler Corporation have long been referred to as the Big Three. This section will review how each of these automotive giants were established and a few details about the companies and their unique history. Finally, a brief review of foreign automotive manufacturers who have located in the United States and the capital investment that they have made.

Ford Motor Company

The Ford Motor Company was founded in 1903 in Dearborn, Michigan, a suburb of Detroit, by Henry Ford and eleven associates. The Ford mission was to create an automobile from contracted standardized parts quickly and economically so that anyone earning a decent salary could afford one (Banham, 2002). Ford continuously looked for ways to improve both his product and the manufacturing process. He used the alphabet to record the model changes. The Ford Model N (1906-1907) sold for $600 and was the first well-built automobile with plenty of power and available in volume. Ford could produce a hundred Model Ns a day. The Ford Motor Company started selling the Model T in 1908 for $825 and sold a whopping 10,660 units in the first year of production. The Model T was powered by a twenty-horsepower four-cylinder engine and had a two-speed planetary transmission. The Model T changed the automotive world forever and made Henry Ford a very wealthy man (Foner & Garraty, 1991).

General Motors Corporation

The General Motors Corporation (GM) was founded in Detroit, Michigan, in 1908 by William Durant. General Motors grew quickly under the leadership of Durant over the next twelve years by purchasing several smaller companies. By 1920, General Motors owned Buick, Cadillac, Pontiac, Oldsmobile, Chevrolet, Delco Products, and the Fisher Body Company.
However, after so many acquisitions, many leaders in the organization felt the company was unstable and questioned Durant’s direction. The General Motors Board lost confidence in his leadership and ability to manage the company and ousted him in 1920. The board appointed Alfred Sloan as president and chief executive officer of GM in 1923, and he remained there until 1946. He restructured the company into five divisions based on the different automobiles and their price range: Buick, Cadillac, Chevrolet, Oldsmobile, and Pontiac. The Chevrolet brand became a very popular automobile with the average American, and sales soared under Sloan’s leadership (Simmons, 2009). Sloan invented “planned obsolescence,” which means each year, the automobile designers would change something about the vehicle. The changes may be slight or it might be a total redesign. The intent was to make consumers want the newer version and to sell more cars. The strategy worked and by 1930, General Motors became the largest automotive manufacturer in America (Foner & Garraty, 1991). General Motors remains the largest American based automotive manufacturer in the world (Fortune 500, 2018).

Chrysler Corporation

The Chrysler Corporation was founded by Walter P. Chrysler in 1925 in Detroit, Michigan. Chrysler started his career working for the railroad, but eventually became the president of the Buick division of General Motors in 1916. Chrysler had a talent for managing a business and making it productive. Under Chrysler’s leadership, Buick’s production went from 40 cars a day to 550 a day, making it the most profitable division of General Motors. However, Chrysler did not agree with William Durant’s leadership and decide to retire and start his own company (Edsall, 2008). Chrysler grew his automobile platform by purchasing the Maxwell Motor Company, Dodge Brothers, and finally introducing the Plymouth in 1928 (Iacocca, 2014). The Chrysler Corporation became a major presence in the automotive industry and by 1936 had
earned the number two spot just above Ford with 25% of the total car sales (Foner & Garraty, 1991).

Foreign Automotive Manufacturers

Foreign automotive manufacturers started locating assembly plants in the United States as early as 1982, when Honda built a plant in Marysville, Ohio. Currently, there are thirteen states that are now home to major foreign-owned automotive assembly plants: Alabama, California, Georgia, Indiana, Kentucky, Mississippi, Missouri, Ohio, South Carolina, Tennessee, Texas, Virginia, and West Virginia. Each of these states has at least one OEM manufacturing plant that continues to grow, expand, and enlarge their facilities (Underwood, 2012). There are eleven foreign automotive original equipment manufacturers (OEM) that have made significant investments in the United States. BMW, Honda, Hyundai, Kia, Mazda, Mercedes-Benz, Nissan, Subaru, Toyota, Volkswagen, and Volvo all have established assembly plants in the United States and have changed the automotive industry with America-labor. “International automotive manufacturers have invested $82 billion into U.S. operations” (Global Automakers, 2017, p. 4).

In 2017, 47% of all vehicles manufactured in the United States were by international name plates. In 2017, foreign automakers employed 133,000 workers directly and 2.47 million indirectly. The 2017 direct employee payroll totaled $11.7 billion with total employee compensation coming in at $157 billion (Global Automakers, 2017, p. 5).

The Economic Impact of Foreign Automotive Manufacturing in the United States and Alabama.

According to Underwood (2012), “Also known as foreign direct investment, or FDI, insourcing is defined as direct investment into the United States by foreign headquartered multinational firms” (p. 463). Hill, Menk, Cregger, and Schultz (2015) found that, “The automotive industry continues to be one of the most important industries in the U.S. economy, supporting more than seven million private sector jobs and $500 billion in compensation, along
with attracting foreign direct investment (FDI) currently valued at $82 billion—approximately 3 percent of all FDI in the United States. Additionally, the industry has collectively invested almost $46 billion expanding and retooling U.S.-based facilities since 2010” (p. 1).

Honda was the first Japanese automotive manufacturing company to make the decision to establish a presence in 1982 in Marysville, Ohio. By 1990, Honda was producing more than 363,000 automobiles at the Marysville plant, which was more than any other single automotive plant in the United States at that time. When the Honda plant opened, there were mixed emotions regarding working for the Japanese in an industry that was historically thought to be strictly American. However, Honda started sharing skills and ideas with their American workforce on the assembly as well as the design office and began relying on their input. Attitudes began to change, and the difference between foreign and American automotive manufacturing started to become blurred (Levin, 1990).

Alabama has experienced a tremendous amount of automotive manufacturing growth since the early 90s. The state was desperate for high-paying jobs and it pulled out all the stops to attract Mercedes-Benz. The $253 million incentive package, in exchange for a plant that would employ about 1,500 people, received much criticism from economic developers in nearby states. When the plant opened in 1993 in the town of Vance, halfway between Tuscaloosa and Birmingham, 70,000 applications were filed for the 1,500 jobs. Alabama, in reality, was paying $169,000 per job to attract Mercedes-Benz and lots of people thought that they were crazy to do so (Gross, 2008). Dethrage (2017) comments, “The opening of the Mercedes-Benz U.S. International plant in Vance in 1997 has led to plenty of quantifiable impacts, including the direct and indirect creation of more than 20,000 jobs and an annual economic impact estimated at over $1.5 billion in 2017, according to the company’s website. It also had a more intangible
effect, signaling to other manufacturers worldwide that Alabama was an attractive place to do business” (p.1). According to the “Made in Alabama” website (2019) “The output of Alabama’s auto industry is a powerful driver of economic growth for the state. Vehicles have become Alabama’s No. 1 export, with shipments to more than 85 nations around the world every year. In 2017, exports of Alabama-made vehicles and parts topped $9.5 billion, led by shipments to China, Germany, and Canada.” Alabama has forever changed and so have the jobs for which Alabama is known.

When an automotive manufacturer moves into town, everything changes. According to Stone (2008), “It's hard to overstate the economic impact that a new plant can have. Before Nissan arrived in Smyrna in 1983, it was a sleepy town of about 6,000. Today, many of Smyrna's 40,000 residents are engaged in the production of the Nissan Altima, Xterra, and Pathfinder” (p. 28).

Honda’s Lincoln, Alabama, plant is located 13 miles north of Talladega and 45 miles east of Birmingham just off Interstate 20. Honda began production in 2001 and directly employs more than 4,000 people. Hyundai’s factory was incorporated in Montgomery in 2002 and boasts more than 3,000 employees. Toyota’s engine factory near Huntsville was completed in 2003, and 1,100 people worked there in 2015. Alabama’s overall ranking in the Area Development survey improved three spots from 2017 and 2016. The state has placed in the Top 10 of the publication’s annual ranking of state business friendliness for nearly a decade, consistently joining its Southern neighbors at the top of the pack. Alabama now ranks in the top five among states in the production of cars and light trucks, and for two years in a row has made more than one million vehicles. Of the 40,000 jobs in the state’s automotive sector, about 27,000 are in the supplier network, which now totals more than 160 companies. Growth in the automotive
workforce is also projected to increase in the state by 13 percent by 2019, compared with 2014 figures (Dethrage, 2017).

Alabama has experienced tremendous automotive manufacturing growth Table 3 below shares some on the facts and figures regarding the four OEMs.

<table>
<thead>
<tr>
<th>Original Equipment Manufacturer (OEM)</th>
<th>Location</th>
<th>Year Announced</th>
<th>Number of Associates</th>
<th>Number of Vehicles/Engines Built Per Year</th>
<th>Tier I Suppliers in Alabama</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honda</td>
<td>Lincoln</td>
<td>1999</td>
<td>4,500</td>
<td>340,000 vehicles</td>
<td>45+</td>
</tr>
<tr>
<td>Hyundai</td>
<td>Montgomery</td>
<td>2002</td>
<td>3,600</td>
<td>390,000 vehicles 720,000 engines</td>
<td>60+</td>
</tr>
<tr>
<td>Mazda-Toyota</td>
<td>Huntsville</td>
<td>2018</td>
<td>4,000</td>
<td>300,000 vehicles</td>
<td></td>
</tr>
<tr>
<td>Mercedes-Benz</td>
<td>Tuscaloosa</td>
<td>1993</td>
<td>3,800</td>
<td>300,000 vehicles</td>
<td>45+</td>
</tr>
<tr>
<td>Toyota</td>
<td>Huntsville</td>
<td>2001</td>
<td>1,400</td>
<td>710,000 engines</td>
<td>35+</td>
</tr>
</tbody>
</table>


Conclusion of the Literature Review

The literature studied in this chapter has revealed that American higher education was once reserved for the wealthy. The general public did not consider a four-year college degree an option for themselves. In fact, in most cases, no one else in their families had attended college. However, as the population of the United States increased and the economy continued to grow, so did the desire and need for higher education. Community colleges were created to serve the massive general public. During the 1960s and 1970s when manufacturing jobs started requiring more than just a high school diploma, community colleges experienced tremendous growth across the United States. As stated earlier, Governor Wallace wanted a junior college or trade school within driving distance for every rural community in Alabama, which was exactly what the 1947 Truman Commission Report had suggested. The literature also revealed that Federal legislation has contributed to the growth of higher education across this nation and greatly
influenced who has access to and funding for a college education. The American higher education system is unlike any other in the world. (Gilbert & Heller. 2013). The literature has further revealed that the automotive manufacturing industry has a major impact on the economy of the United States, the state of Alabama, and the communities in which manufacturing plants are located. Economic development and community colleges are natural and powerful partners. When a community is recruiting new businesses, if they have a community college in their area, the whole game changes. Community colleges have gained the reputation for being workforce training machines (Nocera, 2018).

In summary, community colleges are a major asset to the areas in which they are located and serve. Community colleges provide academic transfer courses, enrichment and community education courses, and most importantly for this research high demand workforce training courses. The more automotive manufacturing grows in Alabama the more important it becomes for community colleges to be training and graduating highly skilled advanced manufacturing technicians (AMT). Advanced manufacturing technicians are highly skilled individuals who keep the assembly lines going and ensure that the manufacturing plants are operating efficiently and to capacity. Therefore, this research is necessary to determine from an industry leader’s perspective what Alabama community colleges are doing right, what needs to be improved, and what needs to be changed altogether with regards to advanced manufacturing maintenance training.
CHAPTER III
METHODOLOGY

Introduction

This research project employed a qualitative methodology and approach, and endeavored to present an in-depth understanding of how the workforce training of advanced manufacturing technicians provided by Alabama’s community colleges compares to the expectations of the automotive manufacturing industry. Creswell (2013) recommends the use of a qualitative approach to research when there is a “problem or issue that needs to be explored” (p. 47). The more businesses and industries continue to locate in the state of Alabama, the smaller the pool of available skilled workers becomes. Therefore, it is imperative that Alabama’s community colleges offer programs in these high demand career fields. Additionally, the curriculum must be aligned with industry standards and prepare graduates with the skills necessary to perform successfully.

In this chapter, I include a description of the research design and provide a discussion of why a pragmatic approach to this qualitative research design was chosen. Next, the research questions are restated along with a discussion of how Human Capital Theory (Becker, 1993) provided the theoretical framework for the study. Then, I explain how the individual participants were selected and how the data were collected. Then, I describe the data analysis procedure and what steps were taken to protect the data as well as preserve confidentiality. Finally, I make known my positionality regarding the research and outline the timeline for the study.
Research Design

According to Corbin and Strauss (2008), qualitative researchers are “drawn to the fluid, evolving, and dynamic nature of this approach” (p. 13). Qualitative research requires that the researcher be situated in the world or location in which the problem or issue exists. In this study, data was gathered through a questionnaire and individual interviews. Creswell (2013) suggests that once the data are collected it should be analyzed using “complex reasoning through inductive and deductive logic” and that by coding the data “themes and categories” develop, which hopefully point to a solution to the complex issue at hand (p. 45). The researcher explores each theme and category that evolves from the two cycles of coding to ensure that the research presents a holistic solution.

A pragmatic paradigm guided this qualitative study. “The purpose of pragmatic qualitative research is to link theory and practice” (Savin-Baden & Major, 2013, p.60). Hatch (2002) comments on qualitative research saying, “Researchers spend extended periods of time interviewing participants and observing them in their natural setting” (p. 15). Pragmatic researchers want to find the solution to a problem by asking what and how questions (Creswell, 2013). That being said, this qualitative research is necessary because there are no known documented perspectives of business and industry leaders regarding the workforce training that Alabama’s community colleges provide. The hope of this researcher is that the current study will help to provide readers with a very engaging, informative, and beneficial perspective from the automotive manufacturers in Alabama regarding workforce training of advanced manufacturing technicians provided by Alabama’s community colleges.
Research Questions

This study was guided by the following research questions:

1. What do Alabama’s automotive manufacturing employers (OEM and Tier 1) perceive as the current and future skills, knowledge and expertise needed for well-trained and well-prepared advanced manufacturing technicians in an industry that continues to develop and change?

2. What challenges do Alabama’s automotive manufacturers face in attracting and retaining highly skilled advanced manufacturing technicians now and in the future?

3. What is the nature of the collaborative partnerships that Alabama’s automotive manufacturers have with Alabama’s community colleges?

4. What factors contribute to automotive manufacturer’s provision of work based learning experiences such as internships or apprenticeships for community college students?

Theoretical Framework

Human Capital Theory (Becker, 1993) provided the theoretical framework for this study. Gary Becker, a professor of economics and sociology at the University of Chicago, is best known for his work, study, and development of the Human Capital Theory. Becker was awarded the 1992 Nobel Prize in Economic Science. The Nobel committee considered his extensive work in applying economic analysis to human behavior in areas such as education, marriage, and discrimination as his greatest contribution to economics. Becker believed that the investment in Human Capital would provide incentive to those invested in as well as pay great dividends especially in the areas of education, earnings, and position. Some critics argued that Becker had reduced investment in human capital to that of investing in industrial equipment, but nothing
could be further from the truth. In Becker’s theory, “human capital” is defined as a skill or set of skills that a labor force possesses and is considered a resource or asset. Applied “human capital theory” basically says if you invest in an individual through training, education, or improving their health the outcome will be increased productivity (Becker, 1993). According to Brown and Asibey (2013), the return on investment in education pays tremendous dividends, so much so “that for every $1 invested in a child’s education, there is a $53 return to a company at the start of employment” (p. 2). Dickens, Sawhill, and Tebbs (2006) note that “a more educated labor force is more mobile and adaptable, can learn new tasks and new skills more easily” (p. 1).

Human Capital Theory (Becker, 1993) is an appropriate framework for this study and supported and guided the research study very well. The young individuals in rural Alabama who pursue a career in advanced manufacturing are destined to become leaders in the automotive manufacturing plants and don’t even realize it as they are going through training (Natter, 2018). Investments in human capital come in many forms, produce a variety of results, and yield an equally varying return on investment. Investments in human capital include paying for education, medical care, on-the-job training, and career advancement within the organization. Results of human capital investments include improved skills, knowledge, and better health. The return on investment include increased production, commitment to the organization, and improved morale for the individual, as well as, the whole organization (Becker, 1993).

Participant Selection

Mazda and Toyota announced in January of 2018 that a site in Alabama had been chosen for a $1.6 billion, 4,000-job joint venture assembly plant. Alabama’s automotive industry has become a major driver for economic growth in the state. Alabama is ranked in the top five states for automotive production and with the recent announcement, some believe that may push
Alabama to the number four spot. There are ten different models of vehicles produced within the state. Vehicles have become the number one export for the state, totaling over $9.5 billion annually (Estes, 2018). These automotive manufacturers require a highly skilled workforce to be successful. Alabama is fortunate to have four OEMs with facilities located within the state: Mercedes-Benz, Honda, Toyota, and Hyundai. They have all experienced significant growth since opening facilities in Alabama and all employ advanced manufacturing technicians. All four were selected to participate in this study along with one each of their Tier 1 suppliers.

A Tier I supplier, as defined earlier, are manufacturers that provide parts and or assemblies of parts directly to the OEMs. The Tier 1 suppliers selected to participate in this study are: Kamtek Incorporated/Magna (Kamtek) for Mercedes-Benz, Alabama Cullman Yutaka Technologies (Yutaka) for Honda, Topre America Corporation (Topre) for Toyota, and Hwashin America Corporation (Hwashin) for Hyundai. The Tier 1 suppliers were selected for this study based on their size and recent expansions in the state. They each employ more than 100 employees and have experienced expansions within the past five years.

The individual positions that were chosen to interview are Human Resources Manager and Maintenance/Training Manager. The Human Resources Manager was chosen to interview because they see the “big picture” and have insight into current and future employment needs. The Maintenance/Training manager was chosen to interview because they work directly with the advanced manufacturing technicians and know the specific skills needed to be a successful employee as well as daily work habits.

The study focused on the position and skillset of an advanced manufacturing technician (AMT). Almost every company uses a different title for this position but to be clear the following terms maybe used interchangeably: industrial machinery mechanic, mechatronics
technician, mechanic, industrial maintenance technician (IMT), and advanced manufacturing technician (AMT). The 2017 State of Workforce Report compiled by The University of Alabama’s *Center for Business and Economic Research* listed “Industrial Machinery Mechanics” as a high demand occupation (Addy, 2017). Laura Putre wrote an article for *Industry Week* magazine in October 2015 entitled “The Four Hottest Jobs in Factory Maintenance,” in which she describes a Maintenance Technician as a highly specialized trained professional in very high demand. Patrick Dean, a career placement service director, comments that it is very challenging to find qualified maintenance technicians to fill these high wage positions (Putre, 2015).

The participants were contacted initially by means of a telephone call. The researcher followed a structured phone conversation protocol as shown in the form Appendix A. The participants additionally were sent an email requesting their participation in the research study, using the form shown as Appendix B. Once these individuals agreed to participate in the study, they were sent a confirmation email shown in Appendix C, along with an electronic questionnaire to complete and return included as Appendix D. Then, interviews were scheduled around a mutually agreed upon date, time, and location and followed interview protocol listed as Appendix E. The participants were given the choice of live or web-assisted interviews. Appendix F was used to record field notes during the interview. The participants signed an Informed Consent form included as Appendix G.

**Data Collection Procedure**

The researcher collected data using two different methods in an effort to answer the research questions. An electronic questionnaire was the initial instrument used to collect data, included as Appendix D. The electronic questionnaire was sent to the participants to be completed at their convenience. Individual interviews provided the additional data for the study.
and followed protocol listed as Appendix E. The semi-structured interviews were recorded with a digital voice recorder. The digital recordings were stored on the researcher’s personal password protected external hard drive in a locked file cabinet in the researcher’s office at his place of employment. He was the only person who had access to this information. Once the analysis of the audio recordings were completed, he deleted the digital files from his personal external hard drive.

**Questionnaire Protocol**

The initial data for this study were obtained through a questionnaire which appears here as Appendix D. The questionnaire was designed to engage the participants and provide an avenue for their voices and opinions to be presented in their own words. The information requested on the questionnaire include: number employed with the company, the individual’s time with the company, individual’s years of experience in the industry, number of AMTs employed at the company, number of AMTs the company anticipates needing in the next five years. Once the questionnaires were completed and received the researcher began the first cycle of coding.

**Semi-Structured Interview Protocol**

Semi-structured interviews provided a second set of data for this study and followed the protocol listed as Appendix E. The researcher made hand written field notes included as Appendix F while conducting and digitally recording the interviews. The researcher discussed the Informed Consent Form presented as Appendix G to the interviewee and gave them an opportunity to sign. The interviewees were given the choice of live or web-assisted interviews. Each interview lasted approximately one hour. Transcription of the interviews began immediately following the interviews. The digital recordings were stored on the researcher’s
personal password protected external hard drive and kept in a locked file cabinet in the researcher’s office at his place of employment. He was the only person who had access to this information. Once the analysis of the audio recordings were completed, he deleted the digital files from his personal external hard drive.

Data Analysis Procedure

This researcher selected the “Holistic Coding” method for the first cycle of coding. Holistic Coding is recommended for the beginner researcher who is learning how to code data and offers a broad approach to understanding the basic themes or issues in the data. Holistic Coding provides the foundation for a more comprehensive coding of the data, which took place in the second cycle of coding. The researcher utilized the “In Vivo Coding” method for the second cycle of coding. When coding data using the In Vivo method, the researcher searched for reoccurring words or phrases that could lead to a solution to the problem being researched (Saldana, 2016).

Weyers, Strydom, and Huisamen recommend the use of triangulation to validate and ensure completeness of the data (2008). Calabrese (2006) notes “Triangulation is a qualitative process that tests the consistency of findings garnered through different methods and sources of data, including field notes, artifacts, and transcripts” (p. 60).

Data Security and Confidentiality

All digital files were stored in a locked file cabinet in the researcher’s office at his place of employment. The digital recordings were stored on the researcher’s personal password protected external hard drive in a locked file cabinet in the researcher’s office. He was the only person who had access to this information. Once the analysis of the audio recordings were completed, he deleted the digital files from his external hard drive. The companies as well as the
individuals who participated in the study each were given a pseudonym to protect their identities. While the identities of the OEMs are somewhat protected by use of the pseudonyms, there were no questions asked during the interview that would compromise or reveal any manufacturing or company proprietary information. The interviews focused on the challenges of filling high skill, high demand positions such as an advanced manufacturing technician. Each participant signed an Informed Consent form, Appendix G.

Researcher Positionality

After graduating high school, I enrolled in the machine tool technology program at Wallace State Community College in Hanceville, Alabama. The majority of my eighteen years of in-field experience was spent working in the aerospace industry. My career as an educator began just over nineteen years ago in career technical education (CTE). My first instructional position, which I held for nine years, was as a drafting teacher at the career technical center where I had attended as a high school student. I joined the faculty of Wallace State Community College in Hanceville, Alabama, on June 1, 2009, as the drafting department chair. In 2011, I was offered and accepted the position of Dean of Applied Technologies, where I have served for the past eight years. As an instructional dean, I am continuously looking for ways to improve relations with business and industry, while also preparing graduates for jobs in high demand, high wage careers. Technology is constantly changing; therefore, curriculum is constantly evolving to ensure that students are developing skillsets that are aligned with the requirements for these covetous careers. This study will be beneficial to Alabama automotive manufacturers, Alabama community colleges, and their students, if the research questions are answered frankly and honestly. As the Dean of Applied Technologies at Wallace State Community College, I have had the good fortune of working with the maintenance managers and human resources
managers at Honda, Toyota, Yutaka, Topre, and Kamtek. Additionally, Honda, Toyota, Yutaka, Topre, and Kamtek have hired graduates from the Wallace State’s advanced manufacturing technician program. I remained objective and avoided bias throughout this research project. This researcher reasons that the opportunity to collect relevant information that could have a positive effect on the future of industrial maintenance training is valuable.

Study Timeline

Once the dissertation committee and The University of Alabama Institutional Review Board gave approval to proceed with the study, invitations were distributed, contact was made with the appropriate individuals, and interview appointments were scheduled. The field work and data collection took place in the summer of 2019.

Summary

This chapter provided a description of the methodology, including the research perspective, research approach, research questions, theoretical framework, data source and participants, data security and confidentiality, researcher positionality, and the timeline for the study. I spoke with participants at all four of the OEMs in Alabama, along with participants from at least one of the Tier 1 suppliers for each of them. It should be noted that, as the Dean of Applied Technologies at one of the larger community colleges in the state, I have had the good fortune of helping a few graduates obtain employment with some of these manufacturers. Furthermore, I am very active with the Alabama Automotive Manufacturers Association (AAMA), the Alabama Workforce Council, as well as other economic and workforce development associations. Being associated with these organizations did not have any impact on my ability to accurately interpret the data that were collected.
CHAPTER IV
FINDINGS OF THE STUDY

Introduction

The purpose of this qualitative study was to capture the multi-faceted insights of Alabama automotive manufacturers regarding their experiences recruiting, hiring, and retaining advanced manufacturing technicians (AMT). This chapter reflects the data collected from the individual interviews and an electronic questionnaire. This study was guided by the following research questions:

1. What do Alabama’s automotive manufacturing employers (OEM and Tier 1) perceive as the current and future skills, knowledge and expertise needed for well-trained and well-prepared advanced manufacturing technicians in an industry that continues to develop and change?

2. What challenges do Alabama’s automotive manufacturers face in attracting and retaining highly skilled advanced manufacturing technicians now and in the future?

3. What is the nature of the collaborative partnerships that Alabama’s automotive manufacturers have with Alabama’s community colleges?

4. What factors contribute to automotive manufacturer’s provision of work based learning experiences such as internships or apprenticeships for community college students?

The researcher followed the interview protocol, included as Appendix E, which consisted of fifteen open-ended questions designed to stimulate dialogue. The interview questions addressed
subjects that strategically align with the research questions. Participants also responded to an electronic questionnaire, included as Appendix D, which gathered basic information regarding them, their company, as well as current and future demand for advanced manufacturing technicians.

Demographics

To better understand the wide spread need for skilled advanced manufacturing technicians, the researcher sought to include a representative group of Alabama’s automotive manufacturers in this study. This information was collected using an electronic questionnaire and a summary of this general demographic information is included as Table 4.

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Years at this company</th>
<th>Years in automotive industry</th>
<th>Number of employees</th>
<th>Number of AMTs currently employed</th>
<th>Open AMTs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carly</td>
<td>1 – 3</td>
<td>1 - 3</td>
<td>1000 – 1500</td>
<td>46 – 50</td>
<td>10 – 12</td>
</tr>
<tr>
<td>Ava</td>
<td>1 – 3</td>
<td>5 – 10</td>
<td>1000 – 1500</td>
<td>46 – 50</td>
<td>10 – 12</td>
</tr>
<tr>
<td>Connor</td>
<td>15 - 20</td>
<td>22</td>
<td>1000 – 1500</td>
<td>64</td>
<td>10 – 12</td>
</tr>
<tr>
<td>Everly</td>
<td>22</td>
<td>22</td>
<td>600 – 700</td>
<td>16 – 20</td>
<td>1 - 3</td>
</tr>
<tr>
<td>Carver</td>
<td>5 – 10</td>
<td>5 – 10</td>
<td>600 – 700</td>
<td>16 – 20</td>
<td>1 – 3</td>
</tr>
<tr>
<td>Jackson</td>
<td>5 - 10</td>
<td>23</td>
<td>5000</td>
<td>300</td>
<td>25</td>
</tr>
<tr>
<td>Matthew</td>
<td>3 - 5</td>
<td>30</td>
<td>300 - 400</td>
<td>11 -15</td>
<td>4 - 6</td>
</tr>
<tr>
<td>Laura</td>
<td>15 - 20</td>
<td>15 - 20</td>
<td>300 - 400</td>
<td>6 - 10</td>
<td>1 - 3</td>
</tr>
<tr>
<td>Ginny</td>
<td>5 - 10</td>
<td>5 - 10</td>
<td>1500 - 2000</td>
<td>46 - 50</td>
<td>1 - 3</td>
</tr>
<tr>
<td>Amy</td>
<td>1 - 3</td>
<td>30</td>
<td>600 - 700</td>
<td>2</td>
<td>78</td>
</tr>
<tr>
<td>Chad</td>
<td>5 - 10</td>
<td>5 - 10</td>
<td>100 - 200</td>
<td>11 - 15</td>
<td>1 - 3</td>
</tr>
</tbody>
</table>
Additional information relating to advanced manufacturing technicians (AMT) such as future openings, pay levels, and apprenticeships has been included as Table 5.

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>AMT demand in 5 years</th>
<th>Entry-level hourly pay</th>
<th>Top hourly-pay</th>
<th>Top Yearly Base Pay</th>
<th>Difficult finding qualified AMTs</th>
<th>Community College Apprenticeship Partner / How many</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carly</td>
<td>40</td>
<td>$23 – $26</td>
<td>$40</td>
<td>$83,200</td>
<td>Yes</td>
<td>Yes / 13</td>
</tr>
<tr>
<td>Ava</td>
<td>10 – 12</td>
<td>$23 – $26</td>
<td>$34 – $36</td>
<td>$74,880</td>
<td>Yes</td>
<td>Yes / 40</td>
</tr>
<tr>
<td>Connor</td>
<td>7 – 9</td>
<td>$23 – $26</td>
<td>$31 – $33</td>
<td>$68,640</td>
<td>Yes</td>
<td>Yes / 13</td>
</tr>
<tr>
<td>Everly</td>
<td>1 – 3</td>
<td>$23 – $26</td>
<td>$37 – $39</td>
<td>$81,120</td>
<td>Yes</td>
<td>Yes / 1 - 3</td>
</tr>
<tr>
<td>Carver</td>
<td>4 – 6</td>
<td>$23 – $26</td>
<td>$37 – $39</td>
<td>$81,120</td>
<td>Yes</td>
<td>Yes / 4 - 6</td>
</tr>
<tr>
<td>Jackson</td>
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The information gathered via the electronic questionnaire and listed on both Table 4 and Table 5 reveal some very valuable information. This information further confirms literature reports that were mentioned in Chapter Two of this document and will be restated here. *Industry Week* magazine published “The Four Hottest Jobs in Factory Maintenance” in October 2015 in which Laura Putre describes the Maintenance Technician as a highly specialized trained professional in very high demand and very hard to find (Putre, 2015). This information also provides encouragement that Governor Kay Ivey and the Alabama Legislature are moving in the right direction with regards to their efforts to promote career and technical education, industry recognized certifications, and apprenticeships (Moseley, 2019). Also, previously stated in Chapter One, Governor Ivey’s “Strong Start, Strong Finish” education initiative has an emphasis on workforce preparedness (Ivey, 2017). The final stage of Ivey’s initiative is advanced training for better jobs. The Governor plans to address the education attainment and skills gap by
developing policies and promoting programs that are available at Alabama’s community colleges in a continued effort to move Alabama forward toward becoming a manufacturing powerhouse (Ivey, 2017).

Emerging Themes Derived from the Qualitative Data

During the summer of 2019, the researcher conducted, recorded, transcribed, analyzed, and coded personal interviews with some of Alabama’s automotive manufacturing leaders. The participant’s narratives were examined for themes that spoke to each of the four research questions. Research Question One asks: What do Alabama’s automotive manufacturing employers (OEM and Tier 1) perceive as the current and future skills, knowledge, and expertise needed for well-trained and well-prepared advanced manufacturing technicians in an industry that continues to develop and change? The participants were asked to describe the fundamental skills that an advanced manufacturing technician (AMT) should possess, and how important are formal academic credentials and industry certifications to gaining employment with their company.

Research Question Two asks: What challenges do Alabama’s automotive manufacturers face in attracting and retaining highly skilled advanced manufacturing technicians now and in the future? The participants were asked to share their personal experiences seeking skilled advanced manufacturing technicians, and what can be done to attract more people to a career in automotive manufacturing. The participants were asked what skills or knowledge they find most often lacking in applicants, and what do they do to ensure that their technicians are up-to-date with technology.
Research Question Three asks: What is the nature of the collaborative partnerships that Alabama’s automotive manufacturers have with Alabama’s community colleges? The participants were asked to describe their involvement and their company’s relationship with the local community college.

Research Question Four asks: What factors contribute to automotive manufacturer’s provision of work based learning experiences such as internships or apprenticeships for community college students? The participants were asked to share their thoughts regarding apprenticeships and work based learning experiences.

The following themes emerged from the collected data in response to Research Question One: (a) very specific skillset required, (b) degree not important to hire but helps and required to advance, (c) ability to learn, (d) industry recognized certifications very important. The following themes emerged from the collected data in response to Research Question Two: (a) very difficult to find, (b) educate parents and start recruiting at a younger age, (c) human capital investment very important. The following themes emerged from the collected data in response to Research Question Three: (a) community college partnerships. Finally, the following themes emerged from the collected data in response to Research Question Four: (a) apprenticeship advantages, (b) comments.

Theme 1: Very Specific Skillset Required

Participants all agreed that the skillset that an advanced manufacturing technician (AMT) needs to be successful on the job is very specific, very technical, and candidates who possess them are difficult to find. While each company has very specific brands of equipment that they use in their plant, if a candidate has experience with a different brand, the company is often still interested in hiring the individual. Most of the equipment in automotive manufacturing plants
has been installed to automate a process in order to increase quality and production time. The basic set of skills that an AMT should possess includes: industrial robot programming, hydraulics/pneumatics, basic electronics, troubleshooting, programmable logic controllers (PLCs), sensors, blueprint reading, and motor controls.

*Industrial robots* are often used in processes where there is repetitive motion, the parts are too heavy for humans to pick up, or the robots can perform the task faster and with greater accuracy. There are several popular brands of robots that are used in the automotive manufacturing world. The most popular robot brands that were mentioned during the interviews were: ABB, Kuka, Moto-Man, Mitsubishi, and FANUC.

*Hydraulic/Pneumatic* training for the most part is not brand specific but usually includes an overall general knowledge of how a system works. The AMT needs to understand the difference between the systems and why one would be used instead of the other. Both systems use cylinders to move parts, but hydraulic cylinders are much stronger and use hydraulic oil. Pneumatic cylinders are for lightweight applications, use compressed air, and are much cleaner (Heney, 2016).

The AMT should be trained in *basic electronics*, which should include alternating current and direct current (AC/DC) along with basic electricity flow. The AMT should be able to strip wires, solder wires, install connectors, and read wiring schematics.

The AMT should have the ability to *troubleshoot* problems with equipment. Troubleshooting is perhaps one of the most important skills to possess and yet one of the most difficult to teach. Troubleshooting requires the AMT to utilize deductive reasoning when solving the issues at hand. The AMT must also learn to conduct a root cause analysis rather than just addressing the obvious issues at hand.
Programmable logic controllers (PLCs) are solid state industrial computers that are very reliable and used to monitor inputs and outputs of industrial automation equipment (Gonzalez, 2015). The AMT must be able to program and modify PLC programs. The most popular PLCs mentioned during the interviews were Allen Bradley (AB) and Siemens. Both AB and Siemens use propriety software to program their PLCs.

A variety of sensors are used in automotive manufacturing plants. The AMT should be familiar all types including motion sensors, proximity sensors, pressure sensors, thermal sensors, and optical sensors. Sensors are usually associated with PLCs and send signals to initiate the next step in the process.

The AMT must be able read blueprints and schematics. The blueprints may be as simple as a simple work cell layout or as complicated as the whole plant floor plan. The schematics may be as simple as an electric motor or as complicated as a whole work cell. The AMT should be able to navigate AutoCAD and other computer aided design software.

The AMT should be very familiar with motor controls. The term motor controls includes a variety of electrical components including, but not limited to, push/pull buttons, signal lights, relays, wiring, conduit bending, as well as, AC and DC motors. The motor controls of a piece of equipment comprise everything that make the equipment run properly from the disconnect that allows electricity to flow to the equipment, the start/stop buttons, the electric motors that runs the conveyor belts, the relays that protect the system from current overloads, and finally, even the emergency stop buttons (Mirza, 2019).

Theme 2: Degree not Important to Hire but Helps and Required to Advance

All of the participants stated that their company preferred AMTs with an associate degree. However, they also said that it is very difficult to find enough qualified applicants to fill
the open positions in this high demand field. Therefore, the companies are more interested in applicants with experience in these highly technical skill areas. Most of the participants indicated that if an applicant had a degree they had an advantage, but someone with experience had just as much and possibly more advantage. Carver at Company B said it this way:

The most important thing is not the degree but their experience and that we see that they understand the machinery and they are trainable and teachable. A degree or certification helps to understand someone has some experience and got trained, but some of the machines are so specific that it requires a lot of training no matter what. So, I would say it's not the most important thing but it is required for them to advance within the company.

All of the participants noted that, while they would hire AMTs without a degree, company policy requires a postsecondary degree for the AMTs to advance within the organization. Most of the companies offer an apprenticeship programs, in which tuition and books are paid up front. Additionally, all of the companies offered some type of educational assistance program. So, if an employee wishes to continue their education the company will reimburse tuition and fees each semester depending on their grades.

Theme 3: Ability to Learn

Every participant at some point during the interview mentioned that a well-trained AMT must have a basic mechanical knowledge and an aptitude to learn. The basic mechanical knowledge that they were referring to includes but not limited to; awareness of hand tools and what they are used for, understanding of how machines work, and basic mechanical reasoning. The AMT should be able to figure out why a machine is not working and how to repair it quickly. Laura at Company E made this comment regarding AMT’s ability to learn:
We generally are looking for people that are motivated to learn. They are finding it difficult to find people that actually want to do anything. Most people just want to be given the opportunity and not earn the opportunity. I guess a willingness to learn not pretty much stuck on this is the way I do this and do it this way and this way. They have to be open to that this is a different way that may be better and may not be. That’s what we’re looking for at an entry level.

Theme 4: Industry Recognized Certifications Very Important

Individuals can earn *industry recognized certifications* usually after attending a short intensive training session, which is provided by the manufacturer of the equipment. The training sessions can be as long as four weeks or longer but also can be as short as eight hours in length. The training is usually offered at the manufacturer’s headquarters and taught by expert training professionals. There are many manufacturers that offer “train the trainer” (TTT) seminars. At TTT seminars, highly skilled professionals can go through the training and become certified to train others and issue manufacturer sponsored certifications. The evaluations or tests are usually online and controlled by the manufacturer. Depending on the equipment, a “hands-on” competency test is often required to confirm the trainee’s skill level. Some of the most common manufacturers that offer these certifications are manufacturers of robots, PLCs, hydraulics/pneumatics, sensors, and motor controls. An important certification that almost all companies require, besides the very specific training certifications that were just mentioned, is an Occupational Safety and Health Administration (OSHA) 10 hour safety certification. The “OSHA 10” can be earned completely online, but most companies prefer in class instruction.

Matthew with Company E commented regarding manufacturer certifications:
It gets them in the door. Through our resume process we are able to see what their certifications are. So, if I see that somebody has a PLC training, they will be put to the top of the pile.

Lynn with Company D mentioned, “OSHA is very important as well as military experience.”

Laura with Company E responded:

They would definitely get first crack at the job over somebody that did not have certifications. It is very hard to find people with certifications in PLCs and robotics.

Theme 5: Very Difficult to Find

The search for skilled AMTs is very difficult and often discouraging for the human resources individual desperately trying to fill the high demand positions. Carly with Company A answered:

They are very difficult to find right now. Job market data released last week nationwide revealed an unemployment rate of 3.6 percent, and when you are down to less than 4 percent unemployment, everybody is working. Skilled trades are going to be gone first, you don’t have to get to 4 percent to find your skilled trades. The people are just not there. You didn’t ask and it may be one of your later questions, but we do have a very large apprenticeship program, and the reason we have a large apprenticeship program is that we can’t hire skilled trades, we have to grow our own.

Ava with Company A responded:

It’s been challenging. We’re currently in the age where we’re experiencing the results of a gap in skilled trades being really promoted with students graduating. Right now what we are looking at is an aging workforce for maintenance technicians. A lot of them have been in the industry for many years, and they are approaching the end of their careers. So
what we see is that we won’t have as much longevity as we would with someone coming in fresh out of school. For a period of time everyone promoted for professional degrees and not the skills, so right now we are having a really hard time. In saying what I said about an aging workforce and more experienced workforce, what also comes with that is stability. These people do not really want to change. They are committed, stable, and vested in the company that they are with, so convincing them to move to another company has been very difficult. Challenging to say the least.

Matthew with Company E commented:

It is tough. I would not say that all of our technicians have been home grown through our company because we do have a couple of technicians that we have stolen from other companies. They don’t have degrees. Actually, one of them I stole is at Northeast right now going through our apprenticeship program to get a multi craft maintenance degree.

Theme 6: Educate Parents and Start Recruiting at a Younger Age

The consensus among the participants was that parents need to be educated and that the students needed to be recruited in the seventh and eighth grades. The automotive manufacturing world in the state of Alabama has a lot of automated equipment, uses technology to run the factory, is very clean, and pays very well. Connor with Company A responded:

Automotive is relatively new to this area. I think people still don’t realize how well automotive manufacturers pay. When you hear the word manufacturing, that picture pops up in people’s minds of the old dirty, smoky, factory type place where grandpa worked in or maybe even dad worked in out at US Steel and they don’t want their kids to get into that, but you also have the public schools that push for computer programming and other academic programs and nobody is pushing for the trades anymore. Even in my
past, I was in the Navy and had the opportunity to be a Navy recruiter and was in the schools a lot, and the counselors weren’t pushing anybody toward anything except for four year colleges. I would get a call when they had somebody that was in trouble, but that wasn’t the guy I wanted.

Laura with Company E commented:

We need to get them when they are young or younger. Everybody tries to push getting them at their junior or senior year, but generally someone already has their minds made up by then. Some of them are like “I’m going to go to college and do what I want and then get out and then decide what I’m going to do.” A lot of junior high is just when their eyes are getting opened to jobs. If we make it more presentable or more desirable, “hey we can come to this” as opposed to sitting at a desk. Everybody wants to do a computer job where they sit at their desk and type on a computer all day. That is not going to fix anything other than computers. It’s not going to fix machinery or electricity. We should start recruiting in the 7th or 8th grade.

Ava with Company A stated:

I think that promotion of skilled trades or jobs that do not necessarily require a professional degree has got to happen. I think that the public does not see the value in these careers. I do not think that we have done a great job in showing the people the income potential with these jobs, and I think that is where a lot of people become apprehensive about going into automotive. I was one of those people. I would have never imagined myself in manufacturing when I came out of college that was not what I wanted to do. I could not see myself as a manufacturing person, but this has been the bulk of my career. Had someone told me that and not pushed corporate America down
my throat when I was in college, I probably could have started my career in manufacturing sooner. I think as a society we don’t understand that there is really great value and career potential in this field. Not to mention that the state of Alabama is growing by leaps and bounds. It is the new industry.

Theme 7: Human Capital Investment Very Important

During the interviews, every participant discussed advanced training that the company provides to their AMTs and how the company developed a professional growth plan for each of the AMTs. All of the companies make significant training investments into their AMTs to ensure that the AMTs are highly skilled. As stated earlier in this document, Gary Becker, a professor of economics and sociology at the University of Chicago, developed the Human Capital Theory. Becker’s Human Capital Theory served as the Theoretical framework for this research. In Becker’s theory, “human capital” is defined as a skill or set of skills that a labor force possesses and is considered a resource or asset. Applied “human capital theory” basically says that if you invest in an individual through training, education, or improving their health, the outcome will be increased productivity (Becker, 1993). Carver with Company B made the comment below regarding the career pathway for an AMT:

I think one important factor would be to show what their career path could be. Not only what your future would look like but also what we can provide for you right now. We are going send you over to get some certifications, get some classes, and get you trained up so as to see the allotment, the time, and money that we spend on each individual to make sure that they know what they are doing. We do all kinds of things. We have development talks or discussions with them to see what they feel like they want to learn
or what do you need to learn to get your job done. We also think ahead and say we just need to send you to that class to get that certification so you have that for the future.

Carly with Company A had this to say about how they encourage and plan AMT professional growth:

Within each department they create what is known as the circle of skills. The circle of skills is how they get their promotions from position to position. For maintenance technicians we have levels 1, 2, and 3 and then you could move into the engineering side beyond that. To be competitive to get into the different pay scales, you have to complete everything that is in your circle of skills so that would be robotics classes you must have attended and PLC classes you must have attended. We will push you in that direction. If you choose not to do it, your pay scale will remain stagnant. We incentivize it.

Everly with Company B shared this regarding how they determine training needs:

We have several ways to do that, we have company specific programs, as well as databases and software that helps us keep track. We are able to constantly monitor downtime throughout the plant, and as we see that down time it helps us pinpoint training opportunities. An example, if we see that we have a lot of down time related to hydraulic failure, then we need to send people for hydraulic training. We also keep track of the equipment that’s coming into the plant, and we make sure that our technicians receive training on that equipment before it actually goes into production on the shop floor.

Theme 8: Community College Partnerships

All of the participants acknowledged that their company is actively involved with at least one of Alabama’s community colleges. Several of the companies were actively involved with two, and a couple had relations with three of their local community colleges. The participants
often referred to utilizing Alabama’s community colleges for computer software training on
programs such as Excel and Microsoft Word. Most of the company employees interviewed said
that the primary involvement with Alabama’s community colleges revolved around an AMT
apprenticeship program. All of the participants said that they were actively involved with the
program advisory boards at the community colleges. Everly with Company B had this to say
about her company’s partnership with the local community college:

Yes, we have had an active partnership with the community college for many years in the
past. I think it’s worked great. We kind of laid our needs on the table. We’ve worked
with them and they helped us customize curriculum to create an apprenticeship program
to meet the needs of our technicians in the plant. They have also helped us as far as
workforce development, so we’re able to approach them with our needs. It’s been great.

Theme 9: Apprenticeship Advantages

The applicants had a lot to say regarding the benefits of participating with
apprenticeships for both the apprentice and the company. Apprenticeships come in many forms
and lengths. There are Registered Apprenticeships through the United States Department of
Labor (DOL). There are informal company specific apprenticeships and internships. As a rule,
the apprentices work at the company three days a week (MWF) and go to the community college
two days a week (TTh). The apprentices are paid a reasonable wage for their work hours, and
some are even paid while attending class. While at work, apprentices are assigned to an
experienced mentor who works very closely with the apprentice to reinforce the skills and
subject matter that they are currently learning in class. The company often pays for tuition,
books, and fees. The apprentice typically has to sign an agreement that they will work for the
company for a certain number of years to ensure that the company does not lose their investment
right after graduation. The agreement usually requires the apprentice to pay back the company’s investment in them, should they decide to leave ahead of the designated time. The apprenticeships are an amazing opportunity for the student. Chad with Company H had this to say about apprenticeships:

You get to date them before you marry them. You have an opportunity to see what kind of person they are and how they interact with other people. Do they show up on time? What are their skill sets, and what are their strengths and weaknesses? The opportunity to get to know someone, and we have seen it both ways, more so on the positive side. We have had interns that we didn’t even finish their internship.

Ginny with Company F commented this regarding how the company benefits from participating with apprenticeships:

We get people who we actually teach while they are working, so when we actually get done paying for that, they are right at an A tech. We don’t have to start over; they are ready to go.

Laura with Company E had this to say regarding how students benefit from participating with apprenticeships:

The benefit is that they get the best of all three worlds. They get a paid education, on the job training, and they get paid for it. When I did my externship, I did not get paid for it.

Jackson with Company C had this to say about how students benefit from participating with apprenticeships:

It’s huge being out here in the environment with lots of experienced guys around you. You don’t just get thrown into the fire. You get to come out here and shadow some guys that are really good and have a lot of experience, and they can help them with the small
things, details they have learned over time to make tasks a little bit easier. Safety issues are learned by being with the more experienced technicians.

Everly with Company B said:

As well as the students it is a win/win. It is a good balance for the manufacturer as well because the students are in class half the time, and then they are working the other half as they go there and are learning the vital skills that they need in order to troubleshoot and fix the equipment. If there is a schematic or an issue there, they can take it back to the college and talk to the instructor. So, it is basically a win/win and helps us to maintain equipment and processes in the plant.

Theme 10: Comments

There were several comments that the participants made during the interview process that resonated. The big takeaway was that the community colleges need some way of ensuring that their instructors are proficient with the skills needed in today’s automotive manufacturing environment. The community college instructors need a process to obtain professional development for areas in which they need to be skilled up. Connor with Company A made this comment regarding the instructors at community colleges:

The things I noticed there is that the instructors haven’t been in industry in a while, so they were pretty far removed. I know it’s tough because if you’re teaching then obviously you’re not in touch with current technologies in the industry. Although I know they do have some that are teaching as well as working in the industry, but that’s just one thing that I noticed.
Carly with Company A made this suggestion regarding instructor skill level:

The big thing I would like to add is the professional development for the faculty. When a person is hired in the college system, we would assume that they have the skill set required to get the job. They may have come straight from industry or manufacturing, and we hope that they spend a long enough career that they retire, that’s a lot of years. This stuff changes over time, the college system has to get with the people who are hiring their students and make sure that their faculty are skilled in the areas that they need taught. You can come over on the industry side and find out what we need and make sure the instructors are competent in those areas.

Connor with Company A had this to say regarding the value of trained AMTs:

Our company is a “just in time” Tier 1 automotive supplier, as all modern suppliers are. Downtime of our equipment is costly to us for several reasons, 1) employees being paid to do nothing, 2) parts not delivered on time, if we actually stop production at our customer they charge us about $10,000 per minute, 3) overtime to get production back to what we planned. We had a production line go down because of a robot failure. The line was down for three hours and several people were attempting to diagnose the problem. A highly skilled technician was called in to his shift early to assist. It took him ten minutes to determine that the communication cable between the robot and the controller had been cut. However, the rubber outer insulation was cut so cleanly that when it was lying flat the cut was not evident. Ten minutes later the cable was replaced and the cell was back in operation. Our technicians must have the skill and ability to quickly critically analyze a situation and make a determination of the cause of the problem and then make the repair. A root cause analysis must follow this event so that corrective measures can be
put in place to not allow the problems to repeat, not just for that instance, but for any similar situations throughout our plant.

Summary

To summarize, the following themes emerged from the collected data in response to the research questions. Research Question One: (a) very specific skillset required, (b) degree not important to hire but helps and required to advance, (c) ability to learn, (d) industry recognized certifications very important. Research Question Two: (a) very difficult to find, (b) educate parents and start recruiting at a younger age, (c) human capital investment very important. Research Question Three: (a) community college partnerships. Research Question Four: (a) apprenticeship advantages, (b) comments. Chapter five includes an introduction, conclusions, and recommendations.
CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

Introduction

The focus of this research was to document how leaders in Alabama’s automotive manufacturing industry view the workforce training being provided by community colleges for advanced manufacturing technicians (AMTs). The results of this study can provide community college leaders in Alabama information that might be beneficial in developing, improving, and implementing effective AMT programs and partnerships. This study was guided by the following overarching research questions:

1. What do Alabama’s automotive manufacturing employers (OEM and Tier 1) perceive as the current and future skills, knowledge and expertise needed for well-trained and well-prepared advanced manufacturing technicians in an industry that continues to develop and change?

2. What challenges do Alabama’s automotive manufacturers face in attracting and retaining highly skilled advanced manufacturing technicians now and in the future?

3. What is the nature of the collaborative partnerships that Alabama’s automotive manufacturers have with Alabama’s community colleges?

4. What factors contribute to automotive manufacturer’s provision of work based learning experiences such as internships or apprenticeships for community college students?

Data were collected for this study by means of an electronic questionnaire and in depth individual interviews. There were fifteen maintenance/training and human resource managers
from nine different OEM or Tier 1 automotive manufacturers from across the state of Alabama that participated in the study. The interviewer endeavored to capture the participants’ perspectives regarding the workforce training provided by Alabama’s community colleges specifically for advanced manufacturing technicians (AMTs). The electronic questionnaire contained nineteen multiple choice descriptive questions to address their demographic composition. The demographic information is noted on Tables three and four of this document. Additionally, the interview protocol included fifteen open ended questions from which responses were gathered. The data were transcribed, organized, coded, and analyzed to identify emerging themes. As stated earlier in this document, the researcher utilized the In Vivo Coding method for the second cycle of coding. When coding data with the In Vivo method, the researcher searched for recurring words or phrases, which can lead to a solution to the problem being researched (Saldana, 2016). The following themes emerged from the collected data in response to the research questions. Research Question One: (a) very specific skillset required, (b) degree not important to hire but helps and required to advance, (c) ability to learn, (d) industry recognized certifications very important. Research Question Two: (a) very difficult to find, (b) educate parents and start recruiting at a younger age, (c) human capital investment very important. Research Question Three: (a) community college partnerships. Research Question Four: (a) apprenticeship advantages, (b) comments.

Conclusions

Research Question One asks, “What do Alabama’s automotive manufacturing employers (OEM and Tier 1) perceive as the current and future skills, knowledge and expertise needed for well-trained and well-prepared advanced manufacturing technicians in an industry that continues to develop and change?” The research data indicate the skillset that an AMT needs to be
successful in the world of automotive manufacturing includes, but is not limited to, training in the following areas: 1) industrial robot programming, 2) hydraulics/pneumatics training, 3) basic electronics, 4) troubleshooting practices, 5) programmable logic controllers (PLCs), 6) sensors, 7) blueprint reading, and 8) motor controls. The AMT should also receive regular training updates to stay current with technology.

Research Question Two asks, “What challenges do Alabama’s automotive manufacturers face in attracting and retaining highly skilled advanced manufacturing technicians now and in the future?” The research data indicate the companies prefer AMTs with an associate degree, but it is very difficult to find enough qualified applicants to fill the open positions, so the companies are more interested in applicants with experience. However, the AMTs must earn an associate degree in order to advance within the company. Every participant noted that their company had become active with a “grow your own approach” to filling the open AMT positions and to plan for future need. Another theme that often recurred in the data was that the Alabama automotive manufacturers spend a significant amount of time and money investing in their AMTs. The companies are making the investment in human capital out of necessity, but also in hopes that the AMTs will develop loyalty and continue to work with the company.

Research Question Three asks, “What is the nature of the collaborative partnerships that Alabama’s automotive manufacturers have with Alabama’s community colleges?” Every one of the participants mentioned serving on one or more advisory boards at their local community college. The technical programs at the community colleges are required to have an advisory board made up of business and industry leaders who periodically review the curriculum, lab, and offer recommendations. The recommendations should assist the instructor in ensuring the program is relevant and current with industry standards. The participants also mentioned
recruiting the students from a variety of the community college programs. Many of the participants commented on their company using the college to provide non-credit training in a variety of areas, such as software, professional behaviors, as well as specific customized technical skills.

Research Question Four asks, “What factors contribute to automotive manufacturer’s provision of work based learning experiences such as internships or apprenticeships for community college students?” The data collected for this study indicate that Alabama automotive manufacturers are already actively involved in both formal and informal internships and apprenticeships. The demand for these highly skilled, high wage positions is so great that the companies are willing to partner with the community colleges in every way possible as long as they are able to ultimately fill the open positions.

Overall, the automotive industry leaders that were interviewed for this study were pleased with everything that the Alabama community colleges were doing to train advanced manufacturing technicians (AMTs). All of the companies who were involved in this research had some type of relationship with a community college. Jackson with Company D commented that when visiting the community college “the instructors and the students always make you feel welcomed.” However, during the interviews, many of the participants commented that the instructors had not worked in “the real world” for some time and that their skills and knowledge level was not very up-to-date with current industry practices. These same industry leaders suggested that their company would be willing to host the community college instructors in a summer professional development. The community college instructors would work in their plant during the summer semester and learn first-hand current industry standards and processes. They further suggested that the college would pay the instructor’s normal salary through the summer.
as an investment in the instructor’s professional development. The outcome, according to the participants, would be the instructor’s exposure to current industry practice and hopefully the instructor would recognize what is relevant in their program and what needs to be changed.

Recommendations

Recommendations resulting from this study have been categorized for business and industry, community colleges, and further research.

Recommendations for Business and Industry

1. Employers need to realize that their employees are their greatest asset and that human capital investments will yield great returns. Employers should partner with community colleges to provide apprenticeships for high demand career fields. Employers should offer tuition reimbursement for employees who wish to continue their education. Employers should partner with Alabama’s community colleges and universities to develop career pathways for various positions within their organization so that employees can know what it takes to advance.

2. Business and industry should provide intern/working opportunities for community college instructors during the summer semester. The summer internship/externship would help the instructor better understand the skills needed to be successful on the job and they could better align the curriculum to industry standards. Employers should be willing to invest in the community college by paying the instructor’s salary for the ten weeks of a normal summer semester every couple of years.

3. Business and industry leaders should communicate their expectations with community college leadership and work to create a win/win partnership. Business and industry should work with their local community college leadership, including the president, dean,
and instructors, to develop a strategic plan to meet their current and future high demand employment needs. The strategic plan should be labor market data driven. The plan should be evaluated bi-yearly and include topics such as facility requirements, equipment needs, personnel needs, and be results driven. Transparency with all parties is imperative.

4. Business and industry leaders should support the community college system by working with and communicating with legislators to ensure that the community colleges are properly funded. There should be yearly meetings between business and industry leaders, legislators, community college leadership, and advocacy groups like Manufacture Alabama to ensure that the colleges are fully supported. Topics that should be addressed in these meetings include grants, legislation, and policy to ensure high demand career programs are funded and supported to meet the needs of business and industry.

5. Business and industry leaders should partner with community colleges and other community organizations to help educate parents and recruit students into career and technical programs. The data from this study indicate that recruiting should begin as early as the seventh grade and include how clean and high tech these modern manufacturing environments are. A business and industry led comprehensive advertising campaign should be developed to ensure that the work environments, career opportunities, and potential salaries are shared across the state. The education and recruiting campaign should be collaborative between business and industry leaders, the Alabama Community College System, Manufacture Alabama, and Alabama Manufacturers Association.
Partnerships between business, industry, and community colleges are vital for everyone’s success, but most of all for student success. According to Amey, Eddy, and Ozaki (2007), the college serves as an academic bridge for students and is often involved with a broad array of partners both within and outside of the educational sector. As an entrepreneurial organization with a tradition of responsiveness, the institution serves as the link among public schools, businesses, and other governmental and community agencies” (p. 6). Partnerships between Business and industry and Community colleges are like relationships. They require work and attention and must be regularly nurtured. By following the recommendations listed above Business and industry will ensure that programs are in place that will supply a skilled workforce pipeline.

Recommendations for Alabama Community Colleges

1. Community college administration should allow instructors to periodically participate in a summer internship in the automotive manufacturing industry. The instructor would work in a cooperating manufacturer’s facility for the ten weeks in a summer semester to learn current industry practices and standards. The summer internship/externship would help the instructor to better understand industry needs and how to better align their curriculum to industry standards. The manufacturer would pay the instructor’s salary and the community college would provide an adjunct instructor to teach the summer classes.

2. Community college leadership should communicate their challenges with business and industry leaders and work to create a win/win partnership. There should be yearly meetings between business and industry leaders, legislators, community college leadership, local economic development leaders, and advocacy groups like Manufacture
Alabama to ensure that the colleges are supported. The more parties that are aware of each other’s challenges the more potential there is available to determine solutions for all.

3. Community college leadership should work with their local business and industry leaders to develop a strategic plan to ensure that the college is offering programs that align with current and future high demand careers. The strategic plan should include such topics as facilities, equipment, personnel, and should be labor market data driven. The plan should be evaluated bi-yearly and the outcomes should be used to determine what changes, if any, need to be made.

4. Community college administration should communicate with legislators and business and industry leaders to ensure that they are aware of the challenges that the community colleges are facing. The community college administration must have a vision and a plan for how to meet the growing and changing employment and training needs of local business and industry. Local legislators along with business and industry leaders must work together to ensure that the community colleges have the proper facilities, tools, equipment, and personnel to provide the much needed training.

5. The data from this research suggest that community colleges should begin recruiting as early as the seventh grade and include how clean and high tech these modern manufacturing environments are. Perkins V legislation encourages offering career and technical programs in middle school grades. A comprehensive career pathway plan needs to be developed by business and industry leaders in partnership with K-12 and community college leaders. The plan needs to map out a pathway for a variety of high demand careers and include specific events that each student will experience as they progress through school beginning in the fifth grade. The experiences should include
skilled professionals from business and industry sharing a hands-on activity that is common to their career. Community colleges should develop promotional materials focused on recruiting females and people of color into all high demand CTE programs but especially advanced manufacturing.

The recommendations listed above should be implemented by community college leaders in partnership with business and industry leaders, K12 leaders, as well as community leaders. In doing so, relationships will be developed and the collaborative efforts will ensure relevancy of the programs. As with any relationship, communication is key to success and through these relationships recruiting efforts will be more effective and impactful regarding modern day manufacturing.

Recommendations for Further Research

This research focused on Alabama’s automotive manufacturers’ perspectives of the workforce training that is provided by Alabama’s community colleges, and specifically the position of advanced manufacturing technicians (AMT).

1. Further research could also expand the study to include states other than Alabama. There are many states in the south that have automotive manufacturing plants, including Mississippi (Nissan, Toyota), Georgia (KIA), Tennessee (Nissan, Volkswagen) Kentucky (Toyota), and South Carolina (BMW, Volvo). As the economy continues to grow and expand, the shortage of AMTs will continue to grow and competition from others states could eventually have an adverse effect on Alabama’s manufacturers. Therefore, a comprehensive study should be performed to fully document the demand for AMTs.

2. Further research could expand to include other industries that employ AMTs besides the automotive industry, such as food processing, pharmaceuticals, and chemical. The
Governor’s Office of Education & Workforce Transformation (GOEWT) should partner with the Alabama Community College System to do a comprehensive study of the OEMs, Tier 1s and Tier 2s to fully document the extent of the shortage of AMTs in the state.

3. Further research could expand to include other high demand career fields other than just advanced manufacturing technicians (AMTs) such as registered nurses, IT technicians, and logistics professionals. The Governor’s Office of Education & Workforce Transformation (GOEWT) should partner with the Alabama Community College System and The University of Alabama to do a comprehensive study of the all high demand career fields to fully document the need in the state.

Research is key for documenting, discovering, and identifying issues as well as solutions. This research has identified the demand and skill set needed to be a successful advanced manufacturing technicians according to Alabama’s automotive manufacturers. As the southern states continue to enjoy an economic boom additional research as recommended above is needed to help identify and fill high demand high wage positions.

Final Thoughts

In June 2019, Area Development magazine awarded the state of Alabama “The Gold Shovel” award. The award comes after a record breaking year of economic development accomplishments. During 2018, Alabama enjoyed the announcement of new projects and expansions totaling $8.7 billion dollars of investment and a projected 17,026 new jobs created. Alabama has earned a gold or silver shovel each year since 2006. Companies are locating to Alabama from all around the world. Governor Kay Ivey attributes the economic growth to the abundance of a dedicated, high quality workforce (Thornton, 2019). Her “Success Plus”
initiative includes adding an additional 500,000 highly skilled individuals to Alabama’s workforce by 2025. The main goal of the plan is to create a workforce pipeline filled with individuals who have industry recognized skills. The individuals will have obtained their skills by earning certifications, certificates, credentials, or degrees in high demand fields. The Alabama Community College System is an integral part of Governor Ivey’s “Success Plus” plan and strategies are currently being developed by the system and college leaders to ensure full implementation (Underwood, 2018).

All of the community colleges in Alabama have some form of advanced manufacturing training programs and none of them are at full enrollment capacity. The Alabama community colleges can meet the growing demand for advanced manufacturing technicians but labs need to be upgraded, some more than others. All of the advanced manufacturing instructors are in need of updated training and professional development. Recruiting efforts need to be laser focused and should cross nontraditional lines, female students typically excel in advanced manufacturing programs.

In 2010, Toyota Motor North America (TMNA) developed the Federation for Advanced Manufacturing Education (FAME) apprenticeship program in collaboration with Bluegrass Community and Technical College in Georgetown, Kentucky. The FAME program has evolved to include other manufacturers and is an industry driven apprenticeship collaboration between employers and their local community college. The FAME model includes a two year advanced manufacturing technician (AMT) degree that focuses on manufacturing and automation. Students enrolled in a FAME program work at a company three days per week under the guidance of expert mentor and attend classes two days per week at a partnering community college.
college. The FAME program has grown to other states and industries and has a reputation for producing highly quality AMTs (Hanford, 2014).

Toyota announced in September 2019 that they had partnered with The Manufacturing Institute (MI), the education arm of The National Association of Manufacturers (NAM), to transition the operation and oversite of FAME to the Manufacturing Institute (MI). The MI will endeavor to grow the FAME apprenticeship model to a national scale to meet the ever growing need for skilled AMTs (Gattis, 2019). Currently there are thirty-one FAME chapters in thirteen states, four of those chapters are in Alabama (Smith, 2019). Ironically, in June 2019, the U.S. Department of Labor (DOL) awarded the Alabama Community College System (ACCS) a $12 million grant to expand apprenticeship partnerships in advanced manufacturing. The Alabama Community College System will be partnering with the Manufacturing Institute to grow the existing FAME programs and scale FAME to the other colleges in the system (Dance, 2019). It seems that, Governor Ivey’s “Success Plus” plan and focus on high demand skilled training at Alabama’s community colleges seem to be on target for supplying the demand for a skilled workforce. As she often says, “Alabama is ready and open for business!”
REFERENCES


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APPENDIX A: STRUCTURED TELEPHONE INVITATION PROTOCOL

Hello, my name is Jimmy Hodges, I am the Dean of Applied Technologies at Wallace State Community College located in Hanceville, Alabama. I am currently working on my dissertation at The University of Alabama and am requesting your help with a research project. The focus of the research project is on what Alabama community colleges are doing or can do to prepare their graduates to be able to fill the advanced manufacturing technician (AMT) openings in your factory. If you agree to participate, your point of view will be included in the final summary of the research findings. These findings will be presented to the Chancellor, Board of Trustees, and community college presidents in the Alabama Community College System. This is your opportunity to let your voice be heard regarding the curriculum and technical training that the community colleges in Alabama provide.

- If you agree to participate, you would complete a short questionnaire and meet with me for a short interview. Both of these activities will focus on your experiences with recruiting for and filling the high demand high skill job openings in your factory, specifically for the position of advanced manufacturing technician, as well as your company’s current involvement in community college-based AMT training programs. Your participation in this study is completely voluntary. Your identity and the identity of your company will be completely protected, and for the purposes of the research, you will be assigned a pseudonym.

- Does this sound like something that you would be willing to participate in?

- The interview will last about an hour. What date and time will work best for you?
Where would be a convenient location to meet?

I will be emailing you the questionnaire sometime today. The questionnaire will be coming from my email address which is jimmy.hodges@wallacestate.edu. The electronic questionnaire is very short, please complete it and it will be automatically sent to me. I will also be sending you an Informed Consent form. Please review it prior to completing the questionnaire, and let me know if you have any questions or concerns. We will review the Informed Consent Form and sign it together on the day of the interview.

Thank you for your time and thank you agreeing to participate in this research project. Your involvement is very important to me.

I look forward to meeting with you on the…..

Good bye.
APPENDIX B: PARTICIPANT EMAIL REQUEST

Dear ____________________,

My name is Jimmy Hodges, I am the Dean of Applied Technologies at Wallace State Community College located in Hanceville, Alabama. I am currently working on my dissertation at The University of Alabama and am requesting your help with a research project. The focus of the research project is on what Alabama community colleges are doing or can do to prepare their graduates to be able to fill the high demand high skill job openings in your factory primarily, the position of advanced manufacturing technicians. If you agree to participate, your point of view will be included in the final summary of the research findings. These findings will be presented to the Chancellor, Board of Trustees, and community college presidents in the Alabama Community College System. This is your opportunity to let your voice be heard regarding the curriculum and technical training that the community colleges in Alabama provide.

Your participation would include completing a short questionnaire and agreeing to meet with me for a short interview. Both of these activities will focus on your experiences with recruiting for and filling the high demand high skill job openings in your factory, primarily the position of advanced manufacturing technicians. Your participation in this study is completely voluntary. Your identity and the identity of your company will be completely protected, and for the purposes of the research, you will be assigned a pseudonym. If you agree to participate in the research study, I will email you a questionnaire to complete. The interview will be scheduled at a time and place of your preference and convenience, and will last approximately one hour.
Thank you for your time and consideration to participate in this very important research project.

I look forward to hearing from you soon.

Jimmy Hodges
APPENDIX C: PARTICIPANT CONFIRMATION EMAIL

Dear ______________________,

I know your time is very valuable and I thank you for agreeing to participate in this research study! I am writing today to confirm the appointment that you and I made during our recent phone conversation.

Date:

Time:

Location:

Also, I am attaching the short questionnaire that I mentioned in the previous email. Please complete and return it to me via email at your earliest convenience. Alternatively, I can collect it from you at the interview.

Finally, I am attaching a copy of the Informed Consent Form that I will go over with you at the beginning of our interview and have you sign. The form provides some additional information concerning the study and the procedures in which you will be involved.

I anticipate that our interview will last approximately an hour.

Again, I sincerely thank you for taking the time and effort to participate in this research study!

Jimmy Hodges
APPENDIX D: PRE-INTERVIEW PARTICIPANT QUESTIONNAIRE

1. What is your title?
2. How long have you been employed at this company?
3. How many years have you worked in the automotive industry?
4. What is the total number of employees at your location?
5. How many advanced manufacturing technicians does your company currently employ?
6. How many advanced manufacturing technician positions are currently unfilled/open at your company?
7. How many advanced manufacturing technicians does your company anticipate hiring in the next five years?
8. What is the average pay for an advanced manufacturing technician at your company?
9. Does your company have difficulty finding qualified AMTs?
10. In what type of recruiting events does your company participate?
11. Are you currently working with a community college regarding the training and hiring of advanced manufacturing technicians?
12. If so, which community college(s)
13. Who is/are your company’s primary contact(s) at the community college(s)?
14. Does your company participate with an internship or apprenticeship program for community college students?
15. If yes, how many community college interns or apprentices do you host at any one time?
16. Do you anticipate increasing the number of interns or apprentices in the near future?
17. If your company currently does not participate in such learning opportunities, do you think it would be open to internships or apprenticeships for community college students in the future?

18. Why or why not?

Thank you for providing responses to this pre-interview questionnaire. We will review it at the time of our scheduled meeting.
APPENDIX E: INTERVIEW PROTOCOL

Note: Researcher will begin by reviewing and securing signatures on the Informed Consent Form. Then, he will review the pre-interview questionnaire information with the participant to get clarity on all responses and information provided. Once this is complete, the following questions will guide the semi-structured interview, allowing for possible divergence should the participant’s answers need further explication or clarification.

AMT Skills, Knowledge and Expertise

1. What are the fundamental skills required for entry-level advanced manufacturing technicians positions?

2. Is there a standardized job description for an AMT at (company name)? If so, could you share it with me?

3. To what degree is a formal academic credential like a certificate or Associate’s degree important for an AMT to have who seeks employment at your company?

4. To what degree do you look for specific industry certifications in the credentials of your AMT job applicants?

Challenges in Hiring AMTs

5. How would you describe your experience seeking skilled advanced manufacturing technicians?
6. What do you think needs to be done to attract more people to a career in automotive manufacturing?

7. What skills or knowledge do you most often see lacking in applicants for AMT positions in your company?

8. As technology is constantly changing, is there an emerging skill or subject for which the community college should be preparing future AMTs?

9. How do you ensure that AMTs in your company upgrade their skills and knowledge on a continuous basis?

Partnerships with Community Colleges

10. How familiar are you with any advanced manufacturing technician or other workforce training programs at Alabama community colleges in your area/region?

11. Have you ever reviewed any of the course offerings for AMTs at community colleges in your area/region? (If yes, does the curriculum cover the appropriate training areas to develop skills that your company seeks in new employees?)

12. Would you say that your company currently has an active partnership with one or more Alabama community college? If so, could you describe the nature of that partnership?

Work-Based Learning Experiences

I notice from your responses to the pre-interview questionnaire that (company name) does/does not currently does not host interns or apprentices from community college AMT training programs.
13. What do you believe are/could be some of the benefits for students to participate in internships or apprenticeships?

14. What do you believe are/could be some of the benefits for manufacturers to participate in internships or apprenticeships?

15. Is there anything else related to the topics that we have discussed today that you would like to add?

Thank you very much for your time. [Offer to send participant a copy of the completed study and note whether or not they want to receive it.]
APPENDIX F: INTERVIEW AND FIELD NOTE FORM

Date: ____________________

Time: ____________________

Interviewee: ________________________________

Location: __________________________________________________

Field Notes: ___________________________________________________________________

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APPENDIX G: INFORMED CONSENT FORM

UNIVERSITY OF ALABAMA

HUMAN RESEARCH PROTECTION PROGRAM

CONSENT FORM FOR NON-MEDICAL INTERVIEW STUDY

UNIVERSITY OF ALABAMA

Individual’s Consent to be in a Research Study

You are being asked to be in a research study.

This study is titled “The Search for Skilled Technicians: An Alabama Automotive Manufacturers Perspective.” This study is being done by Mr. Jimmy Hodges. He is a doctoral candidate in the Department of Higher Education Administration at The University of Alabama, Mr. Hodges is being supervised by Dr. David E. Hardy, Associate Dean for Research and Service and Associate Professor of Higher Education in the College of Education at The University of Alabama. Because this study is a partial fulfillment of an academic degree (Ed.D.), Mr. Hodges is not receiving any monetary compensation or salary for completing this project.

What is this study about?

The intent of this qualitative study is to develop an in-depth understanding of how the workforce training of industrial maintenance technicians provided by Alabama’s community colleges compares to the expectations of leaders in the Alabama automotive manufacturing industry.

Why is this study important – What good will the results do?

As more businesses and industries continue to locate in the state of Alabama, the pool of available skilled workers gets smaller. Therefore, it is imperative that Alabama’s community
colleges offer programs in these high demand career fields. This qualitative research is necessary because there are no known documented perspectives of business and industry leaders regarding the workforce training that Alabama’s community colleges provide. This study will provide a voice to Alabama automotive manufacturers regarding the training that Alabama community colleges provide for industrial maintenance technicians. Additionally, recognizing that the curriculum must be aligned with industry standards and prepare graduates with the skills necessary to perform successfully, the results of this study may allow colleges to adapted current and future program designs to better ensure that success.

Why have I been asked to take part in this study?

You have been asked to participate in this study because you are employed by an OEM automotive manufacturer or a Tier 1 supplier.

How many people will be in this study?

The investigator will interview 16 individuals. The participants will be selected from the four OEMs with facilities located in the state of Alabama and four Tier 1 suppliers with facilities located in the state of Alabama.

What will I be asked to do in this study?

If you agree to be in this study, Mr. Hodges ask you to complete a brief questionnaire and then take part in a single, private interview at a mutually agreed upon time, date and location. In the interview, he will ask you some questions in order to learn about your perspectives on the study topics described above. The interview will last for about 60 minutes. Mr. Hodges will use a semi-structured interview protocol as a guide for the interview. If you are agreeable, the interview will be audio recorded with a digital recording device and the recording will be transcribed.
How much time will I spend in this study?
Completing the questionnaire in advance of the interview should not take more than 30 minutes of your time. The interview should last approximately 60 minutes. However, the actual duration will depend upon how much information about your experiences you choose to share.

Will being in this study cost me anything?
The only cost to you is your time.

Will I be compensated for being in this study?
There will be no financial remuneration to anyone for participating in this study.

What are the risks (problems or dangers) of being in this study?
Generally speaking, participating in this study should carry with it no physical, psychological, professional or personal risks to you. If it should occur that you have concern regarding any questions during the interview, you simply can ask the researcher to skip the question. Similarly, on the written questionnaire you may skip any question that causes you concern. While it is recognized that there can be some perceived risk and unease in allowing someone to audio record your perspectives and opinions on any subject, the researcher will take every precaution to ensure that the recording is used only for its intended purpose and that it will be destroyed and the completion of the transcription and analysis of your interview.

What are the benefits of being in this study?
There are no direct benefits to you. However, the results of this study will provide community college leaders in Alabama with information and insight that will be beneficial in developing, improving, and implementing effective workforce training partnerships with automotive manufacturing companies like the one in which you are employed. Ultimately, such curricular improvements may lead to more productive manufacturing practices and manufacturer results.
How will my privacy be protected?

Your identity and participation in the study will be known only to the researcher and you. You are free to decide where and when the researcher will conduct the private, one-on-one interviews so you may talk without being overheard. When the researcher reports findings and/or publishes any articles using the data, he will use pseudonyms to ensure all participants’ anonymity. Any potentially identifying comments will be masked as much as possible without distorting the meaning of your responses.

How will my confidentiality be protected?

Your interview with the researcher will be recorded on a portable digital recorder. The file created by the recorder will be transferred to the researcher’s personal password encrypted hard drive for storage during the transcription and analysis phases of the study. The audio recording will be transcribed into a word processing file which also will be stored on the researcher’s personal password encrypted external hard drive. The external hard drive containing the digital audio files and interview transcripts, as well as the completed questionnaires collected for this study will be locked in Mr. Hodges’ office at his place of employment. He will be the only person who has access to this information. Once the analysis of the audio recordings has been completed, Mr. Hodges will delete the digital files from his personal external hard drive.

The interview transcripts, along with the manuscript of the dissertation and its related analytical documents will be retained on the hard drive for a period of five years after the study is completed. At the end of the five-year period, all digital files of the transcripts will be deleted and any paper copies of the transcripts will be shredded and or incinerated. When the researcher reports findings and/or publishes any articles using this data, he will use pseudonyms to ensure participants’ anonymity.
What are the alternatives to being in this study?

The only alternative is not to participate.

What are my rights as a participant?

Being in this study is voluntary. It is your prerogative to participate or not. You may choose not to be in it at all. If you start the study, you can stop at any time by asking the researcher to stop the interview. Not participating or stopping participating will have no effect on your relationship with the researcher.

The University of Alabama Institutional Review Board is a committee that looks out for the ethical treatment of people in research studies. They may review the study if they wish. This is to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

Who do I call if I have questions or problems?

If you have questions about this study, please ask them. I will enjoy talking to you about them. Please contact me by phone at (256) 609-9234 or email me at jimmy.hodges@wallacestate.edu.

If you like, you also may request a copy of the transcript of your interview and/or of your completed questionnaire, and I will provide them to you.

You may also contact the chair of my dissertation committee, Dr. David E. Hardy, Associate Dean for Research and Service in the College of Education and Associate Professor in the Higher Education Administration Program at The University of Alabama, via email at dhardy@ua.edu or via mail at the following address:
If you have questions about your rights as a participant in a research study, would like to make suggestions or file complaints and concerns about the research study, please contact: Ms. Tanta Myles, the University of Alabama Research Compliance Officer at (205)-348-8461 or toll-free at 1-877-820-3066. You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach Website at [http://ovpred.ua.edu/research-compliance/prco/](http://ovpred.ua.edu/research-compliance/prco/). You may email the Office for Research Compliance at rscompliance@research.ua.edu.
Agreement:

- I agree to participate in the research study described above.

- I agree to have my interview audio recorded for the research study as described above.

- I do not agree to have my interview audio recorded for the research study described above, but still agree to be interviewed with the research taking notes.

- I do not agree to participate in the research study described above.

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_______________________________________________
Print Name of Investigator or other Person Obtaining Consent
April 22, 2019

Jimmy Hodges
ELPTS
Box 870231

Re: IRB # EX-19-CM-065: "The Search for Skilled Technicians: An Alabama Automotive Manufacturers Perspective"

Dear Mr. Hodges,

The University of Alabama Institutional Review Board has granted approval for your proposed research. Your application has been given exempt approval according to 45 CFR part 46. Approval has been given under exempt review category 2 as outlined below:

(2) Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if:

(iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 546.111(a)(7).

The approval for your application will lapse on April 21, 2020. If your research will continue beyond this date, please submit the annual report to the IRB as required by University policy before the lapse. Please note, any modifications made in research design, methodology, or procedures must be submitted to and approved by the IRB before implementation. Please submit a final report form when the study is complete.

Please use reproductions of the IRB-approved informed consent form to obtain consent from your participants.

Sincerely,

Carpantato T. Myles, MSM, CIM, CIP
Director & Research Compliance Officer

Cc: Dr. David Hardy