Can Apprenticeships Alleviate a Regional Skills Gap?
A Case Study of Programs at Trident Technical College in Charleston, SC

By

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Submitted to the Department of Urban Studies and Planning
in partial fulfillment of the requirements for the degree of

Master in City Planning

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

February 2019

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ABSTRACT

In attempts to address a skills gap, the state of South Carolina established Apprenticeship Carolina in 2007 which helps businesses create federally registered apprenticeships. Apprenticeship Carolina is a newer addition to the longstanding worker-training programs that make up the South Carolina Technical College System's Division of Economic Development. In the Charleston area, actors in the public and private sectors have partnered with the region's technical college (Trident Technical College or "Trident Tech") and leveraged Apprenticeship Carolina to create robust adult and youth apprenticeship programs in addition to leading other new workforce initiatives. At the same time, the local economy is growing and diversifying rapidly in the fields of advanced manufacturing, information technology, and other STEM-related sectors. This makes Trident Technical College's work in Charleston an attractive case study on apprenticeships as a means for addressing skills gaps. Since 2007, Trident Tech, businesses, and community partners have expanded the number of adult apprenticeships and created a regional youth apprenticeship program where both programs offer positions in career pathways in diverse sectors. This thesis examines what program administrators, community partners, and participating businesses ("sponsors") believe is working well and where there could be improvements.

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Acknowledgements

I would like to thank my thesis committee for their guidance and support throughout this process. I would also like to thank other faculty, staff, and colleagues in the department who shared their expertise and encouraged me to keep going. I sincerely appreciate the people in the Charleston area I interviewed who were incredibly gracious with their time. I would especially like to thank my family and friends in the region who shared their insights with me. Finishing this would not have been possible without calls, texts, prayers, and support from my parents, sister, extended family, and friends. Thank you.

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1 – Introduction

       This thesis explores how Trident Technical College ("Trident Tech" or "Trident") appears to play a central role in implementing economic development and workforce development strategies in Charleston, South Carolina. In the Charleston area, public and private sector partners have worked with Trident Tech to create robust adult and youth apprenticeship programs and as a resource for quickly developing or implementing other workforce development initiatives. At the same time, the local economy is growing and diversifying rapidly in the advanced manufacturing, information technology, and other STEM-related sectors. This makes Charleston and the work of Trident Technical College an attractive case study for the use of apprenticeships as a vehicle for addressing skills gaps. Since 2007, Trident Tech, businesses, and community partners have expanded the number of adult apprenticeships and created a regional youth apprenticeship program where both programs offer positions in diverse sectors.

       Now, two of South Carolina's flagship programs for worker training are readySC and the newer Apprenticeship Carolina. Both are employer-driven and both are administered through the state's technical college system. Both programs are also very active in the Charleston Metropolitan area where people are seeking to fill the new jobs and preparing for the few thousand jobs still coming online.

       Recent national reports promoting the possible benefits of apprenticeships to build a pipeline of skilled workers prepared for the future occasionally feature Apprenticeship Carolina. The reports cite Apprenticeship Carolina's fast and focused strategy for growth and its program design for the "win-win" the program says it facilitates for employers and the apprentice-employees (Olinsky and Steinberg 2013; Rossmeier 2015). Apprenticeship Carolina describes itself as "a division of the SC Technical College System, [that] works to ensure all employers in South Carolina have access to the information and technical assistance they need to create demand-driven registered apprenticeship programs" (Apprenticeship Carolina 2017).

       With a stated annual budget of just under $1 million when it was created in 2007, South Carolina grew the number of registered apprenticeships across the state from 731 to 4,485

between 2007 and 2014.[1] As the program that facilitates the creation of federally registered
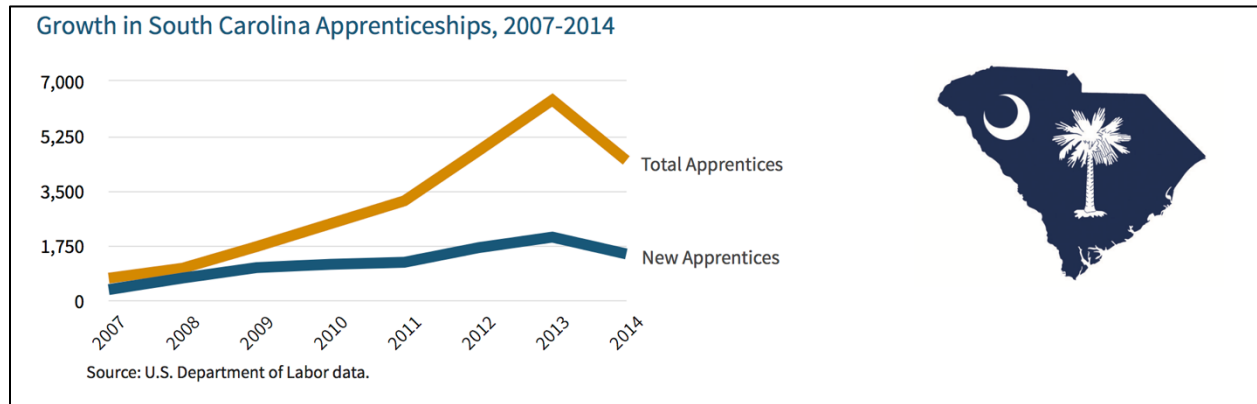
Figure 1: Cowen Institute Issue Briefs- section on Apprenticeship Carolina (Rossmeier 2015)

apprenticeships in the state, Apprenticeship Carolina brings together employers, workers, and education and training providers. It is expanding the number of apprenticeships in fields like manufacturing, construction, and traditional trades and beyond those trades into fields that do not typically feature apprenticeships including pharmacy, hospitality, and information technology ("IT") (South Carolina Chamber of Commerce 2015). In traditional and non-traditional sectors, it is seen as a vehicle for connecting workers interested in quality work opportunities to employers seeking to fill a number of middle skilled job positions that are available and pay well. In addition to the service Apprenticeship Carolina provides employers, a regional partnership in the Charleston area that is focused on producing adult and youth apprenticeships has received additional special attention from the U.S. Department of Labor in recent years. Apprenticeships are seen as ways for graduates receive certifications in career pathways or sectors and, in some instances, they are seen as platforms people can use to continue their academic or vocational training in the future.

readySC, another flagship employee training program that is coordinated by the SC Technical College System, works with firms looking to expand or relocate to the state. It does this by developing a curriculum to train employees and also uses a train-the-trainer model that is tailored to each firm's workforce needs. readySC works in a manner that is best for the company and provides the service at no cost to the company. It is a major component of the

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[1] The number of apprenticeships comes from those registered with the state and the United States Department of Labor. Employers may choose to host apprenticeship programs that are not officially registered and thereby would not be included in the numbers. Reasons for as much will be addressed in the thesis.

incentives package offered to convince a company to locate or expand in the state. In a survey conducted by the SC Chamber of Commerce, readySC was cited as being a major factor in the decisions of about 85% of companies that relocated their business to the state (South Carolina Chamber of Commerce n.d.). While both are employer-centered programs, readySC and Apprenticeship Carolina are very different in that all workers enrolled in training through readySC are not guaranteed an opportunity to work directly with the associated-company.

In addition to workforce development programs and the accompanying incentives for company recruitment that exist statewide, regional chambers of commerce, local economic development offices, and each region's technical colleges work in partnership with the state's Department of Employment and Workforce (DEW) to sponsor more individualized programs based on area needs and industries. Interestingly, public and private sector workforce development partners are reaching further into rural areas and are testing ways to prepare as many local residents as possible for the changing economy.

Because South Carolina's Technical College System's programs appear to be a major force in development, this thesis looks at how Trident Technical College plays a role in implementing employer-based workforce development strategies and in training workers in the Charleston area.

About the Charleston Area

The Charleston Metropolitan area, which includes Berkeley, Dorchester, and Charleston counties together, has a population of over 760,000 people, see Figure 1 (Trident Technical College Division of Finance and Administration 2017). One interviewee explained the area is growing by 38 people a day – "10 net births over deaths and 28 people moving" to the region (County Economic Development Official 2018). Current unemployment in the region is 2.8%[2] (United States Department of Labor, Bureau of Labor Statistics 2018).

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[2] The unemployment rate was around 3.4% when I conducted interviews in Spring 2018 and Summer 2018.
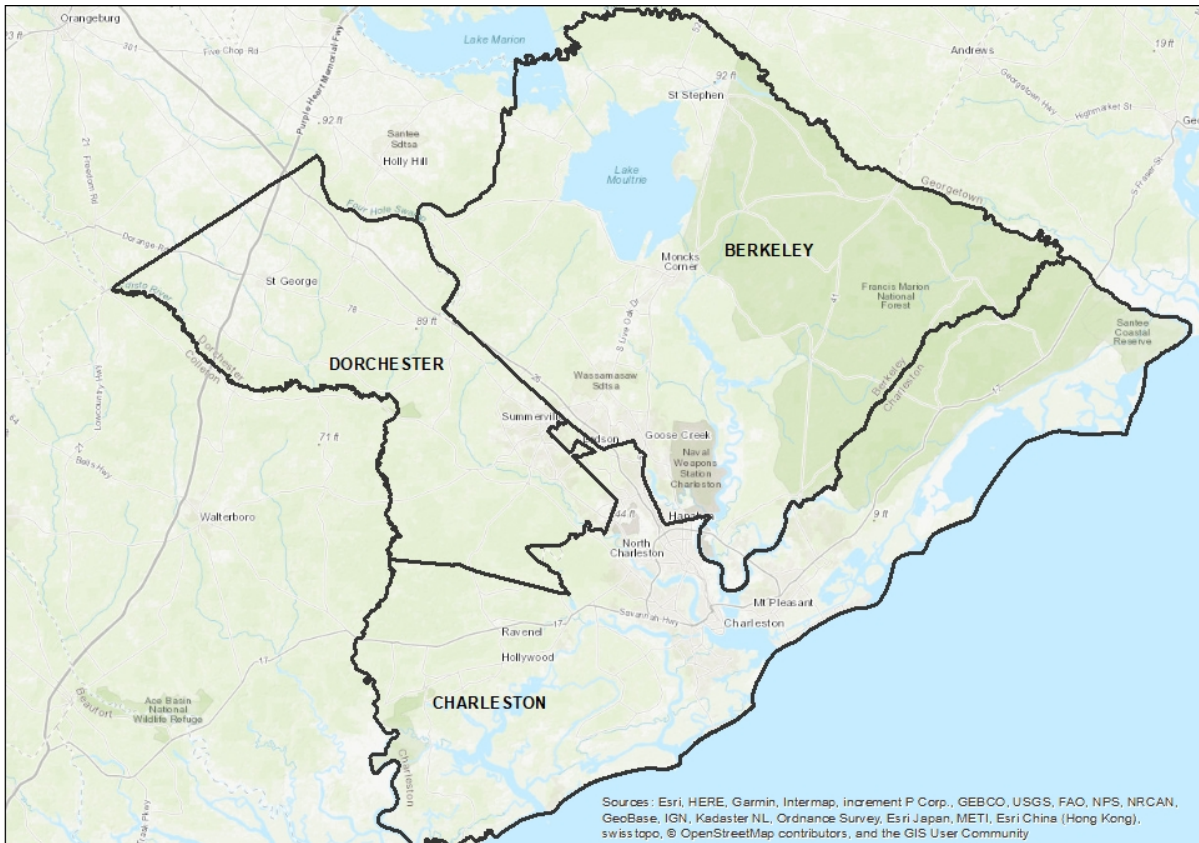
Figure 2: Charleston Metropolitan Area: Berkeley, Charleston, and Dorchester Counties. Additional data sources: U.S. Census.

Some of South Carolina's largest sectors by Department of Labor Employment numbers in 2017 were Trade, Transportation, and Utilities (22% of the state's jobs), Government (22%), Professional and Business Services (15%), Manufacturing (14%), Leisure and Hospitality (13%), Financial Services (5%), Construction (5%), Other (4%), and Information (2%) (SC Department of Commerce n.d.). Among the top 20 largest employers in Charleston are the Medical University of South Carolina, the Boeing Company, the Department of Defense, and the Robert Bosch Corporation. Other leaders are school districts, the VA Medical Center, grocery and retail stores (Publix, Harris Teeter, and stores like Walmart), and local government.
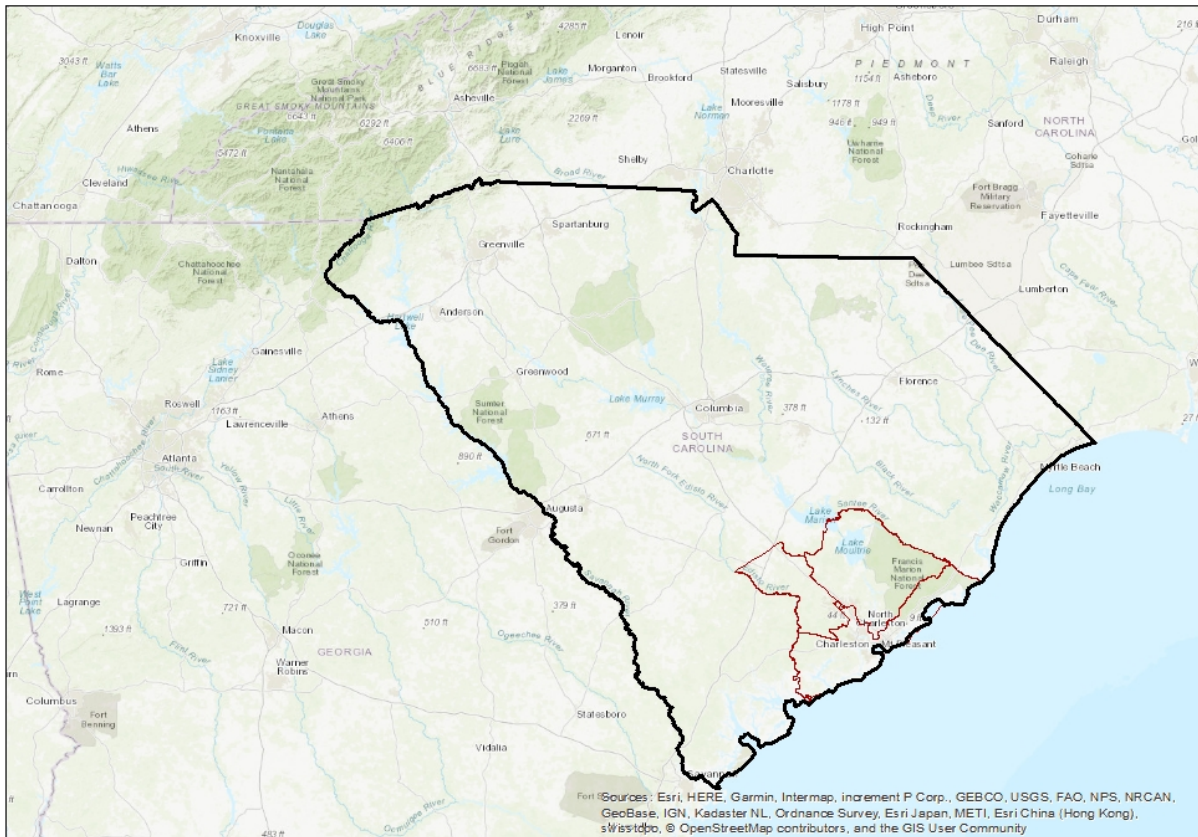
Figure 3: Charleston Metropolitan Area in South Carolina. Additional data sources: U.S. Census.

New employment opportunities and developments in the region appear regularly in the local news. Google hosts multiple data centers in Berkeley County since establishing its first one in 2007 (J. McDermott 2013). In 2015, Volvo announced it would create a new manufacturing facility in rural Berkeley County with 2,000 jobs. The facility opened and started producing vehicles in summer 2018. Volvo was in the news again in late 2017 with reports that they were already planning additions to their original plans and intending to add an additional 1,900 jobs for a total $1 billion investment (Rindge 2017). Mercedes-Benz and other manufacturers have announced new facilities or started construction on facilities in the tri-county area while existing large employers like a Fruit of the Loom Distribution Center have expanded their operations (Rahal 2015; Wren 2016).

News reports maintain that these recent additions and expansions in aero-, auto-, and advanced manufacturing in the Greater Charleston area are building upon the momentum of the Boeing Company's announcement in 2009 that it would be building its Dreamliner planes in Charleston and the subsequent success of the facility. The growing, new industries in this region

of the state look similar to the manufacturing hub that has been established for a few decades in the Greenville-Spartanburg area in Upstate South Carolina. Overall, the Charleston area and state's strategy of attracting employers through tax incentives and employer-centered workforce development appears to be creating new, good-paying jobs due to the sectors involved.

Regional leaders attribute the growth and industry diversification in the region that has been occurring over the past decade to a comprehensive, employer-focused economic development strategy. The strategy focuses on attracting employers from other states and from around the world to South Carolina through a mix of incentives. Some incentives are traditional financial incentives while other incentives include subsidized and customized training programs and training support for a firm's workers. Businesses choosing to relocate to the state or expand their existing operations in South Carolina cite the state's customized training programs for workers as a major part of the deal.

In the last 10 years, the Charleston's previously a largely service and medical-based economy has shifted to focus more on Science, Technology, Engineering and Math (STEM) industries with companies like Google, Boeing, Mercedes, and Volvo locating to the region (Trident Technical College 2018a). A few private employers have offered apprenticeships for high school students in the Charleston area for decades. In the Upstate, BMW imported their home country of Germany's apprenticeship model. There are also strong regional technical colleges and supportive feeder adult education and GED programs in the Upstate which feeds into local industries.

Currently, Boeing is a major partner in building a facility on Trident Tech's North Charleston campus that will advance aero- and aeronautical training and Mercedes has a section of a building that it shares with others (TTC Student Volunteer 2018). readySC has an office on campus. The Division of Apprenticeships on North Charleston's campus facilitates connections between students, the college, and employers who are interested or recruited to offer apprenticeships to high-school students (TTC Student Volunteer 2018).

Apprenticeship Carolina has promoted advanced manufacturing training which has been a boost for the companies and opportunities for new area supplying businesses (Hanks and

Gurwitz 2016)(Uri Berliner 2014). Newer positions that are highlighted in reports point to apprenticeships in traditional trades as well as expansions into other sectors like hospitality and healthcare. Apprenticeships in this fashion, or the "German model," of workforce development as it has been deployed in South Carolina, has been touted as a model for other states.

Shared Prosperity

In *The Brookings Institute's* March 2017 "Metro Monitor" report, the Charleston Metropolitan area in South Carolina ranked second among metropolitan areas in the country that consistently scored above average on measures of growth, prosperity, and inclusion. Interestingly, Charleston ranked 45th in terms of prosperity – the lowest of the 15 top ranked areas that were featured. Just behind the Charleston area in the same group was Raleigh, North Carolina, ranked 42nd in prosperity and the Denver area which ranked 36th with most others ranking at 22nd and below. On the other measures, the Charleston area did better, ranking 14th in growth (change in gross metropolitan product, in hiring by firms 0 – 5 years old, and in number of jobs) and 8th on inclusion (change in median wage, in relative income poverty rate, and in the employment rate) (Shearer et al. 2017, 22).

In the study, prosperity was measured as a change in productivity, in average annual wage, and in the standard of living. The study states, "As the value of labor rises, so can wages. Increases in productivity and wages are what ultimately improve living standards for workers and families and the competitiveness of metropolitan economies" (Shearer et al. 2017). With the Charleston area ranked much lower than the majority of other top performing areas in measures of change in prosperity, this raises questions about whether the rising tide of growth – and even inclusive growth – lifts all boats. Quoting *Kids Count*, a project of the Annie E. Casey Foundation, a 2014 article in the *Post and Courier* highlighted the double-digit growth in childhood poverty in each county the region between 2008 to 2012.[3] There are questions about whether the region's workforce is ready for the kinds of diverse, skilled, "good-paying"

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[3] According to the same article in the *Post and Courier* based on the *Kids Count* report, in South Carolina overall, children living in poverty increased 26% between 2008 and 2012. For the Charleston area, there were increases as well with Charleston County seeing a 22% increase (20,887 children affected), for Dorchester County, the increase was 36% (6,221), and Berkeley County, a 12% increase (9,629).

positions opening up and whether the growth and prosperity of the region are felt equitably by everyone.

Trident Tech has adult and youth apprenticeship programs with over 120 business partners engaged to hire youth apprentices for the 2017-2018 school year. It also has courses, staff, and state-of-the-art training facilities at its sites around the tri-county area that support "aeronautical education and training programs, but also the needs of high tech aeronautical manufacturing supply firms that are flocking to the region, largely because of Boeing" (Trident Technical College Division of Finance and Administration 2017). While all of the companies named in this chapter do not utilize Trident's training resources exclusively, the school has a regional focus on offering traditional community college academics while strongly catering to existing and new relocating firms.

This thesis explores how programs of the region's technical college appear to play a central role in quickly responding to Charleston's economic development and workforce development needs.

2 – Literature Review and Methods

This thesis examines the role Trident Technical College plays in Charleston's growing regional economy. It focuses largely on the school's Division of Apprenticeship Programs. It aims to understand how Trident designs its training and educational programs with partners in the business sector and otherwise. Relevant literature is on community colleges, community colleges as workforce intermediaries, human capital, the skills gap, and the role of South Carolina's technical college system in workforce development.

History and Role of Community Colleges

The first community college or "junior college" in the U.S. was created in 1901, though the idea of junior colleges in the U.S. can be traced to the early 1850's (Drummond 2002). From the beginning, the community college sought to balance offering academic training and vocational training (Drummond 2002). A great deal of academic and professional practice literature for community colleges point to the varied and sometimes conflicting missions they have and the best ways of addressing those missions. The missions are named as: educational training, vocational training, economic development, and social service (Bailey and Averianova 1999). Other pieces are on the structure of community college vocational programs and whether clear career pathways are best for students (Van Noy et al. 2012, 2016). Julian Alssid's 2002 *Building a Career Pathways System: Promising Practices in Community College Centered Workforce Development,* for example, presents promising practices for community colleges. It largely focuses on the strengths of programs that use career pathways and competency-based standards for designing programs (Alssid et al. 2002).

In *Community Colleges and Their Communities: Collaboration for Workforce Development* Margaret Terry Orr considers "new vocationalism" and its implications for community colleges. In her literature review, she states:

> "The new vocationalism reflects a growing emphasis on vocational-technical education for growth industries of the new economy, incorporating academic outcomes (W. N. Grubb, personal communication, Feb. 1, 2001); a market-driven responsiveness to ever-changing business and industry skill needs (Zeiss, 1999–2000); and an emphasis on lifelong learning that is focused on skill rather than degree acquisition." (Orr 2001)

Notably, she outlines Tony Zeiss's argument in "Community/Workforce Development: A Mandate for Relevancy" that (1) employers need skilled workers, (2) that businesses and industries want "certified occupational and workforce skills," not degrees, and (3) that businesses will find other sources for education if community colleges do not play their part in delivering relevant vocational education (Orr 2001).

Workforce Development for Companies and Communities

In his 1964 work *Human Capital*, Gary Becker explored the presumed benefits of worker training and the conditions under which such training is beneficial to a firm (G. Becker 2008). Becker counts: "…expenditures on education, training, medical care, and so on as investments in human capital. They are called human capital because people cannot be separated from their knowledge, skills, health, or values in the way they can be separated from their financial and physical assets." Becker makes an argument about why and under what conditions it is advantageous for a place or an entire country to invest in human capital from a cost-benefit perspective (G. S. Becker 1993). He goes on to say:

> Few if any countries have achieved a sustained period of economic development without having invested substantial amounts in their labor force, and most studies that have attempted quantitative assessments of contributions to growth have assigned an important role to investment in human capital.

He also notes that investment in human capital typically helps those who have received the education and training to earn more over time and that there is a distinction between general skills and job-specific skills (G. S. Becker 1993; Schrock 2014). Questions are raised about whether firms find it advantageous to invest in training if it seems their investment—the trained workers—could easily leave and work elsewhere.

With the nature of work changing in many places, there are studies showing a large number of positions open at times of high unemployment. Some economists refer to the issue of as a "skills mismatch." It is a situation where potential workers are educated but their education and skills do not match the needs of the firms that are hiring.

Public investment in worker training and skills development occurs differently in different countries. In "coordinated markets" like Germany, other countries in Europe, and

Japan, the government plays a larger role in vocational training that is more directly connected to particular industries, trade unions, and employer associations based on firms' needs. In more "liberal markets" like the United States and the U.K., the government plays less of a direct role in training workers by vocation (Schrock 2014). Some career and technical education (CTE) advocates in the U.S. are moving towards better connecting students in K-12 (or K-16) education with vocational paths. This is in hopes of better preparing students for occupations that require education beyond a high school diploma but do not require the time or money needed to acquire a 4-year degree. Some are fashioned as moving "beyond college for all" to a model that may better address the skills mismatch. They would, ideally, prepare students for meaningful, jobs that pay well, that are available, and where companies are ready to hire them (Rosenbaum and Rosenbaum 2001).

In May 2016, the Urban Institute published the brief "Understanding Local Workforce Systems." It describes national funding and policies that support local workforce systems, partners in those systems, who they serve, and strategies for workforce development. It breaks down local systems into roles and partners into: (1) the governmental and public sector, (2) nonprofits and collaborative entities, (3) employers, industry, and the workforce, and (4) education providers. In discussing the role of education providers – like Trident Technical College and other community colleges – it highlights four strategies for educating: (1) where "colleges and universities using accelerated approaches" to teaching skills, providing learning assessments, and more for in-demand jobs, and (2) where "non-degree education and training providers work with employers, industry organizations, and business and trade associations to create credentials focused on the skills and competencies needed for employment in a particular occupation." It goes on to describe two more strategies: (3) Employers providing on-the-job training experiences "through apprenticeships, internships, and other … programs," and (4) "Public high schools create small learning communities called career academies, which offer students occupational training at a technical school or college in addition to their regular academic instruction" (Eyster et al. 2016).

In describing the role of nonprofits and collaborative entities, the Urban Institute's brief highlights the role of workforce intermediaries. They are described as entities that bring

together stakeholders focused on workforce for collaboration or initiatives (Eyster et al. 2016). On community colleges as workforce intermediaries, Robert Giloth in 2004 stated: "The greatest underutilized resource for workforce intermediaries are community colleges and technical schools." He goes on to say, "This infrastructure, at its best, combines adult education, vocational training, connections to community organizations, and case management and college-level certification/articulation with a variety of business responsive training development services" (Giloth 2004).

Workforce intermediaries like chambers of commerce and in some cases community colleges are seen as key to expanding workforce development opportunities like apprenticeships in the U.S. according to Robert Lerman (R. I. Lerman 2016) who is a leading author on apprenticeships. In addition to chambers of commerce, workforce intermediaries for apprenticeships programs are often trade unions and construction industry associations. Interestingly, South Carolina actively opposes union formation as a "right to work" state (South Carolina Chamber of Commerce n.d.). This thesis seeks to better understand what avenues and partners state and local leaders may use in place of trade unions since unions play such a pivotal role in worker education in other states and in places like Germany with apprenticeships and similar workforce development training programs.

Employer-Driven Workforce Development

South Carolina uses an employer-driven form of workforce development. Some states have been experimenting with employer-centered models of training (Osterman and Batt 1993; Schrock 2014). Training programs focus on devoting resources to meeting the needs of the company first. A great deal of the training is tailored to company needs through the South Carolina Technical Education System (Poland and South Carolina Technical College System 2013). A study published in 1993 by Paul Osterman and Rosemary Batt focused on "the effort to improve the skills of adult workers by creating employer-centered public training policies" in order to inform discussions about ways to best spend federal dollars on worker training since there was an increased interest in developing a national training policy for international competitiveness. It notes that improving productivity should impact the competitiveness of American firms. They looked at state programs that were income targeted or community-based

efforts, agency-based models, or public education-based systems by design. The study provides some insight on how different types of training programs impacted productivity and competitiveness. The authors agreed with advocates' arguments that worker training leads to better work organization and productivity, but their observations of state programs raised questions about substitution, accountability (how well dollars that are spent achieve the desired outcomes), distributional issues (whether the scarce dollars are being spent to address the most need), and system (how well are investments benefiting larger area economies and systems of employment as opposed to just strengthening the firms' bottom-line) (Osterman and Batt 1993).

It concluded in part that "a constructive system-building activity … would be to attempt to strengthen intermediary organizations such as business organizations or unions." Funds used for employer-centered training tied to community colleges and larger systems in North Carolina and South Carolina were featured in the study. They noted it seemed that these models did a better job of not simply subsidizing a firm's activities but also contributed to workers' well-being and to the economic health of other economic development systems (Osterman and Batt 1993).

Benefits of a Community College Education for Individuals

There is literature on the role of community colleges as workforce intermediaries and tools for economic mobility for low-wage workers and disadvantaged individuals. Joan Fitzgerald's report on *Community Colleges as Labor Market Intermediaries: Building Career Ladders for Low Wage Workers*, for example, looks at how community colleges can be critical for supporting disadvantaged workers (Fitzgerald 2000). She gives the schools agency and power saying, "Community colleges vocational programs are uniquely poised to provide the training needed for low wage workers to advance into better-paying jobs." The programs she studied have either career ladders or wage progression as major components. In the same piece she states, "To the extent they are successful, community colleges can help to create better-paying jobs as well as provide the training for people to fill them." She continues saying, "Going to scale with career ladder and wage progression strategies means that community colleges have to convince employers to create more middle-paying jobs."

Similarly, in her 2006 work *Moving Up in the New Economy*, Fitzgerald argues that community colleges are a key training link for creating career ladders. The book created with support from the New Century Foundation looks at how individual workers are experiencing "a growing amount of personal debt, a sense of increasing powerlessness, and confusion about how to choose a successful career path." It goes on to say, "These issues are especially acute for the majority of Americans who do not graduate from college" and asks, "How can workers without a college education can be given more opportunities to learn and advance within the sectors in which they are employed." In Chapter 7, "An Agenda for Moving up in the New Economy," Fitzgerald focuses on community colleges and calls them "the key education and training link for career-ladder strategies," but notes that "Collaboration with community organizations and moving students to 4-year colleges often doesn't happen." To fix this, she says "incentives and directives" are needed (Fitzgerald 2006). Both of Fitzgerald's works cited here, understandably, focus more on how career-oriented instruction at community colleges can help low-wage and disadvantaged workers access careers and economic mobility than on the needs of employers.

Federal Support for Workforce Development

Reports by the Congressional Research Service on the federal legislation for funding supporting career and technical education and workforce development through the Carl D. Perkins Act, Workforce Innovation and Opportunity Act (WIOA), and the One-Stop system explain the history of the public programs—including support for programming at community colleges – and for certain private sector partners in these areas. (Dortch 2012; Bradley 2015). The Workforce Investment and Opportunity Act (WIOA) of July 2014 was signed into law by President Barak Obama and was designed "to help job seekers access employment, education, training, and support services to succeed in the labor market and to match employers with skilled workers they need to compete in the global economy." "It was the first legislative reform to the public workforce system in 15 years." (U.S. Department of Labor, Employment & Training Administration (ETA) n.d.). The U.S. Department of Labor has supported the expansion of federally registered apprenticeships and provided funding to states seeking to further those goals, including South Carolina (South Carolina Legislature 2017). In summer of 2017, the

Trump administration directed additional support to these initiatives which included signing an executive order that broadened the government's apprenticeship and skills-training programs (Soergel 2017).

In 2009, in a report for the U.S. Department of Labor, Lerman et al. described sponsors experiences with registered apprenticeships. Many of the sponsors were in construction. Others were in retail and utilities. An overwhelming majority of the sponsors surveyed valued the program and would recommend it to others. Only a few indicated they would recommend the program but with "reservations due primarily to problems with accessing related instruction" (ii). When identifying the benefits of the apprenticeships, more than 80% of sponsors said the program was helping to "meet their demand for skilled workers." Other benefits identified by a majority of the respondents included, "the apprenticeship's role in reliably showing which workers have the skills needed;" and "raising productivity, strengthening worker morale and pride, and improving worker safety;" as well as "worker recruitment and retention and in meeting licensing requirements" (R. Lerman, Eyster, and Chambers 2009). Similarly, Gunn and De Silva submitted a report on registered apprenticeships from the perspectives of sponsors and apprentices to the U.S. Department of Labor in 2008.

South Carolina

There are some academic papers on South Carolina's employer-centered workforce development programs that are tied to the state's technical college system. Bryana Banashefski, a student at American University, produced a senior capstone project on Apprenticeship Carolina (Banashefski 2014). An Urban Institute brief from 2017 described how the creation of Apprenticeship Carolina and the expansion of registered apprenticeship opportunities impacted the diversity of registered apprentices in South Carolina. It found that people of color did not participate any more or less, but that women's participation did grow. The study also found that the increased participation of women was due to apprenticeship opportunities in jobs that typically employ more women (Kuehn 2017). There are also federal government initiatives and series of white papers produced in the last 5 – 10 years on apprenticeships in the U.S. and in particular, the existing programs compared to programs that

are much more robust and seen as successful in Europe (Rossmeier 2015; Olinsky and Steinberg 2013; U.S. Department of Labor n.d.).

The phenomenon of the manufacturing boom in South Carolina and in the Charleston Area in particular is the frequent subject of local news reports (Wren 2017) (Bell and Dykes 2015). The concerted and coordinated effort to growth of auto-manufacturing in the South in spite of previous disinvestment in manufacturing nationwide has been a subject of study (Jacobs 2012) (M. C. McDermott 2014) (Zhang, Kinnucan, and Gao 2016). Academics and journalists have attempted to study the incentives, including initial worker-training, the state and counties offered to Boeing (Kuker 2011; Stech and Slade 2010). Specifically, South Carolina's concerted efforts to grow in this area have received at least some attention in academic literature (Kuker 2011). Interestingly, a study of North Carolina's biomedical industry show that community colleges are important to making sure advanced technology companies have the skilled workers needed to do both production work and research and development—ensuring the regional economy's ability to grow (Lowe 2014). Charleston's economy appears to have both elements.

Reskilling America

Interestingly, in *Reskilling America: Learning to Labor in the Twenty-First Century*, Katherine Newman and Hella Winston address each of these areas. They recommend re-examining education policy and practice in the U.S. The authors argue, in part, that America should change how it currently invests in K-12 academic education and that it happens now at the expense of exposure to vocational education. In this system, an academic education and a 4-year college degree are the goals and they are promoted as the main educational vehicles for individual economic mobility. They describe and explain the roots of the underlying uneasiness many educational leaders in the U.S. have with steering students towards vocational education. The issues are related to race, racism, class, and under-resourced goals of providing all young people with equal access to opportunity. They also argue that with manufacturing locating – and in some cases re-locating—to the U.S. after moving abroad, the looming skills gap, and students being encouraged to attend 4-year colleges and universities over vocational schools

and community colleges, investments and goals in education must adjust if the U.S. wants to adequately prepare and train people for the jobs of the future and remain competitive globally.

Newman and Winston also highlight the role community colleges can play and the results of vocational training in education like apprenticeships and in the style of German education. It is somewhat dismissive of the concerns about how class and racial inequality can be perpetuated through such a direct focus on vocational education but, overall, takes a comprehensive look at what is feasible and beneficial about more vocationally-focused education models (Newman and Winston 2016).

Newman and Winston's book include many of the same themes relevant to this thesis: the role of community colleges in workforce development and the potential benefits of better collaboration and coordination between business and education through career and technical education activities like apprenticeships for high school students. More themes are addressing a skills gap and possible issues of inequitable access to the best learning opportunities.

Research Question: How does Trident Technical College (TTC) design its employment centered programs with companies?

Methods

I conducted interviews over the phone or in person for about 30 minutes to an hour with representatives from Trident Tech, area workforce intermediaries, public and private sector economic development agencies, a local career and technical education (CTE) program, and a few companies. I identified Apprenticeship Carolina, Trident Tech's Apprenticeship Dean, readySC, county officials, a guidance counselor, companies and a regional economic development agency as partners I needed to speak to based on information I found online and referenced in the news. The people I interviewed referred me to others.

They included phone or in-person interviews with representatives from: Apprenticeship Carolina, Trident Technical College's Division of Apprenticeship, the Department of Aeronautical Studies at Trident, 3 small advanced manufacturing firms (referred to as Manufacturing Firm 1, Manufacturing Firm 2, Manufacturing Firm 3), Dorchester County's Department of Economic Development, Berkeley County's Department of Economic Development, readySC, the Charleston Regional Development Agency (CRDA), the Charleston

Metro Chamber of Commerce (CMCC), Charleston County Schools, and the Dorchester County Career and Technology Center (DCCTC). I interviewed one graduate of the adult apprenticeship program. I had additional conversations for context with representatives from the public workforce development system and a few community and economic development leaders in the area. The interviews were semi-structured. A copy of the questions used to frame each conversation are in the appendix.

I read online publications and reports on the South Carolina Technical and Community College system, specifically the *Competitive Edge* series and was referred to reports and publications by those I interviewed. Those reports included documents from the CRDA's *One Region* Initiative, the Chamber's *Charleston Regional Talent Strategy, Phase I Report: Workforce Supply and Demand Gap Analysis* and *Transforming South Carolina's Destiny* about the creation and development of the South Carolina Technical College System. Almost every program partner referred me to the *Regional Talent Strategy—Workforce Supply and Demand Gap Analysis* report.

The interviews did not constitute a formal, full-fledged survey of apprenticeship program partners or participants and responses cannot be considered as representative. No company representatives who had experience working with readySC were interviewed. This report is not an evaluation. Some themes emerged in the responses that may be points of interest for further study or consideration.

To better understand the makeup of the federally registered apprenticeship positions available and to locate companies to interview, I used a U.S. Department of Labor dataset on that is publicly available through the Employment & Training Administration's (ETA) "Sponsor Database" website. I used the online map to display, download, and isolate the federally registered positions located in South Carolina then sorted and counted positions according to their type, sponsor (the host company/organization), and location. For further analysis and to locate people to interview, I isolated the positions in the dataset with addresses located in Berkeley, Charleston, and Dorchester counties – the Charleston Metropolitan area. I emailed or called the listed point of contact at some of the companies with positions in advanced manufacturing and some in hospitality. I also reached out to larger corporations with registered

apprenticeships like Boeing and CVS but had the most success connecting with the small businesses described in Chapter 5.

The initial goal of this research was to better understand what programs and opportunities Trident Tech offered students through its employer-driven education and vocational training programs and how those programs are designed. In the process, however, I learned it was important to develop a much better understanding of the value regional partners see in the college and better identify who some of those partners are. I also thought it important to better understand the history and origins of, not just Trident Tech but, of the state's technical college system. It is through the lens of the local partners, the state's worker-training history, and a better understanding of how the college's services complement the services provided by the technical college system's Division of Economic Development that I began to understand how Trident Tech fulfills its role as a community college, and what that means to economic development and business practitioners. There is an overlap but by no means duplicated role, for example, between Mitchell Harp's Division of Apprenticeship Programs and Apprenticeship Carolina. They are two separate programs. Harp explained how closely the two entities work together and rely on each other to build the apprenticeship opportunities at Trident.

I am studying this topic because I would like to better understand how the region's economic development and workforce development programs may be connecting residents to quality jobs and making career paths more accessible. In addition, I would like to begin to understand how the programs are succeeding and how they may be falling short. I am working on this so that readers can better understand which types of actors, networks, and information may be needed to pursue similar initiatives and so that other researchers and practitioners interested in the Charleston area may be able to more quickly identify some of the major workforce, economic development, and education leaders.

3 – Trident Technical College & the SC Technical College System

This chapter describes Trident Technical College and provides an overview of the state's technical college system. It goes on to describe two programs of the SC Technical College System's Economic Development Division – readySC and Apprenticeship Carolina—and then takes a closer look at the adult and youth apprenticeship programs Trident Tech administers in partnership with Apprenticeship Carolina, the Charleston Metro Chamber of Commerce and area businesses.

About Trident Technical College

Trident Technical College ("Trident" or "Trident Tech") in Charleston, South Carolina is part of a statewide technical college system. The colleges in the system offer for-credit and continuing education courses that are a mix of college-level vocational and technical skills training as well as academic courses. Overall, the SC Technical College System ensures its 16 colleges remain committed to fulfilling both their vocational training and academic missions (Poland and South Carolina Technical College System 2013; Trident Technical College 2017).

Trident Technical College's for credit and continuing education programs equip workers with the education and skills needed to be successful in jobs in the regional economy. The college adjusts the amount of resources they devote to departments, adds and takes away certificate programs, and offers contractual training services in response to a combination of student outcomes and the needs, requests, and projected future workforce needs of the industries in the regional economy.

The statewide system also has a Division of Economic Development that hosts the state's more well-known worker training programs — readySC and

Figure 4: Economic Development in SC, Source: Apprenticeship Carolina, Division of Economic Development

Apprenticeship Carolina.[4] The service areas for these programs are larger than those of the 16 technical colleges, so the programs work closely with multiple campuses in their area.

The statewide system of colleges is governed by the State Board for Technical and Comprehensive Education. The Governor appoints the members of the Board. Each of the 16 technical colleges has its own president. The president of each college leads and answers to their area's Commission for Technical Education which is made up of members appointed by the Governor. The president and the commission govern the colleges based on local educational and industry assets and needs and based on data collected on the performance of programs (South Carolina Chamber of Commerce 2015).[5] The 2015 South Carolina Workforce Report notes that throughout the entire state, every resident lives within a 30-minute drive of a technical college campus.

Trident Technical College, which describes itself as, "a public, two-year, multi-campus community college that provides quality education and promotes economic development in Berkeley, Charleston and Dorchester counties," plays an important role in the Charleston area's growing profile as an advanced industries hub. The school's mission states "Trident Technical College serves as a catalyst for personal, community and economic development by empowering individuals through education and training" (Trident Technical College 2018a)

Trident Tech, like many of South Carolina's technical colleges, has a main campus and a few satellite campuses throughout its service area. Its Main Campus is in North Charleston. The other three campuses are the Berkeley Campus in Moncks Corner, Palmer Campus in Downtown Charleston, and the Mount Pleasant Campus. Some campuses specialize in specific

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[4] Two programs of the SC Technical College System that will not be discussed in detail in this thesis are the Enterprise Zone Retraining Program or "E-Zone Program" and Continuing Education. Continuing education courses are mentioned briefly in the text when describing how companies are interacting with Trident Technical College. According to the SC Technical College System's website, E-Zone provides reimbursements or refunds to companies for retraining or upskilling employees in eligible training activities for sectors like manufacturing and technology. Companies must apply and be approved. Continuing Education training programs are available at all of the Technical Colleges and can be adapted to meet company and sector needs. The thesis focuses more on apprenticeships for adults and youth, most of which were created with the help of Apprenticeship Carolina, in order to highlight a program that seems to meet company needs and, potentially, both the academic and vocational needs of the apprentices.

[5] Dr. Mary Thornley is the President of Trident Technical College. There are 9 positions on the Trident Tech Area Commission.

programs. The North Charleston and Palmer campuses, for example, host the culinary arts programs. According to the college's website, there are four additional small Trident Tech-affiliated sites that offer some educational courses, contractual training, or other job and educational resources. At least one of those sites is operated in cooperation with public workforce development agencies (Trident Technical College 2018b).

Figure 5 Dorchester County QuickJobs Training Center- Trident Tech site in St. Georges, SC

In addition to having accessible locations, Trident Tech celebrates its affordability and accessibility in other ways. The college's promotional materials indicate the college enrolled over 13,000 in 2016.[6] The same promotional materials state "one year [at Trident Tech] costs less than ½ of [that of] four-year colleges and universities." For the 2017-2018 school year, a course at the college cost just over $180 per credit hour. The cost of attending for a year for full-time students for the 2018-2019 school year is estimated at $18,296 ($4,009 for Tuition, $2,000 for books, $146 for other fees, $8,793 for off-campus housing) (Trident Technical College 2018e).

Many students can use Pell Grants or South Carolina State Lottery Scholarships to pay for tuition. Other education funding is available for Veterans and other special groups learning new skills. Trident serves adult learners and some high school students while keeping regional employers' needs and future trends of the regional economy in mind. It is a public school that

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[6] The promotional material states that the numbers are based on data from 2016.

receives funding from the state legislature like other public colleges and universities throughout the state. It also receives a portion of the local millage.[7]

There are diverse courses of study. Students can attain academic credentials through associate degree programs or certificates. Like all of the state's technical colleges, Trident Tech is a strong transfer college. This means a number of students begin their college studies at Trident Tech, seeing it as an affordable way to start their higher education journey. From there, they may attend a 4-year college or university. There are transfer advisors to help them plan and make the transition.

According to promotional materials, the college offers more than 150 programs of study, day and evening courses on campus and online, study abroad opportunities, and over 35 student organizations. The course catalog for 2017-2018 lists the areas: **Aeronautical Studies** (including Aircraft Maintenance and Avionics tracks); **Business Technology** (including Business Administration, Computer Technology, Network Systems Management Bookkeeping, Network Security, Professional Accountancy, Transportation and Logistics, Visualization and Cloud Computing, and more); **Community, Family and Child Studies** (including Early Care and Education with specialized career paths, Child Care Management, Special Education); **Culinary Institute of Charleston** (including Culinary Arts Technology Baking and Pastry Career Path, as well as Artisanal Foods, Culinary Manager, Event Management, Sports and Health Nutrition, and more); **Engineering Technology**; **Film, Media, and Visual Arts**; **Health Sciences**; **Humanities and Social Sciences**; **Industrial Technology**; **Law Related Studies**; **The Learning Center** (for ESL); **Nursing**; and **Science and Mathematics**. All but one of the areas offer career paths – a set of courses that prepare the student with skills to work in a particular profession or receive licensure (Trident Technical College 2017).[8] Some programs like their dental hygienists career track have long waiting lists while some other courses providing skills for high demand positions have low enrollment, according to senior officials interviewed.[9]

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[7] To see a full breakdown of Trident's public and private funding sources, see
https://www.tridenttech.edu/about/ttc/factbook/pub_priv/support.HTM
[8] The only department that does not offer a career track is the Department of English as a Second Language.
[9] One senior official described not having enough students in a department with vocational training in a sector that is growing rapidly.

How Trident Technical College Works with Industries

The creation of a new advanced manufacturing certification program is one recent example of how the college works closely with industries to meet workforce needs. Many candidates training and applying for the incoming advanced manufacturing companies do not have the work experience in manufacturing required by the firms. With industry partners, Trident Tech created a Lean Manufacturing program that companies agreed to accept as the equivalent of one year's manufacturing experience. As of November 2018, the program has already been adjusted based on lessons learned from the first sets of graduates. For example, grants are available by application to a number of participants so they can acquire the certification free of charge (Trident Technical College 2018c).

According to a short history recounted in Trident Tech's *2017-2018 Catalog*, the college has grown and innovated since its founding in 1964. Since 1964, it has supplied educational programs and sector-related training needs. Like all of the technical schools throughout the state, it began as a "Technical Education Center" or a TEC. Berkeley-Charleston-Dorchester TEC focused on training workers in industrial and engineering technology. At the time of its founding it had 226 students. Over the decades it added programs in health services, criminal justice, business, and more. It also expanded its initial footprint and bought buildings in other parts of the county to expand its accessibility. In the 1970s, like other TECs statewide, the center expanded programs of study and it eventually changed its name to convey that it was as Technical College. In the '70s it also built its university transfer program. It created and began to grow its first distance-learning program in the 1980s and continued to expand the size and number of its physical campuses in other parts of the tri-county area. In the 1990s, the college offered courses via videotape and courses online and started its dual credit program for high school students. The dual credit program, which is the academic backbone of the youth apprenticeship program Trident Tech in 2014 and is described in Chapter 5, allows students to earn, both, high school and college credits while they are still students in high school. In the 2000s, Trident Tech expanded the Complex for Economic Development, building 920 on its Main Campus, which has allowed for creating and growing training programs including its Culinary Institute of Charleston. In the late 2000s, it opened courses and job training programs

at new sites in the tri-county area. These additions made physical classrooms and skills training more accessible to more people. Since the late 2000s, the school's campuses and offerings have continued to grow and adjust based on industry needs and in order to increase accessibility (Trident Technical College 2017; Poland and South Carolina Technical College System 2013).

readySC: A program of the SC Technical College System's Economic Development Division

readySC is a program of the South Carolina Technical College System's Economic Division that manages large-scale trainings for workers for incoming, large, often global advanced manufacturing companies. It prepares workers to apply for jobs at the companies coming into the state through "pre-employment training classes" (South Carolina Technical College System 2016). For large companies already in the state, readySC is available to assist the companies with large-scale worker training the company needs in order expand their operations. The readySC service is offered to companies as part of incentive packages from the state and local governments when encouraging companies to locate to the state. The companies are not charged for it – i.e. the service is provided at no cost to the company.

After the trainings, typically the company has more workers to interview for the positions than are hired.[10] The opportunity to participate in the trainings is competitive. The state has used the readySC-strategy for decades. The trainings, previously called "Special Schools," were used to attract manufacturing companies to state in the mid-20th century and helped create manufacturing hubs like the one that still exists with BMW in the Greenville-Spartanburg area.[11] readySC was the vehicle used to train the scores of workers needed to establish Boeing's first manufacturing campus in North Charleston. It is currently used to train workers for positions with the incoming Mercedes and Volvo companies.

readySC uses what it refers to as a "3D process" with 3 phases: Discovery, Design, Delivery. readySC representatives study key processes at the companies' existing sites in the Discovery phase and re-create portions of the processes for training purposes through "training

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[10] There are more workers trained than are hired. News stories from 2018, however, report that it is difficult to find enough people to fill the training classes (Wren 2018) and many still require additional training—getting the year's equivalency of manufacturing certification.

[11] For an excellent history on the creation of the South Carolina's Technical College System and how Special Schools moved the state from an agriculturally-based economy into the modern age with manufacturing, see *Transforming South Carolina's Destiny* (Poland and South Carolina Technical College System 2013).

simulations." They hire skilled staff members from relevant sectors to lead the trainings. At the end of the training process, company representatives interview trainees for positions (South Carolina Technical College System 2016).

readySC has an office on Trident Tech's North Charleston campus where students and members of the public can state their interest in training for positions at Volvo or other companies featured in the news looking to hire lots of workers for their openings. Some of readySC's trainings happen on Trident's campus, but the number of new companies and scale of the trainings needed in recent years required more space than was available on Trident's campuses. As of Summer 2018, the bulk of readySC's training for Volvo and Mercedes is taking place off campus at a workforce training center that the counties have established together and may decide to purchase together (Wren and Ringe 2018). One source explained that trainings for Mercedes and Boeing are happening at on Trident Tech's North Charleston campus, but they are much smaller in scale than readySC's trainings at the workforce center. Those on Trident's campus may be contractual or through continuing education. 80% of employers surveyed by the SC Technical College System responded that readySC was a major reason their company decided to locate or expand in South Carolina.

Apprenticeship Carolina: a new program of SC Technical College System's Economic Division

The state has received a great deal of attention from the U.S. Department of Labor for exponentially growing its number of registered apprenticeships. The growth in apprenticeships in the Charleston area is largely attributed to the

Figure 6 Apprenticeship Carolina Logo, Source: Apprenticeship Carolina

work of Mitchell Harp at Trident Tech, Dean of the Division of Apprenticeship Programs and his team in partnership with members of the metropolitan area's business community. Apprenticeship Carolina, however, is the vehicle that made creating so many registered apprenticeships possible.

In 2007, Apprenticeship Carolina was created as part of the South Carolina Technical College System's Division of Economic Development. Apprenticeship Carolina aims to increase the number of U.S. Department of Labor registered apprenticeships in South Carolina. With a

reported annual budget of just under $1 million when it was created in 2007, the state of South Carolina worked with employers to increase the number of registered apprenticeships across the state from 731 to 4,485 between 2007 and 2014.[12] As registered apprenticeships, each position has three components: on the job training and mentoring, job-related education, and the students have to be paid.

In 2001, a report by the Governor's Workforce Education Task Force flagged the skills gap as an issue needing to be addressed. The idea for the program came out of a South Carolina Chamber of Commerce white paper from 2002 that presented apprenticeship as a possible solution to the skills gap. In 2005, the state created a task force on registered apprenticeships (Banashefski 2014; Hanks and Gurwitz 2016). When Apprenticeship Carolina was created in 2007, the state legislature created a $1,000 tax credit for every apprentice a company hired. Per South Carolina Code §12-6-3477, a company may claim the tax credit for an apprentice that has been with the company for at least 7 months, up to 4 years per apprentice (Banashefski 2014; South Carolina Department of Revenue, Office of General Counsel-Policy Section 2018).

The program divides the state into 6 regions where each is served by an Apprenticeship Consultant. The consultants work one-on-one with companies to adapt job descriptions into appropriate on-the-job training positions for youth or adult apprentices. Consultants also act as liaisons between the company and the area's technical community colleges or the other entities for the associated coursework as needed. The Apprenticeship Carolina regions, like readySC, encompass multiple technical colleges. The Apprenticeship Carolina consultant for the Charleston area with Trident Technical College also represents an area, for example, that includes Williamsburg Technical College. After designing the position, the consultants prepare the Department of Labor paperwork for the companies. Manufacturing is the largest sector with apprentices at 90% (Banashefski 2014) with apprentices in just about every sector from hospitality to pharmacy.

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[12] This number of apprenticeships comes from those registered with the state and the United States Department of Labor. Employers may choose to host apprenticeship programs that are not officially registered and thereby would not be included in the numbers.

What People Say About Apprenticeship Carolina

Multiple interviewees and company leaders in publications like the SC Chamber of Commerce and the technical college system's magazine *South Carolina Competitive Edge* describe the service Apprenticeship Carolina provides favorably. State and business leaders describe the program as critical for reducing the amount of company time and resources needed to design a program for an apprentice and navigate the difficulties of registering their program with the U.S. Department of Labor. The service was seen as especially helpful for small businesses establishing apprentice positions at their sites.[13] It was cited by interviewees, state reports, and national think tanks as the reason South Carolina has been able to increase its number of registered apprenticeships so rapidly (Banashefski 2014; Hanks and Gurwitz 2016).

According to two senior officials interviewed in summer 2018 and reports on funding the state has received, the University of South Carolina is working on a return on investment study on the program for the state. In 2016, South Carolina received a $900,000 grant from the Department of Labor "to expand opportunities relating to apprenticeship programs registered under the National Apprenticeship Act…" (Collins, Library of Congress, and Congressional Research Service 2018). One senior official said: "I've seen some studies that said… that for every $1 you put into an apprenticeship, you get $1.50 back, because you're cutting down on turnover. You're building up employee culture. Your retention rates increase, so. That investment they put forward, then they get it back." The study by the University of South Carolina will be important for understanding the actual costs and benefits of the program to-date.

How Apprenticeship Carolina Designs Positions with Employers

Apprenticeship Carolina is employer-driven meaning employers and their needs drive how the SC Technical College System designed and how they deliver the service. Apprenticeship Carolina does not conduct outreach to companies but it does follow-up on referrals it receives. In the Charleston area, a number of those referrals come from the technical college, economic developers, workforce boards, Department of SC Works, the Council of Governments (the

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[13] For more on this, see Chapter 5.

regional planning body), or by word-of-mouth according to interviews with Senior Official 1 and Senior Official 2.

Interestingly, Mitchell Harp, Dean of Apprenticeships at Trident Tech conducts outreach to companies in the region. He explained he describes the benefits and feasibility of apprenticeships and often connects them with other employers who are willing to share their experiences creating and implementing the positions. The Division of Apprenticeships designs positions, however, to fit the companies' needs. They are not one-size fits all. For a company, their best on-the-job training hours or needs may conflict with the academic schedule. One senior official explained that course providers may adjust or create new class offerings for apprentices within reason.

As mentioned earlier in the chapter, Apprenticeship Carolina consultants typically begin their process of designing programs with individual companies by asking for a job description for the position including tasks. The consultant then works with the company to develop a program for the position based on a template. Senior officials interviewed who were familiar with them described the templates as checklists of the competencies and skills the apprentice is to master on the job.

The consultant adds related vocational training courses that have been paired with that set of job skills for positions in the past. For some common positions, like industrial mechanics or bakers, the company may be able to simply adopt an existing Apprenticeship Carolina template for their own program. If a sufficient template does not exist or the position is in a sector where there are few-to-no existing apprenticeship positions, the consultant works with the company and the community college or other education providers to develop a new one.

The Apprenticeship Carolina consultant works with the representative from the company to determine the makeup of the apprenticeship – whether it should be competency-based, hours-based or a combination of both ("hybrid"). A senior official familiar with the program explained that many of the apprenticeships are hybrids – where an apprentice spends time learning in a classroom (competency component) and does on-the-job training under a mentor for a number of hours (hours-based requirement).

For the education partner, one official interviewed estimated that roughly 60% of the companies an apprenticeship consultant works with use the area's technical college. In some cases, the consultant pairs companies with entities outside of the technical college system that have strong training programs. Some firms, for example, use the National Center for Construction Education and Research (NCCR) for construction skills training. In the Charleston area, the Charleston Electrical Contractors' Association is a large union that offers courses as part of union dues for apprentices. The flexibility to design and choose appropriate education partners and the presence of the consultants has allowed the companies and Apprenticeship Carolina to create apprenticeships in sectors that do not traditionally see apprentices. This is especially the case with small businesses.

For the on-the-job training component, a senior official explained that it is recommended that mentors and their apprentices meet somewhere between once a month to once every three months. At minimum, the apprentice and their mentor must meet once every 6 months. Apprentices work under the direction of a mentor or an assigned staff person at the job site.

For payment, companies hire the apprentices and typically add them to the payroll. The amount varies based on the sector. All of the students in the Charleston Regional Youth Apprenticeship program receive $10 - $11 an hour. The youth program is described in more detail in the next chapter.

Tuition, Scholarships, and Grants

For tuition or education costs, companies often sponsor the adult apprentices, paying the full cost of their tuition. This is especially the case if the apprentice was already employed at the company and they are training for a different role. In some cases, students pay their own way. The Accelerate Greater Charleston Fund paid the tuition and fees for high students in the Charleston Regional Youth Apprenticeship program until the 2018-2019 school year – when the program became too large. Other partners have since stepped in to help.

Apprentices can also be students already enrolled in the college. In that instance, a company would not have to pay tuition for courses a student already completed, if the company chooses to sponsor the student. Similarly, if the student is already in the required

educational program at Trident Tech before they accept an apprenticeship position, they receive credit towards the needed registered apprenticeship coursework hours and competencies they need to demonstrate for courses they have already taken.

Adult students who are already enrolled in a college and have access to federal and state grants and loans can use or exhaust that tuition-related funding when they begin an apprenticeship—if their enrollment status and course-types apply—before their employers have to pay for their tuition. In that way, scholarship money and grants adult students receive based on their academic merit or based on a special status can reduce the cost of tuition for the student or for a company sponsoring them. With the SC LIFE Scholarship,[14] students planning to attend eligible 2-year colleges and technical schools that graduate from high school meeting two of the three requirements (a 3.0 cumulative GPA, 1100 on the SAT or 24 on the ACT, or in the top 30% of their class) are eligible for an amount of funds up to the total cost of tuition plus $300 for books for each academic year ("South Carolina Education Lottery - Education Wins" n.d.). There are newer scholarships for students with 2.0 – 3.0 GPAs to attend the technical colleges for free.[15] So, if a company hires an adult student already enrolled in a technical college or sends an employee to the college that would qualify for the LIFE scholarship or tuition payment otherwise, they do not have to pay for that student's tuition.

By the Numbers

Apprenticeship Carolina's achievements are impressive. The number of registered apprenticeships is now over 6,000. Analysis of a 2016 dataset from the U.S. Department of Labor's Employment & Training Administration's website shows a total of 6,348 federally registered apprenticeship positions in South Carolina (U.S. Department of Labor, Employment & Training Administration (ETA) 2016).[16] Reports cited earlier in this thesis highlighted the 4,485 positions that existed in 2014--see (Rossmeier 2015). Businesses have continued to create federally registered apprenticeship positions since 2014.

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[14] The LIFE scholarship is available for students going directly from high school into college and to those who return to school after taking time off. Students are eligible for up to 8 semesters of support.

[15] Some newer scholarship funds became after the State Supreme Court ruled in a lawsuit "that the state had failed in its duty to provide a "minimally adequate" education in the poorest districts."

[16] See the methods section in Chapter 2 for more on the dataset.

Interestingly, the data does not indicate however many of the positions are filled. Furthermore, when looking at the businesses or sponsors represented in the 2016 data, three types of positions at CVS Health work sites around the state account for 1,820 positions, or 28.68% of the total number. They are: Pharmacy Assistant with 608 positions; Manager, Retail Store (Store Manager) with 606 positions; and Pharmacy Support Staff (CB) with 606 positions. The next type of position in the top 30 is Machine Operator I with 177, or 2.79% of the total number followed by "Maint Mech (Any ind)" or Maintenance Mechanic (any industry) with 134 positions, 2.11% of the positions.

Table 1: Top 30 Registered Apprenticeship Positions in South Carolina by the numbers, Spring 2016

REGISTERED APPRENTICESHIP POSITON, TYPE	# OF POSITIONS	% of TOTAL
PHARMACIST ASSISTANT	608	9.58%
MANAGER, RETAIL STORE (Store Manager)	606	9.55%
PHARMACY SUPPORT STAFF (CB)	606	9.55%
MACHINE OPERATOR I	177	2.79%
MAINT MECH (Any Ind)	134	2.11%
NURSE ASSISTANT	132	2.08%
WELDER, COMBINATION	113	1.78%
ELECTRICIAN	112	1.76%
PLUMBER	103	1.62%
AUTOMOTIVE TECHNICIAN SPECIALIST (CB)	92	1.45%
ELECT-PROD-LINE-MAINT-MECH	91	1.43%
HEATING & AIR-COND INST-SERV	89	1.40%
PUBLIC AFFAIRS (CB)	87	1.37%
ELECTROMECHANICAL TECH	83	1.31%
EDUCATION AND TRAINING (CB)	82	1.29%
GRAPHIC DESIGNER	81	1.28%
HOUSEKEEPER, COM, RES, IND	77	1.21%
CARPENTER	73	1.15%
PERSONNEL SYSTEMS MANAGEMENT (CB)	71	1.12%
AUTOMOBILE BODY REPAIRER	68	1.07%
MATERIAL COORDINATOR	62	0.98%
TEACHER AIDE I	59	0.93%
MAINT REPAIRER, INDUSTRIAL	55	0.87%
HEALTH SUPPORT SPECIALIST (HY)	54	0.85%
COOK (Any Ind)	52	0.82%
CNA Geriatric Specialty (CB)	51	0.80%

ACCOUNTING TECHNICIAN (HY)	50	0.79%
COSMETOLOGIST	50	0.79%
VETERINARY/LAB ANIMAL TECH (CB)	50	0.79%
LANDSCAPE MANAGEMENT TECH	49	0.77%

It is notable that positions with CVS Health make up over a quarter of the total. While surprising, this observation does not negate the significance of the state's rapid apprenticeship growth since 2007 nor does it indicate Apprenticeship Carolina's role as a potentially effective intermediary for creating registered apprenticeships is insignificant. Apprenticeships are still seen as a promising vehicle for better connecting adults and young people to companies and helping the apprentices build skills that are useful for their employers and, ideally, for the sector. Apprenticeship Carolina has helped companies design positions that probably would not exist without the work of their consultants.

This observation about the types of positions available does, however, provide an opportunity to begin asking more focused and nuanced questions about South Carolina's federally registered apprenticeships including: what are some of the stories behind the makeup of the positions created in recent years? What is the quality of the career opportunities created through these positions? How are workforce development leaders measuring the benefits these positions may provide for the apprentice-participants and for the sponsors and what are the costs?

Based on the dataset, it is unclear when CVS created the positions and how much of the exponential growth in South Carolina's numbers can be attributed to the addition of those positions. Reports and company press materials available online indicate CVS is creating apprenticeships and pre-apprenticeship positions in large numbers in select states. The company announced in 2017 they planned to fill 5,000 apprenticeship positions by 2020 (David L. Casey 2017; WISTV - Source: CVS Health 2017). According to a case study by Jobs for the Future (JFF), CVS Health has sponsored over 4,600 apprenticeships and it has created "pre-apprenticeship programs in order to diversify its talent pipeline and build a pool of trained, qualified applicants ready to enter its apprenticeship programs." One of the positions, pharmacy technician, requires training beyond high school and CVS documents there is a shortage of workers in the talent pipeline. Through in pre-apprenticeship, apprenticeship, and

employment positions, the trained pharmacy technicians have developed skills and may have the option of continuing their education into other health related fields (Browning 2018).

Apprenticeship Carolina's service was described as saving the businesses a great deal of time and paperwork. The service was identified in multiple interviews as being the most important step in getting small businesses involved and participating and the reason why South Carolina has been able to increase its number of registered apprenticeships so rapidly. The Return on Investment study underway will be important for measuring the benefits observed to-date against measured benefits and costs.

Charleston Leads the State in Apprenticeship Growth

The growth of adult and youth apprenticeships in Charleston is notable – even within the context of the rapid growth of apprenticeships statewide. As the state established Apprenticeship Carolina, Trident Technical College in the Charleston area established its own Division of Apprenticeship Programs, which is led by Mitchell Harp as Dean. Since 2007, Harp has largely focused on working to encourage companies to establish adult apprenticeship positions and on growing the program. In 2014, the Charleston Metro Chamber of Commerce, Trident Technical College, and area employers established a small youth apprenticeship program. The program is now the most robust youth apprenticeship program in the state. One interviewee expressed that among the apprenticeship programs statewide, the Charleston region does the best in encouraging students to focus on the academics of their programs and for-credit degrees programs. This chapter examines the program's origins, goals, and structure.

Adult Apprenticeships in Charleston

When Apprenticeship Carolina launched in 2007, Trident Tech and local manufacturers created "the First Sector Partnership for Industrial Mechanics" (also referred to as "the first industrial partnership") which trained workers for industrial mechanics positions. Companies agreed to work together to help Trident design a program they as employers and their entire sector could all benefit from. Many of the industrial mechanics in the field were approaching retirement age and there was not a sufficient pipeline of talent to fill their positions once they left.

Figure 7: "Apprenticeship Carolina Employer Sponsor" plaque is on display in the lobby of a small business in Summerville, SC that hosts student apprentices. July 2018

One senior official explained: "If you're from the Charleston area and if you go into a manufacturer or some sort of industrial setting and you see someone working in maintenance or machining and they're in their early 60s or late 50s, 9 times out of 10 if you ask them where

they got their training, it was in the Charleston Naval Shipyard in an apprenticeship program."
Multiple people interviewed explained that the Charleston Naval Shipyard's closure
(decommissioning) impacted the entire regional economy.[17] Trident Tech had an industrial
mechanics program within its Industrial Engineering School that was under-enrolled at the time
of the partnership's beginnings—even though there were a lot of unfilled jobs available.[18] In
talking about the program's origins, Harp, the Dean of Apprenticeships, pointed to the
leadership and vision of Trident Technical College's President Dr. Mary Thornley for establishing
the Apprenticeship Department at Trident as Apprenticeship Carolina was launched so the
entities could work closely together.

For the first industrial mechanics partnership, each employer sent one-to-two adults
already employed with them to become apprentices. They studied at Trident Tech to upgrade
their skills one day a week. It was a great match. The apprentices continued working full time as
they studied and learned from mentors while on the job. The industrial mechanics partnership
continued from 2007 to 2010 and the program graduated a few classes of students.

The program took off from there. "The funny thing is," a senior official explained, "other
companies found out about it. So, they started calling. Because everyone was in need. The
other funny thing is students started finding out about it. When we started that program, we
had no full-time faculty. We were basically operating on adjunct faculty. Now, we have some
full-time industrial mechanic faculty, a department head, and we have a *thriving* evening
program." Over 100 area businesses have registered apprenticeship positions at their sites. The
apprenticeship positions created with the help of the Division of Apprenticeship Programs at
Trident are described as partnerships with each company. By offering a position where Trident
Tech provides the education component, companies providing the on-the-job training
component are, in effect, entering a partnership with the college.

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[17] At the time, the region's economic and workforce development practitioners came together to figure out the future of Charleston's economy after the closure.

[18] According to a senior official at Trident Technical College, the school has an evaluation process for its vocational programs that regularly measures the percentage of students that get jobs in the field after they finish the program.

Since its start in 2007, the Dean has worked with companies to create adult apprenticeship positions with businesses in a variety of sectors.[19] According to interviews with senior officials, in addition to his work connecting with companies, the Dean works with another department leader who conducts outreach and manages relationships with area schools to recruit high school students as well as with a small administrative staff that processes applications and manages academic and other program logistics – largely related to the dual credit process. As described in the previous chapter, Apprenticeship Carolina works with the companies to create the on-the-job training requirements and register the positions with the U.S. Department of Labor.

Cost for the Employer and the Student

As described in earlier sections on Apprenticeship Carolina, some pay for the students' tuition and while others do not. One interviewee familiar with apprenticeships throughout the state explained that after the students have utilized state lottery assistance funds, Pell Grant money, or other federal or state education or training funds available to them individually, the remaining balance is often picked up by the employer.

The Metro Chamber Partners with Trident Tech Create a Youth Apprentice Program

"This sector partnership, which began in September 2014, includes high schools in all four area school districts, Trident Technical College, and a consortium of industry partners. It represents a community-wide collaborative approach to creating a seamless pathway for students from secondary to post-secondary education into the skilled workforce." - Charleston Metro Chamber of Commerce's Website

The Charleston Metro Chamber of Commerce, Trident Tech, Apprenticeship Carolina and other area partners created a youth apprenticeship pilot program with 13 high school juniors and seniors and 6 area manufacturing firms for the 2014-2015 school year. By 2017-2018 school year, the program offered 16 career pathways in 9 sectors.

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[19] For a time, Harp focused on manufacturing while other staff focused on coordinating programs in other sectors, but that has since changed.

Students attend dual-credit classes on campus at Trident Tech 2 days of the week and they spend up to 2 hours a day at work for on-the-job training during the school year. They work full-time in the summer. In addition to receiving the U.S. Department of Labor certification for being trained as an apprentice in the basics of their field, students finish the program with their high school diploma and with college credits that can be applied to an associate's degree or may be applied as transfer credits if they decide to attend a 4-year university.[20] Youth apprentices work part-time during the school year and full-time over the summer. Until the 2018-2019 school year when the cost and level of student participation became too great, the Charleston Metro Chamber of Commerce's Accelerate Greater Charleston Fund covered the cost of tuition, fees, books, and related school supplies. The companies that hire the apprentices pay the students $10 - $11 an hour (Accelerate Greater Charleston 2015b).

The program is employer-centered –originating from the needs of the business community. It is balanced by providing students with academic credentials to further their academic or career-based studies. Students may directly enter the workforce with the in-demand skills and career path after high school, they may decide to continue their studies. They may obtain their associates' degree or enroll in other forms of higher education.

The Business Community as the Driving Force Behind the Program

Inspiration for how to structure a youth-based career-focused apprenticeship program came in part from previous studies on the topic, the success of Trident's adult program, and a Charleston Metro Chamber of Commerce-led regional leader's trip to Alamo Academies in San Antonio, TX.[21] As mentioned previously, the state identified apprenticeships as a way to address a skills gap. Promotional materials from the Charleston program's beginnings refer to it as, "Workforce Academies as a youth apprenticeship program" (Charleston Metro Chamber of Commerce 2017). Program administrators began with a few area manufacturers and later

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[20] Based on information about the 2015-2016 school year.
[21] Each year, the Metro Chamber of Commerce hosts a Leadership Visit for regional leaders to learn about other places and local economies. The Annual Leadership Visit that took place just before the creation of the youth program took regional leaders Alamo Academies and influenced the design of the Charleston Regional Youth Apprenticeship program.

added sectors named in a regional talent demand report commissioned by the Chamber (Accelerate Greater Charleston 2015a). The findings in the report guide how the youth apprenticeship program expands as well as the growing career and technical education programming happening in high schools throughout the region and adjustments to some priority areas in higher education.

In Summer 2014, The Charleston Metro Chamber of Commerce acquired the services of Avalanche Consulting to complete "the region's first Talent Demand Study in 2014 with funding support and participation from Charleston Regional Development Alliance, Charleston Southern, University, College of Charleston, Medical University of South Carolina and Trident Technical College" (Charleston Metro Chamber of Commerce 2017). Avalanche Consulting with the Council for Adult and Experiential Education (CAEL) followed Avalanche's Phase One report on the "comprehensive skill and degree gap" with other phases assessing and making pointed recommendations on how all of the region's institutions of higher education could consider adjusting to address the skills gap.

The Chamber's focus on understanding and better aligning talent demand and education is part of the its Accelerate Greater Charleston (AGC) initiative. The initiative created a fund—made up of private dollars with some local public funds—to support its work and pilot programs like the Regional Youth Apprenticeship Program. The fund paid all of the youth apprentices' tuition and fees until the 2018-2019 school year when the number of students grew too large for the fund to support on its own. A senior official with direct knowledge of the Metro Chamber's initiatives said the overall cost of the program was about $50,000 - $60,000 for each cohort. Beginning in Fall 2018, other funders are joining the Chamber in covering the cost in order to allow the program to continue to grow and host more students.

AGC is a 5-year strategic plan that began in 2012 (Accelerate Greater Charleston 2015a). The plan focused on a set of business development goals including talent development and advocacy. Funding from the 100 investors from area companies and other local entities is used to address those goals. In 2017, Accelerate Greater Charleston started its second, 5-year iteration Accelerate Greater Charleston 2 (ACG2) that is focused on 2017 – 2022.

An Investor Update from May of 2015 states that AGC's focus is on "advancing the competitiveness of our region." It goes on to state that AGC is "the catalytic center point for action and coordination on top issues" where they are looking for results in "economic stimulus, advanced human capital and enhanced productivity" (Accelerate Greater Charleston 2015a).

Mitchell Harp at Trident Tech and others interviewed also confirmed that a German company in the Charleston area familiar with youth apprenticeships approached Trident Tech about creating a youth apprenticeship program after the school and partners saw the success of the adult apprenticeship program. The Division of Apprenticeship Programs worked with the human resources department to shape the apprenticeship program based on the company's experience administering its own in-house apprenticeship program for decades.[22]

Regional Economic Development Priorities Become Career Pathways for Students

The Chamber and regional education partners build out additional programming based on the report (Avalanche Consulting 2014). It is worth noting that representatives from Trident Tech, readySC, county economic development officials, and others all referenced the talent demand study during their interviews. By design, the pathways offered through the Charleston Regional Youth Apprenticeship Program at Trident are in sectors that are now economic development priorities for the region.[23] One program administrator explained the program is designed to fix the problem of students being unprepared for – and in some cases uninterested in—high demand jobs in the area they might be interested in with more exposure.

The sector-based career pathways and the school's offerings for the youth apprentices largely focus on high-demand and high growth careers.[24] The number of sectors and pathways

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[22] A few other local employers including Deynton's Shipyard offered its own youth apprenticeship programs and utilized coursework at Trident in the past, all prior to the creation of the more recent programs. Bosch Corporation was another company referenced as being a leader in continuing youth apprenticeships and a key partner and example for designing the current programs. IFC corporation is also named as a key early partner in reports on the program's creation.

[23] Interestingly, the Metro Chamber planned the youth apprenticeship program w as early as the 2000s, but the was actually implemented with the hire of an area coordinator in 2013. This was according to an interview with a senior official connected to the Metro Chamber of Commerce.

[24] It is worth noting that the Hospitality and Tourism sector is a prominent part of Charleston's economy, but the sector is not mentioned in the "Workforce Supply and Demand Gap Analysis"—the document that shows the high demand, high growth sectors and jobs for the region.

the program offers grows as more students apply, more companies come on board, and Trident increases its capacity. The pathways for 2017 – 2018 are listed below. There were 16 career pathways in 9 sectors. In 2018-2019, the program is partnering with Project Lead the Way to offer engineering pathways.

Table 2: Youth Apprenticeships 2017 – 2018, Sectors and Pathways

Sector	Pathway
Hospitality & Tourism	Culinary Arts Hotel Operations
Information Technology	Computer Networking Programming / Cybersecurity
Manufacturing	Industrial Mechanic Machine Tool Technology
Business Technology	Bookkeeping / Pre-Accounting
Contractual Services	HVAC Automotive Technology
Engineering Design Graphics	Civil CAD (Computer Aided Design) Technician
Criminal Justice	Security / Pre-Law Enforcement
Healthcare	Medical Office Assistant CNA to Pre-Nursing EMT
PLTW Engineering Assistant* (added in 2018-2019)	Engineering Pathway Engineering Technician Pathway

SOURCE: Trident Technical College, Youth Apprenticeship Application Materials. See the Appendix for more on the pathways and for the Accuplacer Test Score Requirements for each pathway.[25]

How Trident Technical College Administers the Program

The youth program is similar to Trident's adult apprenticeship program, but it is administered through the college's dual-credit program. The youth program also has an additional leadership of staff person, Melissa Stowasser, Assistant Vice President for Community Partnerships. Generally, Trident's dual-credit program allows high school students to take a course at Trident Tech (on campus or through their distance-learning system) and simultaneously earn high school credit and college credit. Enrollment in the dual-credit program

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[25] *Students use ACCUPLACER test scores, but they are informed they can submit qualifying SAT or ACT scores in place of ACCUPLACER scores. Based on the pathways they choose, more may be required. The program description materials state, for example, that students "interested in HVAC, Industrial Mechanics, Machine Tool Technology or Automotive Technology" may be required to take an additional "Mechanical Aptitude Test" at Trident's Testing Center and that companies require different math scores – possibly based on the kinds of work students do.*

requires an application and is available to all high school students in the region. There are two staff members in the dual-credit office who handle program logistics for this and all of Trident's dual-credit enrollment with high school students.[26]

Based on the students' applications and career interests, their resumes are shared with companies who later reach out to the students for interviews. Once accepted to Trident Tech in the desired pathway and offered a job with a company, the students participate in "signing day".

Signing Day is a creative way local leaders have tried to alter negative perceptions about manufacturing work and raise the profile of apprenticeship opportunities among young people. Students are hired by the companies, though the workers compensation coverage comes from Trident Tech (Trident Technical College 2018f). One senior official said many companies had a lot of misconceptions about the ability to hire a high school junior or senior based on child labor laws. He countered that by connecting the companies with experience administering well-respected, quality programs for years and some of the newcomers. The college's webpage for the program prominently features key provisions in child labor law (Trident Technical College 2018f).[27]

How Adult and Youth Apprenticeships in Charleston Differ from Others Across the State

Notably, one interviewee that works in multiple communities thinks that among the apprenticeship programs statewide, the Charleston region does the best in encouraging students to focus on the academics of their programs and for-credit degrees programs.[28] Mitchell Harp and members of his team emphasized the importance of providing their students the ability to continue working towards an academic degree and while receiving a recognized vocational certification from the Department of Labor. The program official explained that

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[26] The dual-credit courses at Trident have been available for many years. For example, a number of high school students take dual-credit English classes and transfer the credits to a 4-year college. Some interviewees noted that, as the program continues to grow, the department may need more people to assist with the logistics of dual-credit enrollment.

[27] As this program is growing and the administration pursues more employer-centered workforce development and education programs, the U.S. Department of Labor proposed relaxing some of the child safety laws around work. (Penn n.d.) Questions about how to make such changes and how quickly should be further examined.

[28] The Greenville area also has a strong technical college and strong industries. It is unclear if the interviewee also had extensive knowledge of that region.

academic credentialing appears to get more attention in Charleston than other parts of the state, possibly directly due to the presence of an Apprenticeships Department at Trident Tech. They also believe there could and should be incentives for getting employers in other parts of the state to encourage students to continue their education towards credentials and formal certifications even after being hired – as opposed to simply focusing on getting someone educated just enough to begin doing the job.

Observations about the Program

As described in an earlier section, Mitchell Harp conducts outreach to local businesses or the businesses approach Harp and Trident about the program to get involved. Apprenticeship Carolina helps companies design the apprenticeships based on job descriptions and they complete the paperwork needed to register the apprenticeships with the U.S. Department of Labor. Mitchell Harp shares the resumes of students with the firms.

Two of the three representatives from companies interviewed talked about getting email updates regularly from Harp with potential student apprentices the companies could reach out to. A senior program administrator made it clear the students know the positions are competitive and the process is set up to mimic a real job interview process, so professionalism is expected. That administrator also noted, however, that there are some factors outside of professionalism or job-readiness, like transportation, that could impact a students' ability to participate. See the Appendix for a copy of the application. On the other side, it is made clear to the businesses that students are expected come in eager to learn and prepared to function as an employee, but they should not expected to produce as much as an employee or work that is of the full quality of a regular employee. Trident acts to manage the companies' expectations. The students work in support roles to staff members already trained in the skills the student is looking to acquire. Those staff members serve as mentors.

Trident Tech is not the only youth apprenticeship program in the state, but it is the fastest growing and most robust.[29] Many interviewees pointed to Mitchell Harp's work as the reason Charleston's program developed so quickly. Trident Tech is the only technical college in

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[29] Midlands Technical College in Aiken, SC was the first of South Carolina's technical colleges to formally create youth apprenticeship program.

the state with a person in Harp's role. He works as an intermediary between the college, employers, and Apprenticeship Carolina. He described most of his role as outreach to companies where he convinces them of the feasibility and value of establishing adult or youth apprenticeship positions at their work sites through a partnership with the college.

According to numbers from the Charleston Metro Chamber of Commerce (CMCC), by the 2016-2017 school year the program grew to include 75 youth apprentices and 48 employers in 9 education pathways. By the 2017 – 2018 school year, the program boasted 200 youth apprentices, 99 employers, and 15 pathways. In 2017, Trident Tech announced it would be the site of the Engineering Youth Apprenticeship Program – a pilot program for the nation created in partnership with the U.S. Department of Labor and Project Lead the Way (PLTW). Trident Tech is the post-secondary education partner and liaison between students and employers for the Engineering Youth Apprenticeship Program.

Why Federally Registered Apprenticeships?

Program administrators stated it was important for the positions to be federally registered apprenticeships because of the accompanying U.S. Department of Labor certification. According to the Department of Labor's website, those who complete the program "receive an industry issued, nationally recognized credential that certifies occupational proficiency, is portable, and can provide a pathway to the middle class. In many cases, these programs provide apprentices with the opportunity to simultaneously obtain secondary and post-secondary degrees" (U.S. Department of Labor 2018). It is worth noting that participating companies that hire apprentices for a certain period of time receive tax credits in South Carolina and some of other states. Some of these companies may also receive training funding that is available through federal programs.

During the Obama administration, there was a push to make career pathways clearer – the training in education, skills, and practical experience required to enter and be successful in certain careers. These career pathways were seen as connecting the dots in many ways for people who may or may not have realized a 4 year degree was not required for them to enter their field of choice (Staff 2018). The push was accompanied by funding to support the creation of apprenticeships and career-based and work-based learning. Since that time, more funding

and federal resources have been devoted to career-pathways and work-based learning by both the Obama administration and the Trump administration.

SUMMARY

Step-By-Step: How Apprenticeship Carolina, Trident Tech, and a Local Business Build an Apprenticeship Position Together

STEP 1: Dean of Apprenticeships at Trident Tech establishes a partnership with businesses

Through outreach that takes the form of speaking events, general networking, and referrals, the Apprenticeship office explains to businesses how youth apprenticeships work and the benefits for the student and for the business. In order to participate, businesses agree to be willing to hire youth apprentices as part time employees who will be learning about the field and skills in class and gradually on the job.

STEP 2: Apprenticeship Carolina rep works with the company to create the position / job description

The Apprenticeship Carolina representative for the region works with the company to create the registered apprenticeship. They start with the position's job description and any existing registered apprenticeship templates for similar positions elsewhere.

The templates are described as checklists with competencies and skills to be mastered on the job and courses to be completed. Application details are adjusted as needed.

STEP 3: Apprenticeship Carolina does the paperwork

The Apprenticeship Carolina consultant does the paperwork and sends it to the company and to the Dean of Apprenticeships at Trident Tech for final approval. Final application packets are put together by the Apprenticeship Carolina consultant and go to the company before their submission to the U.S. Department of Labor.

STEP 4: Students apply for dual credit programs and positions

The requirements are the student must: (1) Apply and qualify academically for Trident's Dual Credit Program through an application process. (2) Submit application supporting materials including a resume, accompanying ACCUPLACER test scores or ACT/SAT scores, and recommendations. (3) Interview and be hired by the company. Other points of note: They must

also have reliable transportation and the hiring process is competitive. See the appendix for sample application materials.

STEP 5: The Dean of Apprenticeships matches student applicants with potential companies. Companies reach out to the students to schedule interviews.

STEP 6: Students interview with the companies

STEP 7: Companies offer selected students are offered positions

STEP 8: Trident Technical College hosts a Signing Day event where students accept positions from employers.

STEP 9: Students complete coursework at Trident Technical College and work part-time during the school year and full-time over the summer.

STEP 10: Students graduate with their high school diploma, a vocational certification from the U.S. Department of Labor, and college credits they can apply towards an associates degree or a 4-year college.

5 – Apprenticeships According to Employers & Students

This section explores what employers, administrators, and an employee who completed his apprenticeship coursework in CNC Machining at Trident had to say about the college's apprenticeship program. There are also two success stories Trident Tech provided of students who completed their youth apprenticeship program. The chapter begins with the students' stories.

Students' Stories

John served as an adult apprentice at Manufacturing Firm 1. He was the only student interviewed. Trident Tech also offered the success stories of two other students who served as youth apprentices. Their stories are featured in promotional materials for the program and the South Carolina Technical College System's materials. Their stories are recounted later in this chapter.

John, a graduate of the early adult apprenticeship program at Trident and an employee of Manufacturing Firm 1 in North Charleston, did the CNC Machining program at Trident Tech beginning in 2013. Manufacturing Firm 1 is a CNC manufacturing company, meaning its employees use computers to control its machine tools—the mills, routers, grinders, etc. It is headquartered in Germany and is a supplier to Bosch Corporation, a manufacturer and one of the largest employers in the region. It has about 25 employees and is looking to grow.[30]

John described his experience in the apprenticeship program through Trident Tech as difficult, but key to his learning the fundamentals. His employer agreed with that assessment and said the program provided the theoretical and practical bases for the machining work that the company would not have been able to provide John on the job. Friedrich, the senior executive that found Trident's apprenticeship program for John, explained that as a small business, the company does not have the human resources staff or resources available to devote to deep training of the staff the way that larger companies do.

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[30] Manufacturing Firm 1 runs processes 24/7 and creates custom products for its clients based on the clients' needs. It started with just a few employees and is growing. It opened in the early 2000s so that it could supply the Robert Bosch Corporation located in neighboring Dorchester County. According to its website, Bosch specializes in four sectors: "Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology." It is one of the 20 largest employers in the region.

After John graduated from high school in the area, he worked at Staples. "I knew college wasn't for me," he said. He had been encouraged by at least one of his teachers to continue his education but did not. After Staples, he got a job at Manufacturing Firm 1 based on the recommendation of a family member who was already employed there. He started in the logistics department where he packed, loaded, and unloaded boxes until Friedrich put things in place for John to do the apprenticeship program at Trident.

John was Manufacturing Firm 1's first apprentice. He was one of about 15 adult apprentices in his class. They came from companies across the tri-county area. "A lot of the guys were already at jobs in the field," John explained. "Some guys were already working at Cummings, [or] Bosch. They had the background and wanted to further their education." He continued, "We were all doing the same thing, but you see all the different aspects from the different companies. There was a lot of diversity." Friedrich pointed to the paperwork support from Apprenticeship Carolina as "extremely helpful" for getting the apprenticeship position for John established and running.

John completed Tech's CNC Machining program, which took one year. "It gave me a good foundation of what the people do on the shop floor," he said. As adult apprentices, John and his classmates worked full time and went to classes in the evenings Monday through Friday. Two days were spent in the classroom and two days were hands on. John explained:

> "Going through Trident is a very good foundation for this industry. We machine metals
> or plastics. You have to know how the material behaves. You have to know all of these
> calculations. You use a lot of trigonometry sometimes to figure out angles and
> coordinates and whatnot. Trident really built a solid foundation so you know how to do
> all of that stuff. So, when you're out on the shop floor, you're not completely lost. …. I
> think that was the best thing from Trident. Coming from there I knew exactly when the
> guys were talking about something. 'Oh! I can contribute to that!' It got me a good foot
> in the door on the machine."

Friedrich continued:

> "John started with the simple tasks. When he started the apprenticeship, he started the
> more technical tasks. It took some time before we let him on the machines. In the

beginning, he was shadowing and observing. Then we gave him small tasks where he could do them by himself. What he did at work built off what he learned at Trident."

Manufacturing Firm 1 paid the tuition as well as his wages as a full-time employee. When asked about whether the expense was worth it, Friedrich explained that Trident's tuition was very affordable. He went on to explain that he and Manufacturing Firm 1 as a corporation are very familiar with and believe in the apprenticeship model. So, they believed the investment in John would be worth it. Friedrich noted that the set-up is different in Germany where students in similar programs go to school three days a week and spend two days on the job over a period of three years, but he was pleased with what Trident offered. He said they were looking for something in Charleston like the programs offered in Germany. What Trident offered, he said, was "going in the right direction."

He also said that it made sense for them to participate as a small business. "As a small company, it was the only way to go," said Friedrich. "The big players, … have their own training department and their own teachers, but we don't have that. So, for us it was always necessary to work with somebody who can bring in such knowledge."

After John completed the CNC Machining apprenticeship program at Trident, Manufacturing Firm 1 sent him to Germany to continue studying as an apprentice at the company's headquarters. He later returned to the site in North Charleston where he worked as a machine operator and has since moved up to working in the office as a logistics manager.[31]

After John's program, Manufacturing Firm 1 invested in having one other employee go through the program at Trident. The second apprentice chose not to stay with the company after the training. Friedrich explained that he felt the investment was still worth it. "Not everybody will leave," he said, "and I think we are quite confident that most of the people stay if they see some perspective here for how they can develop."

In addition to learning about John's experience, representatives from the apprenticeship program at Trident Tech shared two students' stories that were referenced by multiple interviewees and featured in some promotional materials. One is about a young woman who completed a 4-year career and technical education program at her high school and then

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[31] John's family happens to be German and he grew up speaking the language, which had to have helped in his transition to studies at Manufacturing Firm 1's headquarters.

participated in the Charleston Youth Apprenticeship program at Trident Tech her senior year. She studied mechatronics and completed her on-the-job training at a respected turbo technology company. According to the company website, the firm "designs, manufactures, sells and services diesel and alternative fuel engines …, diesel and alternative-fueled electrical generator sets … [and] related components and technology." She is currently working to complete her Associates degree and has goals of getting her bachelor's degree. She studied industrial mechanics and finished the program as the only female apprentice in her class of 13. She was hired by the company and later purchased a home– all before the age of 19. Now, she is working and continues to pursue her studies (Kaufman 2017).

Another student, a young man, took a different path. He began the Machine Tool Technology Apprenticeship as a senior in high school. He was employed by an aerospace bearings manufacturer, for his on-the-job training. After graduating from high school, he deferred his acceptance to Clemson University's Mechanical Engineering program to finish the second year of his Charleston Youth Apprenticeship position. Later, he re-applied and got in. Mitchell Harp referenced his story during his interview, adding that the company is helping to pay for his studies at Clemson. The company even helped with things he would need for his dorm room. Though the two students took different paths, Trident staff celebrated their successes as examples of what is possible through youth apprenticeship opportunities.

Students' Challenges

John said the most challenging part of the program was the schedule. As an adult apprentice, he worked a full-time job at Manufacturing Firm 1 and took classes on Trident's campus in North Charleston a few nights a week. It made for long days and late nights. When answering the question of how the program might improve, John agreed that more advanced offerings could be helpful.

Representatives from the two other companies interviewed for this study described a mix of challenges their high-school aged apprentices encountered. In one case, the representative explained that it was unclear if the mentor and student just could not get along or whether the student lacked sufficient job readiness skills or soft skills, as his supervisor reported. At a different site, another student apprentice had a personal injury that left them

unable to fill all of the hours of their on-the-job training. One of the representatives said that one of the apprentices also seemed like they may have been unhappy with the position – that they thought the program was not a good fit and they wanted to do more advanced work. Both companies, however, still thought the program was worthwhile and planned to continue hiring youth apprentices. They offered suggestions, which will be listed among the suggestions for improvement later in the chapter.

Companies Describe their Experiences with Apprentices

All of the companies are small advanced manufacturers and those interviewed had or currently have apprentices in CNC Machining. Two of the three companies had a few dozen employees. One had closer to 100. Two of the three companies interviewed hosted at least one youth apprentice. The employee interviewed completed the adult apprenticeship program and his on-the-job training at the third company. The same company expects to host its first youth apprentice for the 2018-2019 school year. One of the companies had a college-aged apprentice through a different college program at the time of the interview. All of the companies interviewed were small businesses. A fourth company responded to the request for an interview via email. They did not have time for an interview but shared their goals and their experience with the program to-date, which are referenced below.

Reasons the companies interviewed gave for why they find the apprenticeship programs at Trident beneficial include: it is a way to find workers for hard-to-fill positions who may choose to stick with the company long-term; it is a centralized place for finding workers interested in learning a skill; it offers quality courses; and it is affordable. Challenges companies described were the need for additional direction and support for on-the-job mentors, concerns with job readiness, and the need for youth apprentices in more areas. One company planned for a set of new hires to begin training as apprentices in order to have them eventually fill more advanced positions, but they could not get any of the new employees to commit to it.

Still, all of the companies interviewed saw their offering apprenticeship positions with Trident as a positive development with a lot of potential.

The Positives

Across the board, companies viewed the apprenticeship program as a way to invest in an employee who may choose to stay at the company long term. This was the case for employers who hired high school-aged workers through the program and for those who decided to support adult apprenticeship training for existing employees. All said the time and the money spent on wages for the student workers and tuition (if they had to pay it) were worth it – even if the trained worker chose not to stay with the company after completing their studies. Two of the three said that investing in students was worth the cost because the students are training for critical difficult-to-fill positions and it is affordable. One employer said they had 6 positions they have had trouble filling for some time. Having an apprentice who might decide to stay with the company long term was worth the investment.

Two company representatives named the quality of Trident's training as one of the benefits of participating. One explained the school did a great job providing students with a strong foundation and with the theory behind the skills they would learn and practice on the job. One company expressed that Trident could offer more advanced tracks for adult apprentices but made it clear that they were very pleased that Trident is filling what they see as a big gap in basic worker training services in the region. One company said having student workers mentored by experienced employees seemed to boost morale. The mentor seemed to appreciate the interest in his skillset. Someone interviewed also said other workers on the shop floor seemed to respond positively to having a young person interested in their field.

One of the companies interviewed that said they had previous experience with high school-aged workers in an on-the-job training setting described Trident's apprenticeship program as a significant improvement because it is "centralized." The representative, for example, explained that it had a relationship with a local high school in the past where individual teachers connected students to on-the-job training opportunities at companies one by one. They said it fell to the school's "business liaison" with the help of guidance counselors and teachers, or a school's shop teacher to make the connections. However, it was not consistent year-after-year. Because high school students throughout the tri-county area go through Trident's dual credit program, employers described it as a centralized way for students

to connect with employers and as a place with dedicated staff employers could reach out to with questions. Specifically, the companies identified Mitchell Harp as a big help.

In a similar vein, one company explained that as a small businesses, it is difficult to pull resources together to train employees for higher skilled positions. They also referenced the role Apprenticeship Carolina played in getting them registered – handling the paperwork.

"As a small company, it was the only way to go. For the big players, they have their own training department and their own teachers, but we don't have that. So for us it was always necessary to work together with somebody who can bring in such knowledge."
– Friedrich, Manufacturing Firm 1

When asked if they felt the program was worth the investment even if the trained employee did not stay with them after the program, all of the company representatives interviewed said yes. Two explained that trained workers that left would be able to fill a position elsewhere, likely in the region, and one of the two went further to say that they thought students trained who leave may return to the company later in their career.

Their responses conveyed their interest in two goals: investing in workers for the benefit of their own companies and investing in workers for the benefit of the sector as a whole. Hosting the apprentices has a fairly low barrier to entry and it costs the company very little. Overall, all of the companies interviewed thought the program was affordable, convenient, and needed.

Companies Describe What Can Be Improved

A few challenges the companies have experienced implementing the adult or youth apprenticeship programs emerged in the interviews. It should be noted, however, that company representatives consistently coupled each challenge they mentioned with at least one statement of praise for the program. They made it clear that they view Trident's offering and coordinating the program and their participation as on-the-job training sites as a positive experience for them despite the challenges. The challenges named were the need for additional direction and support for some of the on-the-job mentors, the observation that many students lacked soft skills, and the need for apprentices in more areas, like welding.

Two of the three companies felt on-the-job mentors could use better guidance on how to support students in their learning. One company, for example, noted they did not hear from Trident after the apprentice was placed with them. Recent news received in the Fall of 2018 from someone who spoke to administrators at Trident Tech suggests that the college is aware of this and is making sure mentors have more guidance for the 2018-2019 school year.

Regarding students' job-readiness, some of the company representatives and others interviewed mentioned an issue with "soft skills." One representative described interacting with a number of academically qualified students who lacked soft skills. They named arriving on time to interviews or work and the potential apprentices' conduct during interviews—being on their cell phone or texting—as examples. One company described reaching out to multiple students sent their way by Trident but never receiving a reply from many of them and encountering a lack of commitment in interviews in others. As a result, the company said it was prepared to hire multiple students but ended up only hiring one.

To address the soft-skills issues, one company thought it would help if Trident ensured students had the skills needed before being connected to employers. A different employer stated they would be willing to work with the apprentices they hired on these skills but needed more guidance. The company that did not mention soft skills as an issue had only worked with an adult apprentice – someone who was already employed at the company – and had not yet worked with a high-school apprentice, though one was set to begin with them in the Fall.

One of the companies that was familiar with apprenticeships wished there were more advanced tracks available but noted that Trident's current program is a great start. Similarly, another company specifically named the need for a welding track at Trident and named a dire need for TIG welders—a skill often needed for work on government defense contracts. The company explained that students in the area graduating with welding training from high-school career centers and the school ArcLabs, a private school with locations throughout the state, do not have the basic training needed to do TIG welding. As a result, the company recently hired a recent graduate from a welding school in Florida since there are so few TIG welders produced locally.

Despite the challenges named, all of the company representatives interviewed thought the program worked well for them as small employers and that the current program should be continued and expanded. The companies specifically stated they saw great value in the help they received from Apprenticeship Carolina in registering with the U.S. Department of Labor. They also commented that Mitchell Harp communicates with companies regularly about adult and youth applicants.

Positives According to Program Partners and Administrators

Program administrators and partners described the program as well received by employers and participants. They pointed to how the number of students participating is growing each year. They also pointed to the additional tracks offered in the dual-credit program for youth apprentices and the increasing number of companies offering on-the-job training for high school students through registered apprenticeships each year.

Even though all of the available positions are not filled, everyone interviewed described the program as needed since the demand for skilled workers in the pathways identified by the Chamber are so severe. A few pointed to what they felt was a surprisingly high-level of interest from schools, educators, and businesses across the country as well as the Department of Labor. They were proud that local business leaders and the Chamber, Trident, and the Department of Apprenticeship staff are leading the effort together and that they are nimble, making adjustments as needed versus administering a prescribed program.

Program Partners and Administrators Describe Challenges

When asked what they thought could be improved, all but one respondent mentioned the need for reliable transportation as a barrier to participation for many students. Students need to get to class at a Trident campus and to work sites. Other challenges named the need for public funding sources for students' tuition and fees as a major challenge. One mentioned the need for more staff.

Interestingly, negative perception of doing an apprenticeship, largely in the manufacturing sector, was brought up, but not always as a challenge—possibly because it is an issue that is being addressed. In the early 2000s and 2010s in a report to the legislature, it was

noted that perception of manufacturing jobs was largely negative. Parents did not want their students entering dirty, hard work professions or to give up going to college. Public perception of choosing not to go to a 4-year college to pursue a trade or to enter manufacturing was an issue. Excitement around the arrival of Boeing and other internationally known advanced manufacturing companies, the quality of jobs at such companies, plus concerted efforts by leaders is helping to shift some of that perception.

Local leaders have also been intentional in their efforts to recruit students and change perception as well. Leaders highlight the positives of advanced manufacturing and careers in STEM as challenging, modern work that pays well. While Mitchell Harp described a lot of his work as recruiting companies, Melissa Stowasser's position was described as working with high schools to recruit students and help expose high school students to the kinds of careers paths available through apprenticeships. One company mentioned their regular participation in a career fair Stowasser organizes. That same company also participates in a separate community program, STEMersion—a program that took twenty K-12 school teachers to Bosch, to Manufacturing Firm 2 and to other local companies to show what advanced manufacturing and careers in STEM look like, pay, and what those careers can offer students. As noted earlier, Trident Tech also hosts a "Signing Day" for the Charleston Regional Youth Apprenticeships Program. Modeled after signing days for sporting evenings, students publicly sign-on with companies they will be working with as apprentices. Family members, media, and local leaders are all present. Students feel honored to be chosen and they are cheered on by a crowd. All of these efforts are deliberate attempts to show manufacturing, advanced manufacturing, and careers in STEM as desirable career paths.

Challenges

Program administrators, educators and economic development representatives described the challenges. Program administrators and a key partner pointed to the issue of money to pay for the students' tuition as something that could be consistently provided by the state. One person remarked that some of the scholarship money is only available to full time students. That poses a problem for many of the adult students who work full-time and pursue the apprenticeship program in the evenings.

Transportation was named as a major challenge in multiple interviews—by program partners in economic development as well as by program administrators. In order to participate in the adult or youth apprenticeship program, a student must confirm they have reliable transportation. Classes are most often held at Trident campuses and apprentices must be able to report to their on-the-job training sites consistently. Two interviewees remarked that the lack of transportation directly impacts the access of students at schools with fewer resources. One specifically referenced a school in Downtown Charleston of predominately poor, African American students who likely qualify for the Charleston Regional Youth Apprenticeship program academically, but likely do not have the transportation required to participate. As a related issue, one county official noted the desire for a more robust campus in one of the more rural parts of the county that currently only has a small jobs center site. Because the smaller site is not a full campus, adult students from the area may have to travel to the larger campuses further away from their homes in order to participate in apprenticeship or other education programs.

6—Analysis & Additional Points of Note

Trident Technical College along with public and private sector workforce development actors are working towards the same goals while focusing on different segments of the workforce and education system.

Interestingly, the Charleston Region Talent Strategy's "Workforce Supply and Demand Gap Analysis" from 2014 was highlighted as a major factor in just about everyone in the public and private sector's planning and work. Per the people interviewed and spoken to for context, the public workforce development system has additional goals it must achieve per federal guidelines, but they also work towards the goals put forward in the report.

K-12 schools in each county have taken different approaches to career and technical education. Charleston County, for example, has a career and technical education coordinator who helps schools connect students to CTE learning opportunities. Each school has CTE programs available, though the offerings vary – possibly due to equipment availability or staff. See the Appendix for what some of the CTE offerings look like in the Charleston County School District. One of the Dorchester County school districts has deployed a career center model where students have the option of taking the bus to the center. In Summer 2018, education, workforce development, and business representatives participated in a "Education and Business Summit." Similar gatherings have taken place in recent years. Trident Technical College, through its partnership with the Charleston Metro Chamber of Commerce, area businesses, and local high schools acts as an important implementer of workforce development strategy through its apprenticeship programs. It appears to do so in a way that really tries to meet the needs of the students as current or future members of the workforce and the employers.

Youth Apprenticeships are growing in popularity with businesses and with students, but they are not accessible for all of the students who qualify. The employer-driven program is still not meeting companies' demand or fulfilling companies' willingness to work with student trainees.

Students must have reliable transportation to participate (a car, a dedicated parent who will drive them to their work site, etc.) based on the regional geography and extremely limited

public transportation options. Some senior officials described the youth program as competitive. They made it clear that the interview process is modeled after a real job application process and models real employment. Availability of reliable transportation and job readiness are part of competitive hiring practices in the real world. Some companies expressed that many students interviewed have not developed sufficient soft skills to be successful in their on-the-job training hours. At least one of the companies interviewed was not able to hire enough students for adult or youth positions due to this factor. It appears that students who are qualified and interested could be better prepared for what to expect and employers would, in turn, have more apprentices: a win-win. There are some local efforts to address students' job readiness through soft skill development. Among the reports available on talent demand and economic development strategies for the region is a report that specifically illustrates which soft skills are needed to pursue careers in various sectors of the economy and which skills are needed for different pathways in those sectors that may be incorporated into K-12 curriculum.

Students must pass the testing requirements for their desired program at Trident Tech, their application must be accepted in the dual-credit program, and they must interview and be hired by a company. As stated in the previous chapter, almost all of the employers I spoke with mentioned that a number of students lacked "soft skills" or job-readiness skills. As such, many of the positions created by businesses seem to be unfilled. Further data collection is needed to confirm the exact scale of this issue. The Jobs for the Future report on CVS Health details components of their pre-apprenticeship program (Browning 2018), but most of the companies interviewed likely do not have near the resources needed to create such a program. How to improve students' job readiness and who should take the lead on it needs to be addressed. The apprenticeship program could and should likely remain competitive, but adequate investments must be made in order for this and other career and technical education programs to create the pipeline of talent to meet companies' demand for local workers and to best connect students and adults to quality employment.

One local leader summed up these issues for adult and youth apprentices when they expressed concerns that these programs, educational and workforce development opportunities, and newer jobs may not be reaching a specific portions of the local population.

They saw it was possibly due to disconnects caused by pockets of rural poverty, uneven distribution of knowledge about the programs, and the need for reliable transportation to access job sites. Again, further data collection is needed to confirm the scale of this issue, but the same was mentioned in other interviews about many poor, urban youth's inability to participate.

When considering the results to-date for the youth apprenticeship program and sharing information about how the state's economic development programs and public workforce development system intersect, one area economic development leader specifically pointed to the need for programming that reaches more students. They cited that 75 apprentices – the number of students with positions the previous school year – with 29 public and 16 private high schools in the region was insufficient. They noted the goal was 175 youth participants, but that number is still not sufficient when considering accessible training opportunities to prepare scores of young people graduating or soon to be graduating high school for employment. At the end of the 2017-2018 school year, thousands of students graduated from public high schools in the region. There were over 1400 graduates from Berkeley County alone. Growing apprenticeships is promising, but investments in career and technical education programming for students beyond apprenticeships is also a must.

Representatives of the Charleston Regional Development Authority (CRDA) pointed to a plan they launched with the Charleston Metro Chamber of Commerce called the One Region Strategy. It is a 3-year global competitiveness strategy that is trying to ensure that all people and businesses in the region benefit from the current and projected economic growth. The values for the One Region strategy are stated as: "A Strong, Resilient Economy; Attainable Opportunities for All Residents to Live, Learn & Earn; Balancing Growth with Nurturing Our Unique Character; and Being a Connected Community." The development of this strategy may be in response to having some time to assess the initial results of the rapid physical growth and economic development that have come with Charleston's rise on the global advanced auto-and-aero-manufacturing stage. Charleston's low ranking in the category of shared prosperity as referenced in Brooking's 2017 *Metro Monitor* report (Berube 2017) indicates there are statistics to back-up possible cause for concern about ensuring growth that is equitable and shared by

local residents. New people are moving to the region at an unprecedented pace and two companies interviewed stated they have hired or recruit to hire talent from out of state because they cannot find people with the skills they need locally.

Federally Registered Apprenticeships provide a nationally recognized credential for participants that complete the program. Registering apprenticeship positions also gives states and participating companies access to federal workforce training funding. This provides an opportunity to examine how federal dollars are best utilized.

The federal government is devoting more resources towards supporting federally registered apprenticeships and training programs that better define and connect workers to career pathways. These initiatives began in the Obama Administration and have been continued and expanded in the Trump administration. Congress has appropriated funding to the U.S. Department of Labor's Employment & Training Administration to also pursue initiatives expanding apprenticeships and other career-based training programs. States and companies have more access to these federal training dollars when their programs are federally registered. South Carolina's Technical Education System received one such grant from the Department of Labor for $900,000 for fiscal year 2016. The funding, obtained through a competitive application process, is does a mix of paying for the cost of: student tuition to expand youth apprenticeships throughout the state, the expansion of a STEM-related career pathways program into all of the regional technical colleges, and a much-needed return on investment study on apprenticeships in the state that is being conducted by the University of South Carolina.

While the public sector still receives workforce development and training dollars, it should be noted that companies – those that need resources to boost their human resources capacity and many that may not need the funding relief – may also benefiting from more federal dollars going to worker training. There are reporting requirements that go along with implementing a registered apprenticeship, though some earlier reports on the program note the reporting could be better (R. Lerman, Eyster, and Chambers 2009). Apprenticeship Carolina helps companies with, both, initial registration and regular reporting. They act as an intermediary between the companies and the Department of Labor. Registering the

apprenticeships means the federal government must sign off on the positions creating, certifying they meet U.S. Department of Labor standards.

Unemployment is extremely low. Demand and competition for workers is high. The supply of skilled workers is low. Training incentives for companies and workers are occasionally not aligned.

The following applies more to adult apprenticeships and other worker training programs associated with Trident Tech and the state's technical college system. More than one person interviewed said students are sometimes offered jobs and pulled out of education and training programs before they complete them or have a chance to get their credentials. One interviewee said there may be a problem with local auto mechanics, for example, hiring students even if they are in other kinds of training programs that may offer better-paying jobs in the end because employees with mechanic skills are in such short supply.

As one senior program official explained, by encouraging the affordable win-win apprenticeship path, students and employers could be further incentivized to invest in the students' education that results in credit hours and certifications that could benefit them in the long term. A few program representatives recommended more state funding to cover tuition for students whose employers are currently paying for the training, saying that could help to incentivize employers to have their employees credentialed. While this may be needed and beneficial for some companies like small businesses, there could be concerns – especially when it comes to large corporations with sufficient resources – that public officials should allot limited federal and state funds for worker training to go to those entities that need the additional support to participate and provide services.

On a separate, but related worker-training note: Through the training service and incentive the South Carolina Technical College System offers through readySC to incoming large-scale employers locating to the state, as recently as April 2018, the *Post and Courier* reported that Volvo still has hundreds of positions to fill and only 4% of residents qualified – even after meeting a number of academic requirements and getting through the interview process (Wren 2018). It seems clear residents and leaders were not as prepared as they had hoped for the influx of jobs but leaders are quickly doing a lot of innovative things to catch up.

Simply focusing on what the companies and businesses want or need is not enough to ensure the employers' talent demands and potentially talented workers' abilities to fulfill those needs are matched.

Extremely Low Unemployment Could Mean Fewer Workers are Available or Interested in Training

In an interview, a senior official at Trident Tech explained there are fluctuations in enrollment in programs based on local trends and developments as well as marketing for their programs. There is a lot of interest when a new company is moving to town and will be hiring or when a company announces they are expanding operations. They explained the media helps and acts as additional marketing. They noted that the media around the opening of a new training facility Boeing is helping to build on Trident Technical College's North Charleston campus may spark interest and a boost in enrollment in the near future.

In other cases, workers may feel that in such a tight economy they have a lot of options. One company representative explained that they hired a set of employees with plans to automatically begin upskilling them for higher-paying roles. The newly hired employees, however, did not want to commit to the training program. The company representative thought this possibly due to the high demand for workers in a time of extremely low unemployment -- the employees may have chosen not to worry about pursuing additional studies since they had a job and likely will not have trouble finding another if needed.

There may be less of a need for people to pursue better jobs or find ways to get back into the job market if they are unemployed or underemployed. Even people working with and familiar with readySC's programs noted the program is having trouble finding enough people to train for the hundreds of positions opening in incoming companies. One of the companies interviewed remarked that this issue is why Trident's programs are so important. They are part of creating a pipeline of skilled workers. For this particular company, not being able to find skilled workers or workers to train for their positions means they have to recruit workers from outside of the region and possibly from outside the state. They stated very clearly they realize this impacts their bottom line – the recruited employees often demand more in salary than local hires as skilled workers. Boeing, for example, is paying workers in its Charleston plant 40%

less than workers in similar roles in Washington.[32] If readySC does not have enough local workers and has to rely on more people from outside the area, it similarly may impact the wages the recruited trained employees expect.

Training that "Meets Residents Where They Are" is important and it is working.

To prepare workers to enter or move to better positions in the regional economy, workforce development and community leaders in Berkeley County decided to create a traveling training and skills assessment program to community centers and locations in more rural parts of the county. Transportation is a big issue for a number of residents. This program has gone to St. Stephens, Cross, and other small rural towns and seems to have had some success based on early reports. Some sites have many more participants than others.

The goal is to have workers assessed and to have those with sufficient skills move towards the appropriate workforce or company training programs. It was said that training to work for Volvo is the goal for many participants. Workforce development leaders explained, however, that many people may find that they do not have the manufacturing experience or skills for the positions at Volvo. People can continue their education and, ideally, with the assessment, be placed in positions or training programs that provide them better job prospects than the jobs they currently have. Another innovative way local leaders, manufacturing companies and Trident have adapted to create trainings to meet residents where they are is through the development of a formal training program that counts as the equivalent of one-year's manufacturing experience.

Issue of Keeping Technology in Training Programs Up-to-Date

Interestingly, the apprenticeship programs give many youth and adult apprentices an opportunity to learn from employees using state-of-the-art technology at world-class advanced manufacturers, for example, as well as other companies like those that serve as suppliers. The technical education system's economic development programs like readySC do not typically have as much of a problem accessing the most up-to-date equipment. One interviewer remarked that some of the equipment for readySC training is donated to the technical college

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[32] Some believe this disparity is okay due to the differences in cost of living. South Carolina sells itself as a place that keeps labor costs low.

and becomes an asset for students who will later work in the broader sector. Businesses sponsor equipment and rooms on Trident's campus as well.

Trident Tech appears to balance its educational and workforce development missions.

  As of the 2000s, there was a training program the SC Technical College system offered to leaders of technical and community colleges from other states. In the final chapter of *Transforming South Carolina's Destiny,* board leaders explained that all of the incoming technical college presidents in South Carolina must take a course on the history of the system. The history explains why the technical colleges are the way they are. They explained they believed that it is only with this understanding that the presidents will be able to move the colleges forward into the future. Incoming presidents in the past, for example, have tried to stress either the vocational side or the academic side the colleges' work. Some have tried to change the name of the technical college they lead to a "community college" but those moves have been rejected by the larger board (with just one exception). Their academic mission and academic reputations are extremely important for the colleges. However, the state board feels it is critical that the colleges maintain "technical" in their names and as part of their brand for the international business community and otherwise. Stories from companies interviewed and those featured in the *Competitive Edge* series produced by the technical college system indicate companies respect and value the quality of the technical colleges' trainings. Interviewees stated that the commitment of the leaders at Trident Technical College to pursuing both the academic and vocational missions of the school is evident in the design of the youth apprenticeship program. Students receive training in skills and receive credentials and academic credits they can build on as they go further in their careers.

7 – Conclusion

As stated in earlier chapters, the goal of this research was to better understand what programs and opportunities Trident Tech offered students through its employer-driven education and vocational training programs and how those programs—especially adult and youth apprenticeships—are designed. In the process, however, I learned it was important to develop a much better understanding of the value regional partners see in the college and better identify who some of those partners are. I also found it important to better understand the history and origins of, not just Trident Tech but, of the state's technical college system. It is through the perspectives of the local partners, the state's worker-training history, and a better understanding of how the college's services complement the services provided by the technical college system's Division of Economic Development that I began to understand how Trident Tech fulfills its role as a community college, workforce intermediary, and an implementer of economic development and workforce development strategies. Based on the interviews conducted and the data available, the thesis largely focuses on how the adult and youth apprenticeship programs came to be; who the major partners are; and leaders' comments on what is working well and where there is room for improvement.

Charleston is an example of a region taking a proactive, cross-sector approach to economic development and worker training. A few years into the process, however, it is clear that in order to fulfill the promised number of workers and sustain the companies long-term, the region *has* to invest in educating as many of its residents as possible. A series in the local daily from November 2018 *The Post and Courier* points to the severe and deliberate lack of investment in education for all students. Enshrined in state law is educate students to standards that are "minimally adequate." That seems incompatible with the high-tech, internationally competitive regions the state says it wants to develop. In order to meet the labor demands of companies in the Charleston area and in the growing sectors of the future, the region will likely have to better invest in all of its young people. The results of not doing so is showing. Whether or not initiatives like the One Region Strategy can help re-focus attention and resources to preparing residents for the good, skill-based jobs being created has yet to be determined.

While this case study has its limits (a limited number of interviews, no interviews with large companies, and limited quantitative data for example), themes emerged that may be solid starting points for future research. While Apprenticeship Carolina stresses that it does not conduct outreach as an employer-driven program (not wanting to push something on companies they have not "demanded" or asked for), the Division of Apprenticeship Programs at Trident Tech explained that outreach is a big part of their work. The interest and need for the return on investment on apprenticeships for the state will be important and, hopefully, showcase the gains and any challenges for all of the parties involved – the businesses, the educational partners, and the apprentices. In 2012, Nichola Lowe published "Beyond the Deal: Using Industrial Recruitment as a Strategic Tool for Manufacturing Development" in *Economic Quarterly.* It argued that evidence from North Carolina's biomedical sector supported locating research and development functions and manufacturing (or production) together is key for sustainable economic growth. This is in contrast to having a place heavily in one or the other. (Lowe 2014). The commitment in the Charleston region and throughout the state of South Carolina where leaders are strategically recruiting companies and connecting its major industries to local universities, community colleges, and schools – especially in advanced manufacturing – may provide another interesting case study on whether the combination does better guarantee sustainable economic growth. However, to do so, it may require more investment in people moving into the talent pipeline for production as it continues and increases investment in people likely to contribute to the research and development side.

It is clear that the Charleston regions' leaders in economic development, workforce development, business, and education are working together to try to prepare the current and future workforce for the advanced manufacturing and other job opportunities they attracted and are creating. Trident Technical College will likely continue to be a major player and will serve as a major force for implementing or carrying out some of the region's critical workforce development goals.

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Appendices

Appendix A: Interview Questions

Questions for Program Administrators:
Program Design and Development
- What are the program's goals?
- How do you align your administrative process with those goals?
    - i.e. how do you align what's required federal (and/or state) reporting with what's most important for the region. Do they align?
- How do you select which occupations to develop a program for?
    - Once selected, how do you design the curriculum?
- What's the sponsor's involvement in designing the curriculum?
- Which partner(s) are key/critical to making it work?
- Which program components are most critical for success?
    - From an employers' perspective?
    - For the worker's perspective.

- What are your reporting requirements?
    - Federally or state mandated + any reports required for funding

- Are there any recent reports on the programs?
    - Number of participants?
    - Growth over time?

- How many people are in your program?
- Do some sponsors utilize more than one program? (@ the same time)
- If you could change something about the program, what would it be?
- How do you measure results?

- Have you seen any difference across different employers or different industries?

- What percentage of workers being trained are employed afterwards?
  Of those retrained in skills, what levels are achieved?

- Have you done surveys of participants or have reports? Are there any independent evaluations?
- How would you address challenges?
- How has the program changed over time? What are the reasons for the change?

Growth / Recruitment:
- How did you expand/scale up in these other areas?
- How do you recruit students?

Appendix A: Interview Question (continued)

- Recruitment – Workers' side: Any target populations?

Funding:
- Where does funding for your program come from?
- How much does the program cost the company? Overall?
- What are the required reporting mechanisms?
- If you can change one thing about the program, what would it be?

Questions for Program Participants (Trainees):
- Can you tell me which program are you in?
- How did you hear about this program and how long have you been in it?
- Why did you choose to do this program?
  What do you see as the main benefits?

About the participant:
- Can you tell me more about you? (Age, highest level of education, place of origin)
- What were you doing before this?
- What do you see yourself doing after the program?

Questions for Sponsors (Employers/Firms):
- What is your role at the firm?
- Which program(s) has your firm utilized?
- How did your firm hear about the program(s)?
- What is your firm's role in designing the programs?
- Who are your participants?
- How did they hear about the program?
- What do you do to recruit new program participants?
  - What role does Trident Tech play in this?
- How do you decide what's most important in the trainings?

- What parts of this program are the things you like most or see as being most beneficial for the firm employees? (any negatives?)
  - Have you done any surveys of participants?

- How long has this program existed at your company?
- How do you measure results?
  - What are your reporting requirements?
- How has the experience here differed from experiences elsewhere?
- Is there anything else you think I should know?

Charleston Regional Youth Apprenticeship ACCUPLACER Test Score Requirements

HOSPITALITY AND TOURISM

CULINARY ARTS
71 Reading
66 Arithmetic and
20 Elementary Algebra

HOTEL OPERATIONS
71 Reading

INFORMATION TECHNOLOGY

COMPUTER NETWORKING
71 Reading
66 Arithmetic and
20 Elementary Algebra

PROGRAMMING/ CYBERSECURITY
71 Reading
66 Arithmetic and
83 Elementary Algebra

MANUFACTURING

INDUSTRIAL MECHANIC
45 Reading
Required math scores
will vary by company

MACHINE TOOL TECHNOLOGY
45 Reading
Required math scores
will vary by company

BUSINESS TECHNOLOGY

BOOKKEEPING/PRE-ACCOUNTING
81 Sentence Skills
71 Reading
66 Arithmetic and
83 Elementary Algebra

CONTRACTUAL SERVICES

HVAC

45 Reading

AUTOMOTIVE TECHNOLOGY
81 Sentence Skills
71 Reading
66 Arithmetic and
20 Elementary Algebra

ENGINEERING DESIGN GRAPHICS

CIVIL CAD (COMPUTER AIDED DESIGN) TECHNICIAN
71 Reading
66 Arithmetic and
20 Elementary Algebra

CRIMINAL JUSTICE

SECURITY/PRE-LAW ENFORCEMENT
71 Reading
81 Sentence Skills

HEALTH CARE

MEDICAL OFFICE ASSISTANT
81 Sentence Skills
71 Reading

CNA TO PRE-NURSING
81 Sentence Skills
71 Reading
66 Arithmetic and
83 Elementary Algebra

EMT
81 Sentence Skills
71 Reading
66 Arithmetic and
83 Elementary Algebra

PLTW ENGINEERING ASSISTANT

ENGINEERING PATHWAY
71 Reading
81 Sentence Skills
107 Elementary Algebra
20 College-Level Algebra

ENGINEERING TECHNICIAN PATHWAY
71 Reading
81 Sentence Skills
66 Arithmetic and
20 Elementary Algebra

Qualifying SAT/ACT scores may be submitted in lieu of ACCUPLACER in some cases. Students interested in HVAC, Industrial Mechanics, Machine Tool Technology or Automotive Technology may be required to take the Mechanical Aptitude Test at TTC's Testing Center. For test appointments, call 843.574.6410.

Source: Interview with Division of Apprenticeship Programs, Trident Technical College, 2018

Appendix C: Sample Certificate Program for Industrial Mechanics (2017)

Manufacturing
Industrial Mechanics

This certificate program teaches skills required for troubleshooting, maintenance and repair of mechanical systems. The program prepares students for employment in industrial mechanics.

*The Certificate in Applied Science in Industrial Mechanics may be applied towards an Associate's Degree.

Year 1 Fall Semester Classes

Course Prefix/Number	Course Title	College Credit Hours	Description
IMT 210	Basic Industrial Work Skills I	3	This course is designed to give students an introduction to basic safety, construction math, and hand tools as related to industrial applications.
IMT 211	Basic Industrial Work Skills II	3	This course is designed to give students an introduction to power tools, blueprints, and rigging. Students will learn basic communication and employability skills as related to industrial applications.

Year 1 Spring Semester Classes

Course Prefix/Number	Course Title	College Credit Hours	Description
IMT 105	Mechanical Sketching	2	This course provides hands-on instruction in blueprint reading and sketching so the student will be able to utilize analytical and visualization skills in the development of sketching techniques and understanding blueprints.
IMT 161	Mechanical Power Applications	4	This course covers mechanical transmission devices, including procedures for installation, removal and maintenance. Emphasis is placed on drive systems consisting of belts and pulleys, chains and sprockets, and gear drives used to transmit power.

Source: Trident Technical College. 2018d. "Industrial Maintenance Mechanics Program: Industrial Mechanics Certificate." Spring 2018. https://www.tridenttech.edu/academics/divisions/iet/iet_indmaint.HTM.

Manufacturing

Industrial Mechanics

Year 2 Fall Semester Classes

Course Prefix/Number	Course Title	College Credit Hours	Description
IMT 124	Pumps	2	This course covers packing, seals, couplings, alignment, bearings and rebuilding pumps.
IMT 160	Preventive Maintenance	3	This course covers preventive maintenance techniques, lubrication, bearing, mechanical troubleshooting and the use of computers in maintenance.
MAT 170	Algebra, Geometry, and Trigonometry 1	3	This course includes elementary algebra, geometry, trigonometry and applications.

Year 2 Spring Semester Classes

Course Prefix/Number	Course Title	College Credit Hours	Description
IMT 132	Hydraulics	2	This course is a study of basic hydraulic terminology and principles of hydraulics and pneumatics.
IMT 133	Pneumatics	2	This course is a study of basic pneumatic terminology and principles for industrial applications.
IMT 151	Piping Systems	3	This course covers plumbing and piping systems used in industrial, commercial and/or residential construction. Emphasis will be placed on the reading and sketching of piping schematics as well as the fabrication and design of piping systems. This course will also include pump technology and valve maintenance.
IMT 163	Problem Solving for Mechanical Applications	3	This course covers troubleshooting techniques such as critical thinking in mechanical situations, practical problem-solving techniques, root-cause analysis, and mechanical procedures with heavy emphasis on computational and analytical problem-solving skills.

Source: Trident Technical College. 2018d. "Industrial Maintenance Mechanics Program: Industrial
Mechanics Certificate." Spring 2018.
https://www.tridenttech.edu/academics/divisions/iet/iet_indmaint.HTM.

Charleston Regional Youth Apprenticeships

Regional employers are offering rising high school juniors, seniors and graduating seniors the opportunity to get paid to learn. Youth apprentices receive paid on-the-job training along with classroom instruction at Trident Technical College through TTC's Workforce Academies. The Charleston Metro Chamber of Commerce ensures funding to cover the costs associated with apprenticeship-related courses for students who are hired by participating employers.

Two-year apprenticeships are available in the following areas:

Industrial Mechanics	Culinary Arts	Emergency Medical Technician
Machine Tool Technology	Hotel Operations	CNA/Pre-Nursing
Computer Networking	Bookkeeping/Pre-Accounting	Medical Office Assistant
Computer Programming	Civil CAD Technician	HVAC
Cybersecurity	Security/Pre-Law Enforcement	Automotive Technology
IT Governance	PLTW Engineering Assistant (Engineer and Technician Pathways)	

Students who complete the two-year program will receive:
- Paid employment and mentoring from an industry professional
- A high school diploma (for those still taking high school classes)
- Approximately 30 college credits from TTC free of charge
- A completion certificate for coursework that may be applied to an associate degree
- National credentials from the U.S. Department of Labor
- Two years of work experience
- Marketable skills for life

To be eligible, a student must:
- Be a rising junior or senior (at least 16 years of age) or a graduating senior
- Achieve qualifying placement test scores
- Demonstrate academic readiness and responsibility
- Have reliable transportation to work and to school
- Be legally able to enroll in post-secondary education and work in the United States

TRIDENT TECHNICAL COLLEGE

Source: Interview with Division of Apprenticeship Programs, Trident Technical College, 2018

Youth Apprenticeship FAQs

What are Youth Apprenticeships?

Apprenticeships are flexible training programs that cultivate well-educated, highly skilled workers able to meet the demands of a competitive global economy. Youth apprenticeships are open to high school juniors, seniors and graduating seniors, giving them the opportunity to earn while they learn through paid on-the-job training under the direction of an industry mentor. Youth apprentices also take college classes that directly relate to their apprenticeships.

Will my high school schedule change?

Your high school schedule will be adjusted to accommodate the college courses you will be taking at TTC. Youth apprentices usually take high school classes in the mornings and their TTC classes in the afternoons. Your high school counselor will work with you to ensure you meet all of your academic goals and that you are on track to graduate with your high school diploma.

Can I still participate in sports or other extracurricular activities?

Probably not. There simply won't be room in your schedule. Becoming a youth apprentice requires a serious commitment of time, effort and energy. You will be working a minimum of five hours per week for your employer during the academic year and then full time during the summer between the two years of the program. In addition to regular high school classes, youth apprentices take a specific sequence of college courses each semester throughout the two years. The program is designed for motivated students interested in gaining work experience, on-the-job and in-the-classroom training, and professional connections while still in high school. The demands of the program are significant, but so are the rewards.

How do I apply?

Talk to your high school counselor and ask for a Youth Apprenticeship application and a Dual Credit Application, or go online: www.tridenttech.edu/career/workforce/car_youth_apprenticeships.htm. Return the fully completed packet to your school counselor or to the Division of School and Community Initiatives in Bldg. 700/Rm. 101-B at TTC's Main Campus, 7000 Rivers Ave. in North Charleston. You may email it to Ellen Kaufman at ellen.kaufman@tridenttech.edu or Tanisha Hook at tanisha.hook@tridenttech.edu. Fax it to 843.574.6489. Mail it to Trident Technical College, Division of School and Community Initiatives, P.O. Box 118067, Charleston, SC 29423-8067.

Once my application is complete, am I in the program?

Qualifying placement test scores and a complete application packet are only the first steps. You have to be called for a job interview by one of the participating employers and then receive and accept a job offer. You must be hired by one of the participating companies to become a youth apprentice.

Need more help?

We get it! The process may seem daunting until you talk to someone. If you have questions that haven't been answered or need help getting started or completing the application, call Ellen Kaufman in the Division of School and Community Initiatives at 843.574.6990, or email ellen.kaufman@tridenttech.edu.

Source: Interview with Division of Apprenticeship Programs, Trident Technical College, 2018

Appendix E: 2017-2018 Youth Apprenticeship Application Packet Checklist

TRIDENT TECHNICAL COLLEGE

Youth Apprenticeship Application Packet Checklist

Incomplete applications will *not* be forwarded to hiring companies and will delay the application process.

A complete application packet should consist of the following:

✓ **Youth Apprenticeship Application Form**

Please print clearly!

✓ **A cover letter, which should address the following questions:** (*see sample*)

   a. Why do you want to be a youth apprentice?
   b. How do your career interests relate to the apprenticeship for which you are applying?
   c. Why do you think you should be hired as a youth apprenticeship?

✓ **A résumé, which includes:** (*see sample*)

   a. Education (include any courses/training that support your qualifications and interest in a youth apprenticeship)
   b. Awards and honors
   c. Extracurricular activities
   d. Any employment information
   e. Volunteer work/community service
   f. Interests and skills

✓ **Two recommendation forms**

Recommendations should come from:

   a. Within a school setting (teacher, coach, school counselor)
   b. An individual in the community (volunteer coordinator, youth director, employer)
   c. A relative is acceptable *only* if he or she has supervised you in a paid work setting.

✓ **Release of Information Form**

✓ **Media Consent and Release Form**

✓ **Qualifying Placement Test Scores and any other required testing for apprenticeship**

Submit completed packet to:

TTC Division of School and Community Initiatives

PO Box 118067, Charleston, SC 29423

or email to:

Source: Interview with Division of Apprenticeship Programs, Trident Technical College, 2018

Appendix F: 2018-2019 Charleston County School District Career and Technology Education Clusters & Programs by School

2018-2019 CCSD Career and Technology Education Clusters & Programs by School

Program	Academic Magnet	Baptist Hill	Burke	Clark Academy	Chas Chart Mth Sci	Daniel Jenkins Acad	Garrett Academy	Greg Mathis Charter	James Island Charter	Military Magnet Acad	North Charleston	School of the Arts	St. Johns	R. B. Stall	Wando	West Ashley
Agriculture, Food & Natural Resources																
Horticulture (010601)															#	
Architecture & Construction																
Architecture/Mechanical Design (151301)							#									
Building Construction (460000)			#													
Arts, A/V & Communications																
Digital Art and Design (500402)		#	●				●				●			●		
Fashion Design and Apparel Construction (500407)												●				
Media Technology (100299)															#	
Business, Management & Administration																
Administrative Services (520401)		●		#			#									
Business Information Management (521206)		●	#			#	#		●	●			●		●	●
General Management (520201)									●					#	●	●
Human Resource Management (521001)							#									
Operations Management (520204)															●	
Education & Training																
Early Childhood Education (131210)		●					●									●
Finance																
Accounting (520301)									●					#	●	●
Banking Services (520803)														#		
Business Finance (520804)															●	
Securities & Investments (520807)															●	
Health Science																
Biomedical Sciences PLTW (260102)					●								#		●	#
Health Science (510000)			#		#		●		●		●				●	●
Sports Medicine (310505)									●						●	●
Hospitality & Tourism																
Culinary Arts Management (520905)			●				●		●	●	●		●		●	●
Human Services/Family & Consumer Sciences																
Barbering (120402)		●														
Cosmetology (120401)							●								●	
Family and Consumer Sciences (190101)				●			●		●							●
Nail Technology (120410)																●
Information Technology																
Information Support & Services (151202)			#						●	●						●
Networking Systems (110901)									●							
Programming and Software Development (110201)	#								●					#		●
Web and Digital Communications (110801)		#	#		#		#		●		●				#	●
Law, Public Safety, Corrections & Security																
Law Enforcement Services (430107)											●					
Manufacturing																
Mechatronics Integrated Technologies (150404)																●
Marketing, Sales & Service																
Marketing Communications (090903)					●		●							#	●	#
Marketing Management (521401)									●						●	
Merchandising (521802)																●
Real Estate Sales															●	
Science, Technology, Engineering & Mathematics																
Aerospace Engineering Technology SREB (150801)														#		
Computer & Information Systems Security/Info Assurance (111003)																#
Pre-Engineering PLTW (140101)	#	#	#		●		●		●					●	●	●
Transportation, Distribution & Logistics																
Automotive Collision Repair Technology (470603)							●									
Automotive Technology (470604)															●	

= Concentrator Programs as of 09/03/2018   ● = Completer Programs as of 09/03/2018

Source: Charleston County School District. 2018. "CCSD Career and Technical Education Clusters & Majors." September 2018. http://charlestonempowered.com/cteforms/clusters/.