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THE ROLE OF COMMUNITY COLLEGES IN THE GLOBAL KNOWLEDGE-
BASED ECONOMY: URBAN AND RURAL DIFFERENCES
IN WORKFORCE OUTCOMES

By

Michael Joseph McGrevey

A Dissertation
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy
in Community College Leadership
in the Department of Leadership and Foundations

Mississippi State, Mississippi

May 2012

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By

Michael Joseph McGrevey

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DIFFERENCES IN WORKFORCE OUTCOMES

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The aim of this study was to investigate the question of whether or not the gap between rural and urban workforce outcomes is reduced with investment in human capital and training conducted by community colleges. In this study, rural and urban differences in employment rate, employment retention, and wage gain after receiving training were examined to determine the extent to which the gap between rural and urban workforce outcomes is reduced by investment in human capital and training conducted by community colleges. Three research questions were examined.

1. Are Mississippians in rural and urban settings equally able to secure employment after receiving specialized and advanced training?
2. Are Mississippians in rural and urban settings engaging in specialized- and advanced-skill development equally able to retain employment over time?
3. Do Mississippians in rural and urban settings experience the same wage increase after receiving specialized and advanced training?

The researcher hypothesized that investment in skill development would reduce the gap between rural and urban workforce outcomes, controlling for individual and local factors. The results of this study have several implications. First, training is a critical component to gaining and retaining employment. On average, 80% of those who receive training from community colleges are able to gain employment. Of those, 54% are able to retain their jobs for the remainder of the year and training generates an annual increase of \$4,633 in wages, on average. Second, the results show that there are urban and rural differences in workforce outcomes. Third, individual characteristics matter and, in all cases, those who benefit the most from training are those with 2-year degrees, confirming that community colleges play a fundamental role in providing the knowledge and skills for our workforce. Fourth, local conditions cannot be dismissed in addressing differential workforce outcomes.

DEDICATION

I wish to dedicate this research study to my wife, Ada, for lovingly providing the support and encouragement I needed throughout this long process. From the beginning of my efforts to obtain a doctoral degree by attending classes on the weekends, to the end, spending countless hours researching and preparing this final dissertation, she supported me and insisted I stay focused.

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CHAPTER I

INTRODUCTION

Statement of the Problem

The 21st Century ushered in a new set of challenges for maintaining and promoting economic competitiveness. The economy will rely increasingly on knowledge-based products and services, a trend that will accelerate the demand for a workforce with solid educational credentials along with a host of critical skills, including but not limited to (a) undertaking broad problem-solving, (b) engaging in open-ended tasks, (c) pursuing teamwork along with entrepreneurial opportunities, and (d) embracing intentional, life-long learning. Unlike in the past, attracting, preparing, and retaining workers with high levels of education and advanced skills is fundamental to maintaining economic competitiveness in a global market.

A series of demographic, social, and economic transformations over the last century contributed to the increased demand for a high-performance workforce. In 1900, for example, the U.S. economy relied primarily on small communities and a large segment of the workforce employed in a labor-intensive agriculture industry. More than 60% of Americans lived in rural areas, defined as small towns (population less than 2,500), the open countryside, and farms (U.S. Census Bureau, 1995). During 2010, more than 80% of Americans live in urban areas within large population agglomerations and an appreciative segment of the workforce is employed in the high-skill service industry. The

10 largest metropolitan areas alone account for more than 25% of the total U.S. population (U.S. Census Bureau, 2010).

The process of urbanization has followed the patterns of the American economic transformation. The mechanization of agriculture and industrialization in the first half of the 20th Century set in motion a process of migration of many unskilled workers from rural areas to urban centers. During this time, the American economy became heavily dependent upon the manufacturing industry, a focus requiring some technical skills. Globalization of the economy and the introduction of computer technology in the production process in the early 1980s resulted in two important changes to manufacturing. First, many low-skilled, low-paid jobs moved offshore, leading to a dramatic decline of unskilled jobs in this industry. Second, the demand for education and skills in the production process increased.

Manufacturing is and will continue to be a key component of the U.S. economy. The United States is home to the largest manufacturing sector in the world, and its economy would be seriously compromised without a strong manufacturing presence. Now more than ever, to be competitive, manufacturing must be dynamic and rapidly evolving and rely on a high-performance workforce. The U.S. Bureau of Labor Statistics (BLS; 2005) reported that U.S. manufacturers are constantly implementing process improvement techniques, incorporating quality management systems, and overhauling their production operations via technology, testament echoed by the National Association of Manufacturers (NAM; 2005), a representative of which remarked, that modern manufacturing requires cooperation across sectors and a diverse workforce involved in many activities far beyond traditional production roles. Workers are more versatile than

they have ever been and must possess a high level of education and a combination of technical and interpersonal and soft skills (NAM, 2005) because “U.S. manufacturing now requires less manpower and more brainpower” (The Manufacturing Institute, as cited in Mississippi Manufacturers Association [MMA], 2011, p. 4). Those in U.S. manufacturing emphasize work in small-team settings where there is less emphasis on assembly lines, rigid specialization, and following orders and more emphasis on reasoning, logic, and the ability to make independent decisions (Handler & Healy, 2009). A report by the BLS (as cited in MMA, 2011) included this statement about the situation:

To be sure, perceptions of manufacturing jobs being performed in dark and dangerous environments are outdated. The current manufacturing work environment is better described as one emphasizing high levels of knowledge, sophistication, and technology, as “intelligent” systems become pervasive throughout the manufacturing process. (p. 4)

Like manufacturing, a similar trend has occurred in all industrial sectors where, more than ever, emphasis is placed on higher education and specialized skills. In 1900, less than 5% of the workforce was required to have a bachelor’s degree. In 2010, more than 30% of jobs required at least a bachelor’s degree (U.S. Department of Education, 2009). Today, 60% of the workforce is required to have some form of postsecondary education, along with some form of skill development through professional training.

Despite the national trend of increased demand for higher education and specialized skills, there are some fundamental differences between rural and urban labor markets. Overall, in the United States, the workforce in urban centers is better educated

than the workforce in rural areas (see Figure 1). This disparity is even wider in Mississippi (see Figure 2).

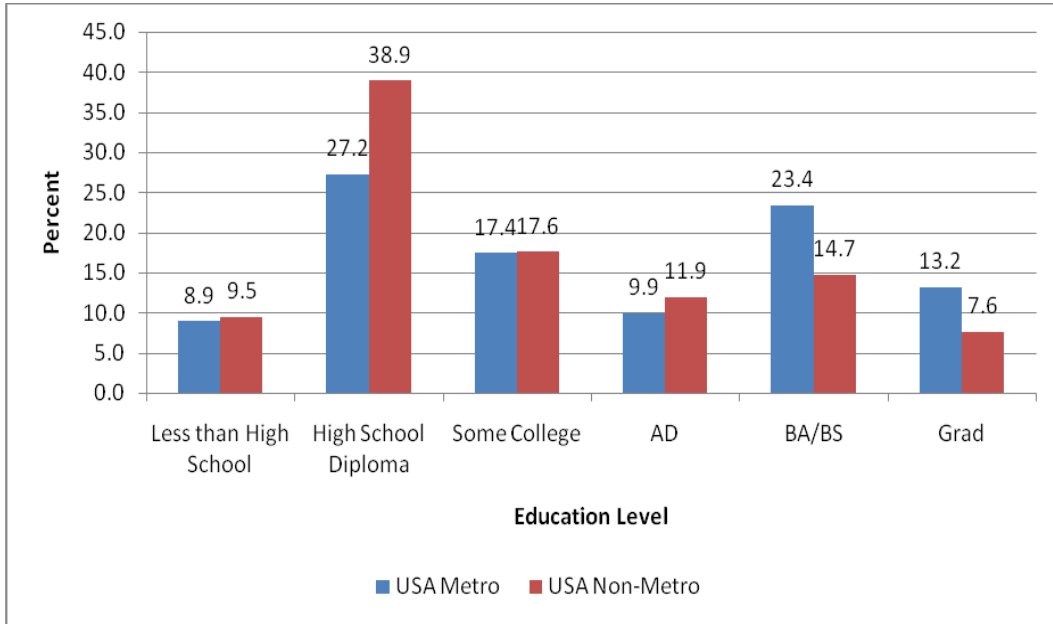


Figure 1. Educational attainment of nation's labor force, metropolitan versus nonmetropolitan (ages 25+)

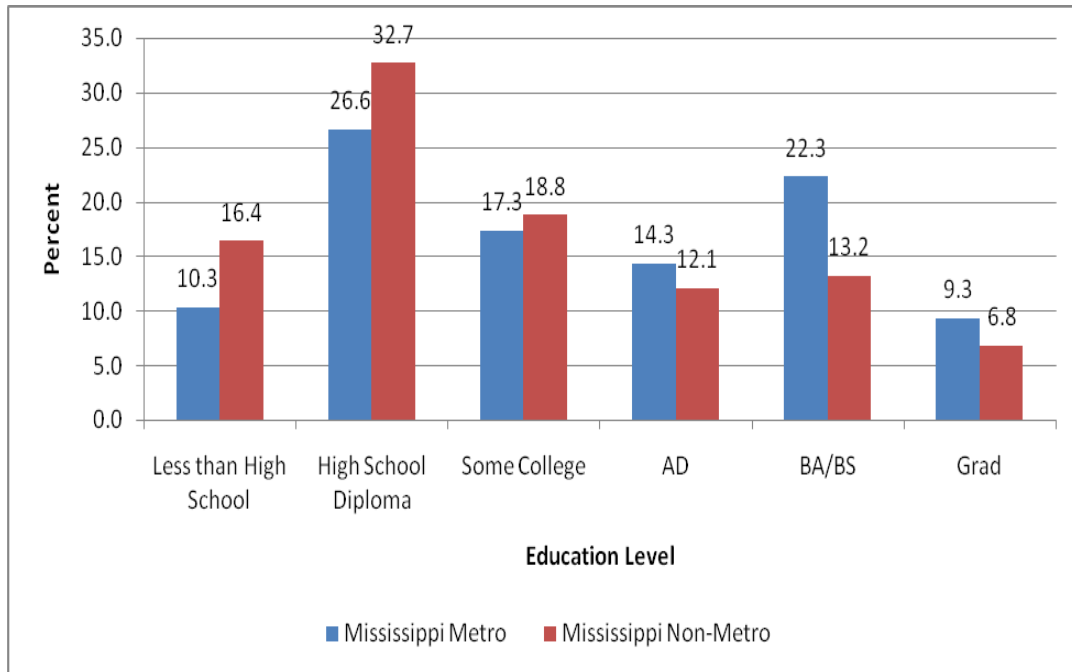


Figure 2. Educational attainment of Mississippi labor force, metropolitan versus nonmetropolitan (ages 25+)

Urban Americans are those residing in the 366 U.S. metropolitan areas.

According to the Office of Management and Budget (OMB; Nussle, 2007), metropolitan areas are broadly defined as core-based statistical areas (CBSA), which are areas based on a recognized population nucleus and adjacent communities that have a high degree of integration with that nucleus. As defined by the OMB, “Metropolitan Statistical Areas [*sic*] have at least one urbanized area of 50,000 or more [inhabitants]” (Nussle, 2007, p. 2).

Rural Americans are those residing in 2,305 nonmetropolitan U.S. counties, covering 83% of the nation’s land. These counties are those that fall outside metropolitan areas and have no cities with 50,000 or more inhabitants. Nonmetropolitan counties are further divided into micropolitan and noncore areas (Nussle, 2007). Micropolitan areas

have at least one urban cluster of 10,000 or more inhabitants but less than 50,000 and often include more than one county. Any areas that fail to meet these criteria are defined as noncore areas, which are delineated by single county boundaries (Nussle, 2007). Of the total U.S. population, 10% live in micropolitan areas and 7% in noncore areas.

Urban and rural populations are also economically and socially distinct. Unlike urban populations, rural populations live in local environments where labor markets typically offer low-wage, part-time, and temporary jobs, mostly available in the service sector (Beaulieu, 1999, 2000; Bloomquist, Gringeri, Tomaskovic-Devey, & Truelove, 1993; Gorham, 1992; Lichter, McLaughlin, & Cornwell, 1995). Rural residents also have limited means of transportation to labor markets with good jobs, loosely defined as those jobs that pay well and are available all year around. Low levels of human capital in terms of educational attainment, job experience, and job skills are other barriers faced by rural populations in securing good jobs (Beaulieu, 1999, 2000; Haleman, Billings, Sargent, & Zimmerman, 2000; Lichter & Jensen, 2002). Continuing out-migration of rural residents with higher levels of education and better job skills has eroded rural America's stock of human capital and, therefore, its long-term economic viability (Lichter, et al., 1995). Also, globalization has contributed substantially to shrinking the pool of good jobs in rural America, as many manufacturers find it more cost-effective to produce abroad. The continuing erosion of economic opportunities and underinvestment in human capital have undermined the ability of rural populations to develop the locally based social infrastructures necessary to forge and establish their problem-solving capacities toward maintaining, preserving, and promoting community well-being (Flora & Flora, 1993; Luloff & Swanson, 1995; Wilkinson, 2000).

To be sure, there are ecological, demographic, economic, and social differences that clearly distinguish rural and urban populations. However, rural populations are at a greater disadvantage than their urban counterparts for three important reasons. First, differences between local environments with thriving economies and those with high and persistent poverty are more pronounced in rural populations than in urban populations (Lichter & Johnson, 2007; Weber, Jensen, Miller, Mosley, & Fisher, 2005). Second, places with high concentrations and persistence of poverty are also those with the highest percentages of minorities, especially African Americans (Lichter, Parisi, Taquino, & Beaulieu, 2008). Third, rural populations are more divided across class and racial lines than their urban counterparts (Lichter, Parisi, Grice, & Taquino, 2007a, 2007b). The problem is clear: Public policies that fail to recognize rural disadvantages because of an urban bias might hurt rather than help rural America.

Purpose of the Study

The purpose of this study was to highlight the distinctions between rural and urban populations' education needs relative to good employment and quantify those distinctions to establish justification for policies that support the needs of rural populations in terms of education and skill development. Investment in human capital is seen as a critical policy issue for accomplishing two main objectives. As Smith and Tickamyer (2011) explained, first, it is to meet the demands of the growing knowledge-based economy, and second, seen as a critical policy, is to reduce the rural-urban gap. The human capital model has been used to explain differential workforce outcomes in terms of investment in educational attainment, work experience, and training. According to this model, more education, work experience, and training increase one's productivity

(Becker, 1962; Mincer, 1962, 1974; Shultz, 1962). Thus, the general assumption is that investing in human capital increases one's income and, therefore, one's quality of life. Also, investment in human capital is a strategy for increasing the well-being of a community as a whole (Wilkinson, 2000).

Given the increasing importance of education and training, community colleges, now more than ever, play a central role in preparing the workforce for the jobs of the 21st century and in reducing the rural-urban gap in workforce outcomes. They can do so in multiple ways. First, community colleges are the main point of entry to four-year colleges. Second, they are the main institutions for connecting education with job skill development through providing specialized and advanced training at all levels. Third, they have a history of sustainable partnerships with employers in their local regions, especially in rural settings. To be sure, community colleges have all the elements necessary to act locally and compete globally.

Research Questions

This study examined the extent to which the gap between rural and urban workforce outcomes is reduced by investment in human capital and training conducted by community colleges. Specifically, the study examined three important research questions.

1. Are Mississippians in rural and urban settings equally able to secure employment after receiving specialized and advanced training?
2. Are Mississippians in rural and urban settings engaging in specialized and advanced skill development equally able to retain employment over time?
3. Do Mississippians in rural and urban settings experience the same wage increase after receiving specialized and advanced training?

Hypotheses

The researcher hypothesized that investment in skill development reduces the gap between rural and urban workforce outcomes, controlling for individual and local factors. Specifically, it was hypothesized that there are no differences between rural and urban workforce members in their ability to secure employment after training. A second hypothesis was that there are no differences between rural and urban workforce members in their ability to retain employment after training. Finally, this study hypothesized that rural and urban workforce members experience the same level of wage gain after training.

Significance of Topic

This study provides three contributions to the knowledge base of this subject. First, the study highlights the role that community colleges play in the current knowledge-based economy. There is considerable discussion in the academic and political realms on how to overcome the gaps in education and skill requirements for the jobs of the future. At this time, however, little is known about how educational institutions should contribute to meeting the challenges posed by the 21st Century economy. To be sure, community colleges are the intermediary organizations that link K-12 to higher education and the intermediary organizations that link graduates to the workforce. Most importantly, community colleges provide programs specifically tailored to address skill development. This study demonstrates how community colleges have adapted and evolved to address workforce challenges throughout the last century. Specifically, the study provides a conceptual framework to examine how community colleges can respond to the workforce needs of any given time.

Second, this study introduces an innovative approach in the use of administrative data. Typically, these data are collected for accountability and reporting requirements. This study shows how such data can be used for research purposes and therefore for knowledge creation.

Third, this study addresses the issue of the rural-urban gap in workforce outcomes. In the policy arena, programs are often designed with an urban bias. This study outlines how urban-rural differences in demographic, economic, and social conditions might result in differences in workforce outcomes. The study shows that a critical role of a community college is to reach out to diverse populations with different needs. In doing so, community colleges help minimize disparity in urban-rural workforce outcomes.

Limitations

Despite the scientific merit and the significant contributions of this study, it was not without limitations. First, the study was limited to one state: Mississippi. This limitation might reduce the overall generalizability of the findings to other states, given that states have differences in workforce needs, community college systems, and, most importantly, levels of rurality. Second, the study limited its focus to noncredit-hour workforce activities. In recent years, there has been considerable discussion on how to bridge noncredit with credit hours, especially in career technical education. Future research should consider expanding this study to other states and including data that will provide information about career technical programs across community colleges. To be sure, this study is a starting point rather than a definitive answer to the questions related to the role that community colleges should play in the growing knowledge-based economy.

Definitions

The definitions for the terms used with this research are as follows:

Core-based statistical area refers to a collective term for both metropolitan and micropolitan areas.

Human capital denotes the stock of competencies, knowledge, and personality attributes used to perform labor that produces services or goods of economic value.

Metropolitan is a geographic entity defined by the OMB (Nussle, 2007) for use by federal statistical agencies in collecting, tabulating, and publishing federal statistics. A metropolitan area contains a core urban area population of 50,000 or more individuals. Each area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (measured by commuting to work) with the urban core.

Micropolitan refers to a geographic entity defined by the OMB (Nussle, 2007) for use by federal statistical agencies in collecting, tabulating, and publishing federal statistics. A micropolitan area contains a core urban area population of at least 10,000 but less than 50,000 individuals. Each area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration within the urban core (Nussle, 2007).

Noncore areas are areas that fall outside of metropolitan and/or micropolitan areas (Nussle, 2007).

Nonmetropolitan represent counties located outside the boundaries of metro areas and are further subdivided into two types: micropolitan areas and all remaining noncore area counties (Nussle, 2007).

Rural areas represent small towns (population less than 2,500), the open countryside, and farms (Nussle, 2007).

Rural sprawl describes the residential patterns beyond urban sprawl, consisting of large lots developed for residential and recreation, vacationing, and/or hunting purposes (Nussle, 2007).

Skills refer to the physical, mental, or interpersonal aspects of work. They are often measured in terms of complexity, diversity, and autonomy (Nussle, 2007).

Technology denotes the application of knowledge and skills for the achievement of practical purposes. It includes both physical apparatus, such as tools and machines, and the knowledge required to build and use them and to solve problems in their application to the production of goods and services. Technology is commonly defined as having three components: operations technology, materials, and knowledge (Nussle, 2007).

Urban sprawl refers to the growth of suburbia (Nussle, 2007).

Workforce refers to all the workers employed, working or capable of working in a location (e.g., city, region, or nation).

Organization of the Study

After Chapter 1, the document includes four chapters. Chapter 2 presents the literature review with an examination of the evolution of the role of community colleges over the last century. Specifically, this section looks at the how the development of the modern community college system, within the context of the evolving 20th Century U.S. economy, technological advancements, and shifting demographics contributed to the expanded delivery of increasingly complex U.S. worker skills. Furthermore, in chapter 2 how the resulting federal/state/local policy response contributed to this unique and

quintessential American democratic educational institution is also examined. While the context is broad, this analysis provides a unique view of the birth and evolution of the modern community college system nationally and locally in Mississippi. Chapter 3 presents the methods. First, a detailed description of the data used in the study is provided then a description of the dependent and independent variables are provided. Lastly, the analytical strategy and statistical model for the multivariate analysis are presented. Chapter 4 presents the analysis. A detailed description of the descriptive analysis and the multivariate analysis are provided. An initial analysis indicates that, indeed, there are urban-rural differences in workforce outcomes. However, the analysis also shows that when controlled for local characteristics, these differences disappear. Chapter 5 discusses the implications of the study and provides an analysis of the role of community colleges in the current knowledge-based economy.

CHAPTER II

LITERATURE REVIEW

Introduction

The literature review includes an examination of the evolution of the role of community colleges over the last century. Specifically, this section looks at the development of the modern community college system within the context of the evolving 20th Century U.S. economy, technological advancements, and shifting demographics, as the community college system contributed to the expanded delivery of increasingly complex U.S. worker skills. An examination of how the resulting federal/state/local policy response contributed to this unique and quintessential American public educational institution is also provided. While the context is broad, this analysis provides a view of the birth and evolution of the modern community college system nationally and locally in Mississippi.

Perhaps most telling is that a large outcome of the events leading up to and out of the Great Depression and World War II was the maturation of the idea of industry and workforce preparedness as part of sound economic and military preparedness to meet the market demand. This section outlines how national leaders struggled with the best ways to reduce barriers and improve the quality of human capital development activities for U.S. workers and how the community college evolved as part of this structure of

education and training delivery to help the United States shoulder this new leadership role.

The researcher believes, that for one to envision how the modern community college can best continue its evolution in serving its local constituencies in terms of a socially diverse, globalized economy and digital age, one must appreciate and understand the context from which it evolved. Beginning at the Progressive Era and working through the end of the 20th Century, this analysis is segmented by 10- to 20-year increments. The analysis offers a glimpse into the forces contributing to the community college evolution much like that of a video, where the true essence of the story can only be appreciated once all of the individual frames are assembled and run together in sequence, delivering a fuller, more comprehensive image.

The review includes eight chronological eras and two issues: human capital and rural issues. In the introduction to each section, an overview is provided followed by three sections: (a) Economy, Technology, and Demographics; (b) Worker Skills, Training, and Policy Response; and (c) Junior/Community Colleges.

1890-1920: The Progressive Era

Introduction

The Progressive Era signaled the beginning of the end for the laissez-faire doctrine largely adhered to by political leaders for many of the previous decades. Support for the increased regulation by farmers and others who perceived economic injustices by industrialists concerning unfair business practices found support in the Progressive Movement. This movement helped propel legislation such as the Interstate Commerce

Act (regulating railroads), and the Sherman Antitrust Act (preventing monopolies) to be enacted, introducing new levels of federalism into the American political and economic landscape (Behr, 2009).

From an international perspective, World War I and immigration were major factors of this era, affecting a shift in the American experience and attitudes. First, while immigration had always played a major role in growing the U.S. population, supplying much-needed skilled, semiskilled, and unskilled workers for industry, it also began to drive federal policy making. Second, demographically, women and minorities became an increasingly large composition of the workforce, replacing millions of men called up to serve in the armed forces, which vacated jobs nationwide. Finally, both factors highlighted the need for policy makers to begin thinking about federal involvement in worker training as a national strategy to prepare the U.S. workforce to remain competitive while facing peacetime international competition, and as a national security issue supporting mobilization efforts in times of war.

Economy, Technology, and Demographics

Economic growth in this era (and indeed the entire upcoming century) was driven by three main technological advancements shaping the American experience: the internal combustion engine, chemical production (post-World War II includes synthetics), and electrical technologies (post-World War II includes electronics). Specific advancements were made within this timeframe; the expansion of petroleum production, introduction of the use of alternating current that increased electrical power distribution efficiency over large distances (replacing steam and oil as primary sources of power), new scalable electrical motors to power machinery, the mass production and use of the automobile,

and the burgeoning aircraft industry, contributed to new industries, new jobs, and new worker-skill requirements (Mowery & Rosenberg, 2000).

The U.S. economy continued to move from a rural and agriculturally based economy to one that was urbanized and industrialized, a trend that would continue through the entire next century. In 1910, 77.6% of the population was living in rural areas but by 1920, that number had decreased to 66% (Hobbs & Stoops, 2002). In 1910, 41% of the U.S. workforce was employed in agriculture but by 1930, that number had decreased to 21.5% (Dimitri, Effland, & Conklin, 2005). Rural families and individuals, both Black and White from the South, were migrating to metropolitan areas in search of jobs and higher wages offered by industry and the increasing service sector. Many were undereducated, unskilled, and virtually unprepared for finding work in the industrialized metropolitan areas.

This era also represented the beginning of the end for the second wave of immigration to the U.S. from countries across the globe. The first wave, from 1820 to the beginning of the Civil War, carried many Western Europeans immigrating due to displacement from industrialization that was taking root in the home countries at the time. Many of these individuals were educated and skilled workers from the region of what is now Germany, in addition to many Scandinavian countries. The second wave of immigration saw nearly 25 million immigrants, predominately Southern and Eastern European, many seen as undereducated and unskilled, enter the U.S. after the end of the Civil War to the beginning of the 20th century (Diner, 2008).

In 1892, Ellis Island was established in order to document and manage the huge influx of immigrants. While immigration contributed to tensions centering on unemployment in times of economically slow periods:

...each group [of immigrants] evinced a distinctive migration pattern in terms of the gender balance within the migratory pool, the permanence of their migration, their literacy rates, the balance between adults and children, and the like. They [also] shared one overarching characteristic: They flocked to urban destinations and made up the bulk of the U.S. industrial labor pool, making possible the emergence of such industries as steel, coal, automobile, textile, and garment production, and enabling the United States to leap into the front ranks of the world's economic giants. (Diner, 2008, para. 13)

Immigration played a major role in not only providing manpower for industrial growth, but also, overall, it contributed to the historical, single greatest percentage increase in the U.S. population. During the period of 1900-1910, the U.S. total population grew by more than 16 million, from 76 million to 92 million—a 21% increase (Hobbs & Stoops, 2002). Immigration altered the demographics of the U.S. and it also played predominately in influencing legislation written between 1900 and the mid-1920s, including solidifying the arguments for a coordinated federal response for worker training.

Worker Skills, Training, and Policy Response

While the Progressive Era may have demonstrated the beginning of a shift in political leaders' attitudes towards federalism in the private sector, it did not extend to national policies concerning worker education and training. Despite business and

educators' support, education and training were seen by political leaders primarily as a state responsibility and not a federal one. Apart from this philosophy and the absence of a mechanism to fund a federal education and training system, larger, more populous state political leaders did not yet see the broader benefits of sharing tax revenues to increase the competitiveness of the entire nation's human capital reserves—essentially subsidizing the training of other smaller, poorer states' workers. Perhaps most importantly, the question of how best to allow local communities to determine market-driven training requirements for their industries and businesses while receiving federal funding remained unanswered. As new technologies, management practices, job restructuring, and economic growth had an impact on jobs, wage structures, demographics, and skill requirements through 1900, the inclusion of the federal government in worker training and education was debated heavily, but never manifested into any substantial legislation. Not until the demands of World War I were felt by industry in particular and the society in general did the federal response begin to directly address worker education and training from a national perspective.

Demand for skilled workers heretofore had been met through worker training provided by private or state training schools, apprenticeships, on-the-job training, and immigration of skilled workers, primarily Western Europeans. With the dramatic expansion of an industrial and service economy after 1900, businesses began to rely more upon semiskilled or unskilled employees, resulting in a dramatic impact on the nature of work, the demographics of the workplace, and arguments for federally funded vocational training (Dorn, 2007).

Braverman stated that factory centralization, mass production, assembly lines, increasingly sophisticated machinery, and the introduction of scientific management (1974, p. 59) equipped industry management with the tools to rearrange and break down complex tasks into simpler, semi-skilled and unskilled job activities—theoretically effecting an overall “deskilling” (Braverman, 1974, p. xvi) of the workplace. In practice, the desired outcome for management was to increase organizational productivity, efficiency, and labor control.¹ Skills were largely specific to the factory or industry in which they were employed and could be learned in a short period of time; perhaps as little as a week or two (Hodson & Sullivan, 2008). Increasingly, children, youth, American migrants from rural agricultural regions, and huge waves of immigrants from Southern and Eastern Europe filled assembly lines and other semiskilled and unskilled urban, industrialized jobs, ostensibly because they were poorly educated and had few skills, preventing them from commanding higher wages.² Furthermore, due to smaller numbers of workers requiring higher, broad-based skills (e.g., machinists, electricians, die makers), coupled with widening use of labor-saving technologies throughout factory floors, the apprenticeship system shrank rapidly to near nonexistence by the early 1900s (Dorn, 2007).

Factors influencing arguments for federalism in worker training during this era were multifaceted. The outcomes desired hinged on three main points: increased worker

¹ For a comprehensive review of labor process theory, see Paul Thompson’s *The Nature of Work* (London, England: Macmillan, 1989). Also, for an interesting analysis on the impact technology can have on worker skills, see Aimee Chin et al., “Technical change and the demand for skills during the Second Industrial Revolution: Evidence from the Merchant Marine, 1891-1912” (*The Review of Economics and Statistics*, August 2006, 88: 572-578).

² Some would also contend that these groups were easily taken advantage of, manipulated, and controlled by unscrupulous management, extracting higher profits at the cost of fair labor practices.

efficiency, Americanization (assimilation; Dorn, 2007, p. 3) of immigrants, and expanded literacy and education of American citizens, particularly youth. Apprenticeship programs, both in terms of their quantity and quality, could not meet the market demands for more workers to learn higher order skills. Furthermore, only a very few large firms tended to provide worker training. The vast number of small- to medium-sized firms, which employed the greatest number of workers nationwide, could not or would not offer worker training and therefore relied heavily on on-the-job training. These skills typically were neither transportable nor comprehensive enough to meet the increasing efficiency and productivity levels achieved by Western European firms. Cries from educators and some business leaders forewarned of impending national competitive disadvantage and crises due to an uncompetitive workforce, incapable of meeting the new economic order, and the increasing competition from a worldwide market place.

The influx of Southern and Eastern European immigrants led to great numbers of new employees and citizens largely unskilled, undereducated, and English-deficient workers. Many citizens and political leaders feared these immigrants would not adapt and conform to American culture, learn English, or otherwise become productive and contributing citizens. Some argued that the very way of American life was threatened. This belief led to the notion of the need to *Americanize* these new citizens through increased access to vocational training to help them adjust to and become productive American citizens (Dorn, 2007).

Dorn (2007) further explains that the steady migration of families from rural to urban areas and the subsequent increase in idle time for youth and young adults led increasingly to crime and other antisocial behaviors. Issues of poverty, poor health care,

underemployment, and unemployment of young adults also were of concern. Consensus was growing towards the need for compulsory education of youth 16 to 18 years old, along with reshaping education to better equip them to find work, earn more, and prepare them for citizenship through industrial and/or vocational training.

But it was not until the outbreak of the Great War, World War I, that the arguments for federally funded worker training coalesced into a comprehensive and actionable national legislation (Lee, as cited in Dorn, 2007). The siren song heard for years leading up to the war concerning the lack of a national skilled workforce became a reality as technological advances expressed their impact on work-skill requirements both in the civilian sectors and military and opened arguments for a national approach to human capital development. Also, rapid demographic shifts emerged stressing the American economic and military response to the wartime effort.

Dorn (2007) further explains that World War I initiated a substantial demographic shift in the American workplace, resulting from both a supply and demand perspective, highlighting training needs for numerous classes of workers. Immigration from Western Europe plummeted, lowering one source of skilled workers. Initial compulsory education initiatives coupled with burgeoning child labor laws were decreasing the numbers of youth available to fill unskilled jobs. Most notably, hundreds of thousands of able-bodied men left jobs to enlist in the armed services, reducing both skilled and unskilled workers for industry. Great gaps in overall supply of workers were occurring nationwide. Consequently, large numbers of women moved into higher paying industrial jobs. African Americans migrated north from rural southern regions also looking for higher paying jobs, often in the service jobs vacated by women moving into industry jobs. On

the demand side, the war caused industry in Western Europe to close or shift production to military essentials. Closer to home, demand for goods increased to fill the gap in production from Western Europe and to fulfill the needs of the wartime machine in the United States. The need for skilled, semiskilled, and unskilled workers rose dramatically in a very short period of time, with little in the way of a tangible solution to fill the void. Calls for a national strategy to train huge numbers of workers in vocational and industrial skills were abundant (Dorn, 2007).

Commercial and military technological advances, namely with the automobile, airplane, radio communications, steamship propulsion, and mechanized weapon systems also contributed to the cause of support for federal funding of vocational training. Skills in these new industries were more specialized, often requiring ongoing and continuous retraining to keep workers current. Not only was the nature of work and skills changing, but also the methods, techniques, and delivery of training needed to be updated and modernized as well. Government support for all sectors of the economy supporting commercial and military demands for skill upgrades was needed to meet the worker demand.

How could political leaders justify the use of taxpayer funds from large populous states to effectively fund other, less populous states? A central tenet of the human capital development theory is the notion of migration or mobility of the workforce to gain education and training, then to migrate in order to find work. Because worker mobility was increasing due to improved transportation, most notably by railroad and the new automobile, the notion of national government funding of worker training became increasingly palatable to political leaders. Workers were capable of commuting longer

distances and permanent relocations were easier. Political leaders began to see how shared national resources could make the whole workforce better prepared for future requirements, either due to wartime demands or global economic changes.

By 1917, the free market mechanisms that had traditionally trained workers were incapable of meeting the demand in the timeframe required for wartime industries or by the military and the arguments for a national approach to human capital development were coalescing around a shared sense of responsibility by a majority of political leaders. After many years of stalling, negotiation, and political bickering, business, education, and political leadership finally reached the tipping point, successfully reintroducing and passing the Smith-Hughes Act (National Vocational Education Act, 1917). This act became the first federal effort to develop workers for industry, agriculture, and the home³. The act was designed to deliver vocational programming below the baccalaureate level to students over 14 years of age to prepare them to go to work.

Initially, training and financial resources funded by the new legislation were focused on agricultural and home economic skills for high-school-aged teens and young working adults. In time, more schools offered industry preparation skills training as training resources for this type of instruction became more available. The largest constraint in meeting the legislative requirements was finding qualified teachers who demonstrated the necessary technical skills along with pedagogical experience. Programmatically, the act served high school and young adults, separating students interested in vocational training from academic training in high schools and provided

³ Interestingly, the act did not provide funding support for training in the fastest growing occupational fields in business and commerce (bookkeeping, stenography, typing, and related courses).

focused funding for vocational teachers. Effectively, the program forced physical separation of vocational students from academic students, an undesirable side effect that would remain in schools for years.

The National Vocational Education Act (1917) required the formation of boards of vocational education in each state in cooperation with existing public school boards to maintain local control and to respond to local labor market needs. Also, the act set the precedent for the remainder of the century for states and local communities to match federal funding with equal or larger amounts of their own money to fund the program. While the effects of the Smith-Hughes Act (National Vocational Education Act, 1917) on the nation's two-year college system would not be fully realized for several years, it nonetheless set the stage for the involvement of the two-year junior college system to deliver worker training, vocational education, and adult education in addition to adjunctive academic education.

Junior/Community Colleges

As the Progressive Era signaled the end of laissez-faire doctrine and open, unlimited immigration, it also signaled the beginning of America's two-year college system. The history of the birth and maturation of the contemporary community college can be thought of in two phases: the first phase, which occurred prior to three primary federal legislative actions in the middle of the 20th Century (a) the G. I. Bill (Servicemen's Readjustment Act of 1944, 1944), (b) the Truman Commission Report of 1947 (President's Commission on Higher Education, 1947), and (c) the Higher Education Facilities Act of 1963 (Johnson, 1963); and the second phase, which occurred after passage of these pieces of legislation. Prior to the Truman Report, community colleges

were actually called two-year or junior colleges, reflecting their original purpose of providing expanded access to postsecondary academic opportunities for those desiring a baccalaureate degree but who might not otherwise be able to gain entrance to universities due to their ethnicity, income, gender, proximity, or educational performance.

Conceptually, the first phase of the formation of junior colleges, both public and private, was seeded primarily out of two pieces of federal legislation affecting institutional development from two directions: downward from the land-grant university and upward from secondary education. First, the Morrill Acts (1862) expanded access to public higher education by providing funds and grants for land towards the formation of colleges, “where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts” (Morrill Act, 1862, para. 1). These early institutions pioneered and popularized the notion of service to the broader community through agriculture and general extension divisions, increasing access to a wider variety of training programs for larger populations, later popularized by the national community college systems. Second, the Kalamazoo Decision of 1874 (as cited in Cubberley, 1920) provided national precedence for the formation and maintenance of comprehensive taxpayer-funded public high schools nationwide. The concept that local taxpayers could form and run their own school systems to better meet their needs was affirmed, setting the stage for the initial mechanism for setting up junior colleges in local communities.

The initial mechanism by which many public junior colleges were formed, especially in the early years, is what Dougherty (2001) called circumscribed initiation. Dougherty’s phrase circumscribed initiation refers to the expansion of curriculums from

public high schools to providing two-year postsecondary education in preparation for articulation to four-year institutions. Dougherty (2001) also attributed public two-year college formation to another path referred to as popular mobilization. Popular mobilization referred to the effort to control proliferation of junior colleges and limit state financial obligations, state governments required the founding of two-year colleges to be approved in advance by a state agency coupled with a community referendum eliciting local community support. Still other junior colleges were also formed through the demise and restructuring of unsuccessful four-year colleges. According to Cohen and Brawer (2008), of the 203 four-year colleges in 1900 with enrollments of 150 or fewer, 15% had become junior colleges.

Thus, in 1901, 27 years after the Kalamazoo Decision, the United States' first junior college, Joliet Junior College (Illinois), was formed from the expansive Joliet High School. The second college formed was in Fresno, California, in 1910. Thereafter, junior colleges began proliferating substantially. By 1915-1916, there were 74 public and private two-year colleges.⁴ Within seven years (1915 through 1922) this number had increased by 133 colleges nationwide to 201 – a 179% increase (Cohen & Brawer, 2008). There are many reasons for this expansion, but Cohen and Brawer (2008) perhaps illuminated the point best by explaining:

...that since its founding, the United States has been more dedicated to the belief that all individuals should have the opportunity to rise to their greatest potential.

Accordingly, all barriers to individual development should be broken down.

⁴ Brint and Karabel (*The Diverted Dream*, 1989) showed only 46 junior colleges in 1917-1918 and 52 in 1919-1920. Cohen and Brawer cited the American Association of Community and Junior College, as well as the U.S. Office of Education as their primary sources of historical data.

Institutions that enhance human growth should be created and supported. Talent is potentially to be found in every social stratum and at any age. People who fail to achieve in their youth should be given successive chances. And perhaps most crucial – absent a national ministry of education or even, until recently, much state control or oversight – the local school districts could act on their own.

(Cohen & Brawer, 2008, p. 11)

While the quantity of junior colleges grew, junior colleges nonetheless numbered too few to contribute measurably to the overall workforce development demands of the country, thus limiting worker access to needed training. In 1918, total enrollment for all junior colleges was just 4,504 (Brint & Karabel, 1989); in comparison, four-year colleges enrolled well over 400,000 students (U.S. Census Bureau, 1975). Mississippi for instance, would not have its first junior college until 1922. It would be decades before junior colleges would be ubiquitous enough nationwide to guarantee workers access to desired training and education on demand.

1920-1928: The Roaring '20s

Introduction

The Roaring '20s were described as such due to impressive economic growth and social liberalism bordering on excess. Major domestic and international forces that made an impact on the nation were postwar reconstruction efforts, agricultural sector distress in the late 1920s, shifting patterns of international debts and lending, and the cessation of open immigration policies. Technological advances, both imported from Western Europe and those developed domestically, stemming primarily from the general purpose

technologies (GPTs) of combustion engines, chemical engineering, and electrical innovations, increasingly contributed to economic growth and sector diversification. Consumer and durable goods never before available in large, affordable quantities began to be available to the mainstream populous. Critical infrastructure consisting of electrical power grids, petroleum pipelines, railroads, and roads spawned interstate commerce, tourism, and leisure activities. The trend towards increased skill complexity in industries accelerated and workers, correspondingly, pursued education and worker training to keep up with the ever-changing workplace.

The new educational phenomenon of two-year colleges continued to grow and institutional leaders searched for their role within the increasingly complex educational strata of publically funded secondary education, colleges, and universities. In Mississippi, the first junior colleges emerged, growing from the abundant agricultural high schools that dotted the rural landscape, and Mississippi became the first state in the union to legislate a formal two-year college system. The Roaring '20s was a decade that set the United States apart from the rest of the world, setting the stage for U.S. dominance as a world economic and social power for the remainder of the 20th Century.

Economy, Technology, and Demographics

Immigration resumed quickly after the war despite European postwar reconstruction efforts, with an estimated 2.9 million immigrants entering the United States. This force became a major political issue due to its perceived impact on unemployment rates. Despite passage of the Immigration Act of 1924 (as cited in Dorn, 2007), which was intended to severely restrict the inbound flow of immigrants, the overall contribution of immigration to the growth of the U.S. population remained

significant and its impact to the U.S. economy pervasive. Easterlin (2000) surmised that “by 1920, nineteenth-century immigrants and their descendents had doubled the size of the American population compared with that which would have resulted from the colonial stock of 1790 alone” (p. 535). Even with the new immigration restrictions, the U.S. population continued to grow from 105.7 million in 1920 to 122.8 million in 1930, a 16.1% increase.

Migration from rural to urban areas continued as well, with metropolitan areas growing from 35.9 million in 1920 to 54.8 million in 1930 (Hobbs & Stoops, 2002). The agricultural boom during the war, fed by huge demands nationally and internationally, boosted prices and led to speculative land purchases. With the end of the war, demand for commodities decreased significantly, depressing prices. Many farmers were squeezed between lower commodity prices and loan payments to banks for land purchases made at the height of the agricultural boom. Consequently, smaller farmers sold off and moved, contributing to the migration patterns from rural to urban areas.

Technological advances, industrialization, and mass production continued to grow in use. Additionally, according to Mowery and Rosenberg (2000), the integration of technologies across all spectrums of the U.S. economy will fuel twentieth-century growth and prosperity. Moreover:

Inventions, when they are first introduced or patented, are typically very far from the form that they embody when they eventually achieve widespread diffusion; or, to put it differently, it is the improvements that they undergo that finally lead to widespread diffusion. (Mowery & Rosenberg, 2000, p. 804)

Mowery and Rosenberg (2000) elaborated further and remarked:

...many intermediate steps must be completed before the commercialization of such innovations. In many cases, ancillary inventions or improvements, frequently from other industries, are needed; new products must be redesigned for greater convenience and cost-reducing changes are necessary to render them more affordable; further adaptations are necessary as consumers discover new unanticipated uses; production facilities need to be reorganized to adapt to the idiosyncratic production requirements of the new product. The time required for all these complementary developments to emerge typically is measured in years and not infrequently, in decades. (Mowery & Rosenberg, 2000, p. 804)

The 1920s also brought about a major shift in corporate structuring, characterized by vertical integration. Large firms sought to acquire strategic advantages through the control of the entire process of inputs and outputs, from the supply of raw materials and component construction to final assembly (Hodson & Sullivan, 2008). This incorporation evolution, the buying up of smaller competitors, gave rise to the oligopolies and brought on many challenges to the leaders, managers, and workers in these companies, restructuring work and thus worker skills. Concerns centering on antitrust violations, along with the loss of labor-worker control of work, began to arise during this era, leading to political and labor unrest in the late 1920s and 1930s. Steel companies led the way in vertical integration, but so too did petroleum, pharmaceutical, electrical, and automobile manufacturers seeking to gain dominance through vertical integration.

The classic example of vertical integration coupled with technological advancements on work skills is Henry Ford and automobile manufacturing. Ford achieved market dominance initially by being the first to move into large scale

automotive production. His company gained further advantage in market penetration by effectively utilizing continuous process flow technologies. However, this dominance was relatively short lived. Within a few years, while Ford maintained a focus on productivity efficiency and his general lack of appreciation for the impact of the rising technological revolution occurring around him, allowed other domestic companies to catch and for a time surpassed his achievements. Ford eventually responded by vertically integrating and collocating nearly all the processes necessary to make components and assemble an automobile in one location, the River Rouge site. Furthermore, Ford sought to gain strategic advantages in continuous process flow by lowering material and training costs and increasing worker productivity. “Fordism” (Galambos, 2000, p. 938) integrated steel manufacturing and subassembly manufacturing (e.g., engines, frames) with final assembly that further experimented, then perfected, the use of an automated line moving the products from one location to another. Each assembly location was specifically designed to accomplish predetermined tasks. This enabled unskilled or low-skilled workers to be trained quickly to that specific location and limited tasks. The net effect on worker skills was to increase skill requirements in fewer, high-skilled positions and reduce skill requirements in more semiskilled and/or unskilled positions (Galambos, 2000). Worker skill enrichment and development suffered and they lost production autonomy. To counter potential worker unrest, Ford paid his workers comparatively well, essentially trying to buy their acquiescence to this new structure.

Overall, Ford’s plants achieved immense production efficiencies through these innovations and economies of scale, making the process very profitable (Galambos, 2000). His focus on production of a single product line, however, nearly caused his

demise, when General Motors and other automobile manufacturers incorporated additional technological advances in product design. These competitors introduced numerous car models assembled in continuous flow systems, managing to capture huge, heretofore untapped segments of the market. Ford's first mover market share penetration and domination due to strategic advantages in continuous process flow technologies was lost in just a few short years due to his short-sighted focus on productivity efficiency and a general lack of appreciation for the impact of the rising technological revolution occurring around him (Mowery & Rosenberg, 2000).

Technological advances in other sectors during this era were also occurring. Automatic arc welding and the frozen food process (discovered and introduced by Clarence Birdseye) are two examples of how ubiquitous electrical power and electronic equipment facilitated the diffusion of other new technologies, products, and services, as outlined by Mowery and Rosenberg (2000). In fact, another innovation, electrical refrigeration, made commercialization of frozen food products possible. Nagangast (as cited in Krasner-Khait, 2000) explained:

The household refrigerator is one of the greatest unsung inventions. Engineering technology perfected it, made it reliable, and inexpensive enough for widespread ownership...The household refrigerator changed the way people ate and socially affected the household. They were no longer dependent on ice delivery and they didn't have to make provisions for it like leaving a key or leaving the door open. Ice wagons became a thing of the past. By the 1920s, the household refrigerator was an essential piece of kitchen furniture. In 1921, 5,000 mechanical refrigerators were manufactured in the U.S. Ten years later that number grew past

one million and just six years later, nearly six million. Mass production of modern refrigerators began in earnest after WWII. By 1950, more than 80 percent of American farms and more than 90 percent of urban homes had one. (para. 29)

Likewise, other technologies were making an impact on the U.S. economy; for example, radio use was expanding and the first televisions were beginning to appear. A good example of chemical technology contributing to new products was Kodak and its introduction of color film. On the farm, a new product was taking advantage of the technology of internal combustion engines—tractors. Despite continued use of old technologies such as threshers, overall productivity for farming was increasing; Reinhardt (n.d.) documented the history of her family's farm and wrote:

The U.S. Department of Agriculture reports that it took 40-50 labor hours to produce 100 bushels of wheat on five acres with a gang plow, seeder, harrow, binder, thresher, wagons, and horses in the 1890s. By 1930, it took 15-20 labor hours to produce 100 bushels of wheat on 5 acres with a three-bottom gang plow, tractor, 10-foot tandem disk, harrow, 12-foot combine, and trucks.

For corn, it took 35-40 labor hours in 1890 to produce 100 bushels on 2.5 acres with a two-bottom gang plow, disk and peg-tooth harrow, and 2-row planter. By the end of the 1920's, it took 15-20 labor hours to produce 100 bushels of corn on 2.5 acres with a 2-bottom gang plow, seven-foot tandem disk, four-section harrow, two-row planters, cultivators, and pickers. (Reinhardt, n.d., paras. 4-5)

Farm productivity increases contributed to migration of many Americans from rural places to metropolitan locations. The service industry sector continued to grow, offering new jobs and requiring new skills such as business professionals and health care

services; penicillin, for instance, was discovered in 1928, but like most all other inventions, it took many years for the invention to gain mainstream use. It was not until pressures of the loss of human life on the battlefield during World War II caused by infections that antibiotic treatment of wounds became a staple of the health industry.

Worker Skills, Training, and Policy Response

Forces contributing to the need for access to worker training in the 1920s were numerous. Demographically, soldiers returning from the war brought back their knowledge, enhanced by skills learned while in the military. However, skills unused for years often needed supplementing and technological improvements introduced, even in the few years during the war, required new skills. Large numbers of women displaced by returning warriors shifted from heavy industry to burgeoning service, transportation, light manufacturing, and business administration jobs, all requiring new skills. Minorities, too, continued to search for access to better opportunity through higher paying, more skillful jobs.

Technological improvements introduced new products and services and consequently drove a shift in employment opportunities, as evidenced by the change in distribution of workers throughout industry sectors. For instance, between 1920 and 1930, the number of workers decreased in agriculture from 27.6% to 22.9% and manufacturing from 26.4% to 24.4%. Percentages of workers increased, however, for transportation, utilities, trade, finance, education, professional services, and government as the economy became increasingly diverse and international trade forces arose (Hodson & Sullivan, 2008).

As demographic shifts and technology innovation drove changes in sectoral employment, worker training became more important; greater diversity in products, services, materials, and processes demanded much more industry-specific knowledge and skill. The demand for higher skilled employees began to grow. Electric technology proliferation, for example, had an impact on industry sectors; specifically, electrical machinery became more sophisticated and more abundant, and the automation and use of specialized, interchangeable parts (interestingly, initially perfected by bicycle manufacturers) increased. Consequently, skill requirements for workers making, running, and maintaining more sophisticated equipment increased and changed (Behr, 2009).

Furthermore, particularly with regard to employment opportunities for women: ...a new occupational structure, reflecting the introduction of new technologies during the war, evolved in a way that made more jobs in light industries available. Scientific discoveries also led to new technical innovations in communications, transportation, and new product lines such as office machines and dictaphones that made clerical work more productive. In addition, technical innovation rejuvenated older products such as paper, rubber goods, and tobacco products, which created jobs that pulled women into the labor force. For example, in 1919 women filled nearly 60 percent of the cigar making jobs and 55 percent of cigarette manufacturing jobs. Women also qualified for watch making and the assembly of small machines such as typewriters, telephones, radios, calculating machines, sewing machines, glass finishing and optical instruments, the production of china, ceramics and tableware...Service occupations such as

telephone operators suited women because those jobs required less physical strength and did not compete with men. (Dorn, 2007, pp. 144-145)

Despite availability of a large workforce, the availability of skilled and semiskilled labor capable of meeting industry needs remained insufficient to meet the demands of an expanding and diversified economy. Immigration restrictions limited access to an important pool of heretofore skilled and semiskilled labor (Dorn, 2007), and much of the domestic workforce, men and women, young and old, struggled to maintain relevant skill sets with the shifting industry sector skill demands. How, then, was industry to fill the gap? How were workers to find access and invest financial resources to educate themselves increasing their marketability? In the absence of a broad federal strategic response for a continuum of worker training, there was an ad-hoc arrangement of public and private sources of training for workers to gain increased education. Much of this education and training required self-investment of time and money, incurring both direct and opportunity costs generally associated with human capital development.

Congress enacted several pieces of legislation to help workers, albeit in a limited way. The George-Reed Act of 1929 extended and amended the Smith-Hughes Act (National Vocational Education Act, 1917). The act provided additional funding to secondary and, in some cases, postsecondary two-year colleges to offer vocational training. Combined federal, state, and local funding of vocational education programs increased from \$7.97 million in fiscal year 1920-1921 to \$29.9 million by 1930. Student enrollment in these programs increased from 168,000 in 1918 to 981,000 students in 1930 (Dorn, 2007). Also, the federal Vocational Rehabilitation Act of 1918 (1917) was enacted to train disabled veterans of World War I, helping them gain skills, find work,

and become independent, contributing citizens. Soon after, the Civilian Vocational Rehabilitation Act of 1920 was enacted to aid those civilian workers injured in the workplace.

Besides vocational training, public schools and businesses also learned to work together to provide cooperative training. In fact, according to Dorn (2007), “educators in the 1920s emerged as the key link between public and private sector training” (p. 135). Local committees composed of business leaders, chambers of commerce representatives, training associations, and school administrators would meet to research, forecast, and report on the types and quantities of jobs, their skills, and other workforce development requirements. Schools would then develop various vocational educational classes (often held in the evenings) based on recommendations made from these committees for prospective employees. Next, firms trained new hires in specialized skills (Dorn, 2007).

Demand for educational development during the 1920s was substantial. For example, fall enrollment for postsecondary education between 1920 and 1930 increased by more than 85% (Snyder, 1993). Business and commercial training similarly saw increases. Between 1918 and 1924, attendance in public school commercial courses increased by more than 55% (Dorn, 2007). To meet training demands, various nontraditional training avenues for instruction opened through adult education, various forms of distance learning, and evening classes at public schools.

While adult education became popular in the 1920s, undoubtedly, forms of adult education had been in place for years. By 1924 the term “adult education became vogue” (Dorn, 2007, p. 161) when the Carnegie Corporation sponsored the first conference on adult education. Initially, adult education formed as a response to reduce high illiteracy

rates among migrants, urban uneducated poor, and immigrants. In the case of immigrants, it also served as a way to Americanize foreigners, reducing illiteracy, teaching English, and providing citizenship development courses. By the late 1920s, adult education had evolved and changed to focus more upon adult literacy, teaching skills, and crafts for filling leisure time (Dorn, 2007).

Distance learning through national university extension offices, correspondence courses (public and private), radio programming, and military training were also popular avenues to receive training. Correspondence courses in particular were quite popular. In fact, many university extension programs used correspondence delivery. In 1921, approximately 15,000 students took university-sponsored correspondence courses at institutions in 39 states. Private correspondence courses were also popular. International correspondence schools claimed to have enrolled more than 1,750,000 students by 1915 (Dorn, 2007).

Evening class enrollment delivered through the growing public school system was seen by some to be the principle method from which adults could gain access to desired training. From 1921-1922, more than 842,000 adults enrolled in classes offered through evening schools. During this era, worker training was in high demand, but industry and workers were, for the most part, still on their own to determine the best approach to conduct training. Since the Vocational Act only focused on preparing high school teens and working young adults for employment, a comprehensive workforce strategy helping unemployed older adults, incumbent workers, women, and minorities remained absent from the national landscape.

Junior/Community Colleges

Nationwide, junior colleges continued to grow in number, composition, and scope. By 1922, 37 of the nation's 48 states contained junior colleges and, of the 207 institutions operating in 1922, 137 were privately supported (Cohen & Brawer, 2008). Besides academic education, junior colleges were offering adult and continuing education curricula and, by the end of the decade, some offered vocational education courses, mainly in California (Dorn, 2007). Along with the physical expansion of junior colleges, organizational development strategies were also fermenting. Nationwide, access to education was increasingly valued and seen as a pathway to prosperity—what Andrew Carnegie referred to as “ladders of ascent” (Brint & Karabel, 1989, p. 5).

Accordingly, the nation's educational system was solidifying into an orderly and highly stratified system. At the lower strata of the system were state funded public schools, where compulsory attendance requiring 12 years of education had been enacted. At the high end of the strata were universities and four-year colleges offering general education, baccalaureate degrees, and access to esteemed positions of scholarship and research. In the middle, junior college leaders struggled to identify their place and role in the strata. Leaders of these institutions attempted to carve out their education-market niche, attract students, and differentiate themselves from four-year colleges while gaining acceptance and legitimacy. Their goal was to solidify themselves as a vital component of the U.S. educational system. Junior college leaders were caught, trying to balance “both the egalitarian promise of the world's first modern democracy and the constraints of (America's) dynamic capitalist economy” (Brint & Karabel, 1989, p. 6).

Initially, junior college leadership, supported by many four-year college leaders, thought their roles might evolve into the sole provider of the first two years of general college education, transferring students to universities to finish baccalaureate degrees. Institutions of higher learning leadership in favor of such an arrangement were Nicholas Murray Butler at Columbia, David Starr Jordan at Stanford, and William Rainey Harper at Chicago (Brint & Karabel, 1989). Each of these leaders shared the notion that the first two years of college were an unnecessary part of university-level instruction and “their general desire was to reconstitute universities as research and training centers for an intellectual elite” (Brint & Karabel, 1989, p. 24). In essence, this was an attempt by institutions of higher leadership to use the junior colleges as a filter; the hope was, according to Harper, that the associate’s degree awarded by junior colleges would encourage some students to opt out of further education, allowing only the brightest and most persistent students to transfer (Brint & Karabel, 1989).

This vision never really became a reality. Four-year private colleges saw junior colleges as a direct threat and therefore did not want to give them any unnecessary advantages. Additionally, all four-year colleges and universities eventually succumbed to the reality of the pocketbook—while the first two years of college were difficult to manage, the sheer numbers of students provided a steady income stream that four-year institutions could not ignore or readily give up to other institutions (Brint & Karabel, 1989). Junior college leaders would have to look elsewhere for a large, sustainable source of revenues to grow their institutions.

Besides academic transfer, the other educational strategy that some junior college leaders began to pursue aggressively was in the idea of offering terminal (Eells, as cited

in Brint & Karabels, 1989) vocational education. Guided by notions of social engineering and influenced by university leaders, Brint and Karabel (1989) stated:

...general education courses should be a part even of the vocational tracks and that preparatory (or transfer) curricula should be an option in all colleges. The reforms they urged were designed to bring about a change in emphasis, not a complete reconstitution. But this change in emphasis was to be far-reaching . . . that between two-thirds and three-quarters of junior college students should properly be enrolled in terminal occupational training programs. (p. 36)

Despite these efforts, students and parents remained faithful to academic curricula, declining to be diverted (Brint & Karabel, 1989, p. 10) from their goals of gaining access to four-year institutions and the resulting baccalaureate degree. Surveys conducted during this time clearly indicated that the majority of students favored junior colleges because these colleges saved money and prepared students for the university. Small classes, low costs, personalized instruction, and the opportunity to live at home were other advantages cited (Brint & Karabel, 1989). The goals set forth by national two-year leadership to increase student interest and demand for terminal vocational training failed to gain traction until well into the 1940s and 1950s.

Mississippi's community college story not only exemplifies the national narrative, but also adds its own stamp of originality. The passage of Mississippi Senate Bill No. 251 in 1922 permitted the offering of first year college courses through Mississippi agricultural high schools—"circumscribed initiation" (Young & Ewing, 1978, p. 3). In the 1922-1923 school year, Pearl River County Agricultural High School and Hinds County Agricultural High School were the first to offer college courses (Pearl River had

already offered courses to students without legislative authority the year before, giving them the honor of being Mississippi's oldest community college; Young & Ewing, 1978).

The law resulting from Mississippi Senate Bill No. 251 required each agricultural high school to have a farm, a dairy, a garden, and other facilities in land animals and equipment, effectively providing hands-on experience in agricultural skills, access to financial assistance, and supplying fresh vegetables, dairy, and meat for subsistence (Young & Ewing, 1978). Despite the seemingly agricultural and vocational bent, students attended junior colleges primarily to gain quality academic training, affording them a gateway to a four-year degree. The access these junior colleges provided both in terms of geography and financial affordability, set students on a pathway to a degree that otherwise would not be attainable to them.

In 1928, a new law⁵ guiding Mississippi two-year colleges was passed, instituting the Commission of Junior Colleges—the nation's first state-level system of junior colleges. Membership on this commission, not surprisingly, reflected institutions of higher learning involvement in junior college development similar to trends elsewhere in the nation. Members were the chancellor of the University of Mississippi, the president of the Agricultural and Mechanical College (Mississippi State University), and the president of the Mississippi State College for Women, the heads of three public junior colleges, and the state superintendent of public education as chairman. Additionally, the law went further to specify course work at the colleges. Much like the narrative on the national

⁵ Author of both pieces of legislation was Dr. Julius Christian Zeller, who had served as superintendent of Bolivar County Agricultural High School and had “come under the influence” (Young & Ewing, 1978, p. 5) of President William Rainey Harper of the University of Chicago. Harper saw the junior college as a way to take over the first two years of the university, purifying the university from the contaminant of general education (Brint & Karabel, 1989).

stage of junior college leadership and institutional development, the law required a focus on vocational skill development but also allowed academic preparation for transfer to four-year institutions. Ultimately, Mississippi junior colleges were not able to implement vocational training as intended. As Young and Ewing (1978) explained:

Institutions never deliberately violated this law. The simple fact was that money, manpower, knowhow, and facilities were not available for vocational aspects of the law. The early organizers had made a faithful attempt to accomplish the vocational training in their agricultural high schools and had largely failed. Dr. E.R. Jobe...suggested three reasons for the decline of agricultural schools: first, the people expected too much; second, consolidation; and third, the policy of the vocational education department in the state department of education.

The superintendents knew they could not succeed in the diverse vocational curriculum. Consequently, they never attempted it and avoided failure. They had no doubt that students could be provided two years of regular collegiate education, transfer to senior institutions, and make acceptable records. They were convinced that good transfer records would gain for the new college's academic respectability and acceptance by local officials and the legislature. This prognostication proved imminently correct. (p. 14)

By 1932, 11 institutions had been established and accredited by the Mississippi Junior College Accreditation Commission, and 4 were accredited by the Southern Association of Colleges and Secondary Schools. Enrollment was growing and every region of the state except northeast Mississippi had a two-year institution operating. While virtually no vocational training was being conducted, colleges and universities of

the state and throughout the nation accepted Mississippi junior college graduates without reservation. The Mississippi junior college system was firmly established, and prepared to meet the challenges of the economic turmoil of the 1930s.

1929-1940: The Great Depression and War Mobilization

Introduction

During the 1930s, several major domestic and international forces challenged the U.S. economy. Abrupt commodity price declines coupled with agricultural sector contraction were leading factors that contributed to the Great Depression and the subsequent recessions experienced throughout the decade. Perhaps most significant was the unprecedented federal response to the economic challenges followed by mobilization efforts leading up to the United States entry into World War II. Despite the economic turmoil, slowdown in economic growth, and perpetual high unemployment, labor markets experienced vast changes during this time. Industries and technologies introduced over the past decades continued to evolve, expanding opportunities for semiskilled and skilled workers. Even so, unskilled workers had difficulty finding work, and in many cases, unskilled wages lagged behind those of semiskilled and skilled workers, contributing to a substantial wage differential (Goldin, 2000).

Technological innovations introduced new businesses and industries, new jobs, new work, and new skills, further diversifying the economy and enhancing the demand for skilled labor. Paradoxically, despite federal work policies limiting working hours for some industries and reductions in consumer demand for products due to the depressed economy, national productivity increased during this era. This situation proved even in

times of economic turmoil, “human capital accumulation and technological change were to the twentieth century what physical capital accumulation was to nineteenth century—the engine of growth” (Goldin, as cited in Bills, 2004, p. 93).

Economy, Technology, and Demographics

Peter Temin (2000) described the Great Depression as “an economic event of unprecedented dimensions. There had been no downturn of its magnitude or duration before, and there has been none since. It stands as a unique failure of the industrial economy” (Temin, 2000, p. 301). But, based on modern research and contrary to popular opinion, the Great Depression was more a result of international crises acting *upon* the U.S. economy rather than inherent domestic economic instability (Temin, 2000).

While the Great Depression overshadowed the entire decade (and beyond), the period of the 1930s actually experienced a series of economic recoveries and declines, including a second recession in 1937, nearly as dreadful as the Great Depression. Many of the economic ups and downs of the era, though, can be attributed to a vast array of confusing leadership priorities, conflicting federal policy making, and consistent but misguided monetary practices.

The Great Depression began in the middle of 1929 and lasted through the first quarter of 1933. Industrial production fell 37%, prices decreased 33%, and real gross national product (GNP) declined 30% (Temin, 2000). Many reasons have been given for the drastic economic downturn. Severe and abrupt agricultural sector contraction due to falling commodity prices and speculative land purchases contributed somewhat to the large gaps in income distribution nationwide. Consequently low demand for consumable and durable goods slowed the economy. Constrictive Federal Reserve Bank monetary

policies in 1928 and 1929 negatively affected the stock market, leading to the October 1929 Great Crash (Eichengreen, 2000) due to over speculation. Consumer confidence bottomed out, leading to huge depositor runs on banks and greatly depleting bank reserves. Finally, the Smoot-Hawley tariff, theoretically leading to international trading partners imposing similar tariffs on imports, had a negative impact on trade balances and demands for U.S. goods overseas (Temin, 2000).

According to Temin (2000), international monetary forces, adhering to the principals of the gold standard, and the resulting Federal Reserve Bank's actions in 1931 provided the impetus that pushed the U.S. economy over the edge into the depths of the Great Depression. Modern research indicates the U.S. economy was well within normative levels of historical economic downturns despite the many factors tearing at the economy. The ensuing recession was deep. The Federal Reserve's response to protect the value of the U.S. dollar against devaluation forces due to bank collapses in Austria, Germany, and England pushed the economy into the Great Depression. The Federal Reserve raised interest rates sharply in the fourth quarter of 1931, severely constricting the monetary supply and drying up credit available for industry. Industrial expansion activities declined sharply, further contributing to unemployment, making the downward economic cycle even worse. Business and consumer confidence in the entire financial system collapsed due to persistent and chronic deflationary expectations.

Subsequently, in 1932, the Federal Reserve, under pressure to expand the economy, began open market purchases of gold to lower interest rates and enable industry to borrow and expand again. As interest rates fell, banks, already in a precarious position due to low reserves, began to experience lower profits. For the banks,

particularly those with the lowest gold reserves, the drop in profitability propelled the banking system towards the probability of even more bank closures. Compounding the situation, Federal Reserve Banks refused to pool financial resources to help the most troubled banking institutions—system liquidity all but dried up. Finally, French and British banks, fearing severe devaluation policies proposed by U.S. leaders, began to withdraw dollar balances in New York. Subsequently, the Federal Reserve abandoned expansionary policies in order to help preserve the international monetary system, effectively halting further broad economic expansion again. Contemporary monetary philosophies of the day that were focused primarily on preserving international credit markets rather than growing the domestic economy directly, along with passive Federal Reserve intervention, severely handicapped the broad leveraging of economic forces capable of elevating the U.S. out of the depression (Temin, 2000). Therefore, U.S. leaders were forced to consider relying on the addition of drastic federal policy intervention and control to restore confidence in the economic system, reversing the downward trends upward towards long-term recovery.

The federal response, principally to restore faith in and reconstitution of the American economy, was first led by President Herbert Hoover, then later by President Franklin Delano Roosevelt. In both cases, the responses were inconsistent and sometimes chaotic, often leaving business interests confused, uncertain, and certainly unwilling to invest in expansion efforts of capital improvements, hiring, or even worker training. In the first case, President Hoover developed several initiatives. Described as “an activist in the manipulation of tax rates and levels of federal spending to stimulate investment and reduce unemployment...Hoover extended the scope of corporate liberalism to include

fiscal activism” (Brownlee, 2000, p. 1037). He first cut taxes payable in 1930 and increased capital outlays. Public works projects, like the beginning of the huge dam in Nevada later named in his honor, were a start. He also instructed the Reconstruction Finance Corporation to invest in public works projects that would theoretically provide jobs and thus grow consumer demand. However, these investments proved to be ineffective due to its limited scope. President Hoover also signed the Glass-Steagall Act of 1932, enacted in an effort to stop deflation. This act expanded the Federal Reserve’s ability to offer rediscounts on more types of assets, such as government bonds as well as commercial paper. The Glass-Steagall Act was ineffective in reversing the deflationary expectations of business leaders and consumers (Brownlee, 2000). Then paradoxically, in 1932, to reign in federal debt spending and following on the heels of the Federal Reserve contraction of monetary policy in 1931, Hoover signed the Revenue Act of 1932, the single largest peacetime tax increase in U.S. history. This action had a negative impact on public sentiments, further delaying economic recovery (Brownlee, 2000).

The second wave of federal interventions was led by President Roosevelt after he was inaugurated in 1933. These federal interventions signaled a clear departure from federal policy making of the past. According to Brownlee (2000), “the Democratic administration of Franklin Roosevelt (1933-1945) quickly moved beyond the corporate liberalism of Herbert Hoover to apply the coercive power of government to the tasks of relief and economic recovery” (Brownlee, 2000, p. 1038). President Roosevelt immediately took two steps. First, Roosevelt devalued the dollar on April 18, 1933, through the signing of the Farm Mortgage Act of 1933, allowing him to set the price of gold. This action, coupled with a new Federal Reserve Board chairman who shared

Roosevelt's vision of devaluation, freed domestic macroeconomic policy to expand the economy (essentially ignoring the potential international monetary implications). Second, Roosevelt launched a series of programs under The New Deal. These two actions altered the trajectory of business and consumer deflationary expectations, albeit through centralized command and control, signaling a major change in U.S. leadership's approach to solving the economic challenges, nudging the economy from the downward spiral upward, toward a much-needed recovery (Temin, 2000).

The New Deal was important and precedent-setting. Never before had the federal government demonstrated such activism in intervention and control of the U.S. economy in a peacetime environment. Brownlee (2000) stated:

...took the federal government for the first time into the direct provision of welfare services...large scale public construction...and a greater degree of planning and a concomitant departure from competition, sponsored and enforced by the federal government. (p. 1038)

Titled The New Deal (I & II), Roosevelt's new programs and policies came in three principal forms; relief, recovery, and reform (Brownlee, 2000). Under relief, President Roosevelt's administration created the Civilian Conservation Corps (CCC), Public Works Administration (PWA), and the Works Progress Administration (WPA). Instituted in 1933, the CCC provided employment to approximately 2.5 million men working on conservation projects through 1941. The PWA, launched in 1933, provided federal funds for construction projects to create jobs through 1939. The WPA, instituted in 1935, ran through 1943, and was another government work-sponsored program which provided

expanded work opportunities for construction jobs and public works to musicians, writers, and artists (Brownlee, 2000).

Under recovery, the Federal Housing Administration was formed, insuring mortgages at 10% interest for 20 or 30 years. The administration also created the Tennessee Valley Authority (TVA) in 1933 to provide jobs, regulate electricity, and protect low-lying areas from flooding through large publically funded projects. Finally, the Agricultural Acts were implemented to control agriculture production, thus indirectly controlling commodity pricing, an attempt to support the depressed agricultural sector.

Under reform, the Glass-Steagall Banking Act of 1933 created the Federal Deposit Insurance Corporation, guaranteeing deposits up to \$5,000 and implementing rules for banks to separate financial roles, bolstering depositor confidence. In 1934, the Securities Exchange Act was passed, creating the Securities and Exchange Commission which regulated stock exchanges and investment advisors, theoretically limiting stock speculation. Finally, and perhaps most importantly, in 1935, the Social Security Act was enacted which provided unemployment insurance, Supplemental Security Income (for the elderly, blind, and disabled), and Aid to Families of Dependent Children. The Social Security Act helped those citizens with the highest level of exposure to the depressed economy (Goldin, 2000).

Despite The New Deal programs, unemployment remained high throughout the decade, never getting below 9-10% from 1930-1940; in 1935, it was as high as approximately 22-25% (Goldin, 2000). While much of the unemployment was due to macro- and microeconomic forces and even federal policy making, there remained acknowledgement that some unemployment resulted from a fundamental structural

change of the economy due to technological advancements (Dorn, 2007). According to Hodson and Sullivan (2008), this structural change, or “net displacement of jobs and increased job insecurity resulting from the introduction of new technologies” (p. 211) gave rise to the term “technological unemployment” (p. 215) or “technological displacement” (p. 212).

High unemployment was part of what Temin (2000) characterized as the “dual aspect” (p. 325) of the recovery. One aspect, as measured by unemployment, was easily described as “an anemic recovery” (Temin, 2000, p. 325). The other aspect, defined by productivity, demonstrated impressive growth despite the severe economic challenges (Temin, 2000). Technological advances contributed to increases in worker productivity, expanded existing industries and the introduction of new products and services. These improvements further diversified the overall U.S. economy, driving up demands for more semiskilled and skilled workers, and further exposing those with few skills to continued unemployment.

For instance, as a classic example of the pattern of the technological innovation process described earlier by Mowery and Rosenberg (2000), particularly within the chemical technologies, was the introduction of polymer engineering, specifically, a new product called neoprene. Nicholas (2008) explained the importance of this discovery as follows:

Neoprene, which Du Pont publicly announced in November 1931 and introduced commercially in 1937, quickly became one of the 20th century’s major innovations. By 1939, every automobile and airplane manufactured in the United

States had neoprene components...Similarly, Du Pont discovered nylon in 1934 and introduced it in 1938 after intensive R&D and product development. (p. 2)

Business leaders, engineers, and managers further expanded existing industries such as automobile manufacturing (Volkswagen Beetle), ship-building technologies, and aircraft manufacturing. New products and inventions such as prefabricated housing (camper trailers), radar, 3M Scotch® tape, and relatively high-definition television all contributed to major shifts in industry employment and, subsequently, worker skill requirements. Another example was the chemists and metallurgists designing and producing new and lighter materials, including steels, mixing nickel, chromium, tungsten, and other metals, improving the quality and durability of tools and machinery (Mayer, 2005). These advances in steel manufacturing meant stronger and cheaper steel, contributing to, for instance, more farm implements completely made of steel instead of steel/wood combinations. These changes increased productivity and expanded the need for new skills in basic welding and metal fabrication for farmers.

Bigger and better tractors with rubber wheels, the introduction of combines, hybrid seeds, pesticides, electricity, and indoor plumbing all contributed to expansive worker knowledge and skills on the farm. However:

...the Depression did have an effect (on farming). During the early 30s, sales of farm machinery dropped dramatically. In 1930, there were about 200,000 tractors produced. By 1932, only 19,000 tractors sold. Some manufacturers went out of business or were sold to other companies, but those that remained continued to invent new machines or better parts. By 1935, over 160,000 tractors were being

produced again. In some cases, farmers got their first government checks and bought machinery. (Ganzel, 2003c, para. 5)

Despite the agricultural challenges of the 1920s and subsequent national economic downturn of the 1930s, and because of the technological improvements, “not all farmers were in trouble...Large-scale farming began to change the face of the plains. Many wheat farmers consequently could prosper despite low prices” (Temin, 2000, p. 303). However, small farmers who could not capitalize their operations, particularly cotton tenant farmers in the South, did not deal well with the depressed prices and the efficiencies gained by farmers who were deploying technology. Consequently, many of these farmers, particularly Blacks, left their farms and migrated towards industrialized areas to find employment (Temin, 2000).

These trends contributed to the migration patterns from rural to metropolitan areas, as well as from east to west across the United States. Between 1930 and 1940, total population in rural areas remained virtually unchanged from 68.0 to 68.7 million, but metropolitan areas grew from 54.8 million to 63 million (Hobbs & Stoops, 2002). During this time, the agricultural industry sector composition also shifted. Between 1930 and 1940, the volume of the workforce employed in agriculture decreased from 22.9% to 19.2% (Hodson & Sullivan, 2008). Overall, the U.S. population grew from 122.8 million in 1930 to 131.7 million in 1940 and the labor force composition continued to change. More women were entering the workforce, filling the gaps left from fewer children (lower fertility rates and compulsory education) and fewer older workers (retiring) in the workforce (Goldin, 2000).

In light of the economic challenges of the 1930s, technological innovations were still prevalent, resulting in changes in the U.S. economy, the nature of work, and consequently, worker skills. Demand from the U.S. workforce to upgrade skills in order to find jobs and increase wages was also substantial. Even though federal investments in The New Deal were huge, very little in the form of human capital investment was realized. Vocational education focused primarily on youth continued but, for older incumbent, dislocated, and unemployed workers, federal investments in adult education or worker training were virtually nonexistent, except in limited cases within the CCC, PWA, and WPA. U.S. citizens, however, still pursued education and found ways to pay for and gain access to the desired worker training that would help them find work and income.

Worker Skills, Training, and Policy Response

The dual aspect of the economic recovery, severe and persistent unemployment along with substantial increases in worker productivity, was also demonstrated within the labor market itself. Unskilled workers—laborers, seasonal workers, farm workers, rural Blacks, the foreign born, women, and younger workers between 16 and 24 years of age specifically—remained unemployed disproportionately to semiskilled and skilled laborers. While the demand for unskilled workers lagged nationwide, in some sectors and geographic locations, industries needed workers with higher levels of general education and specific industry skills.

In 1935, the National Industrial Conference Board:

...raised concerns over the paradox of high unemployment yet demands by some industries for skilled and semiskilled workers, especially those in the metal trades,

which included machinists, tool and die makers, sheet metal workers, screw machine operators, pattern makers, molders, grinders, and electric welders was persistent. (Dorn, 2007, p. 203)

In a survey conducted by the National Industrial Conference Board of 287 manufacturers, which employed more than 115,260 workers in the northeast industrial core, 100 firms expressed shortages in certain classes of workers. Other new industries were expanding as well. Between 1931 and 1937, employment in plastic molding increased 200%. Commercial aviation likewise demonstrated growth. While aircraft manufactured for export remained around 500 units per year prior to 1936, manufacturing increased to more than 2,000 units per year by 1939. Employment increased to more than 100,000 by 1939 and anticipated a threefold increase in the near term (Dorn, 2007).

The diversifying economy also caused shifts in demand between sectors. Percentages of workers employed in agriculture, manufacturing, mining, construction, transportation, and utilities all decreased between 1930 and 1940. During this same time period, percentages in workers in trade, finance, real estate, domestic services, personal services, education, government, and professional services all increased, some substantially. An interesting example of the expansion of white-collar, professional services jobs is the number of scientists and engineers employed in industrial research laboratories within major manufacturing firms in the United States. Employment here increased from 10,918 in 1933 to 27,777 in 1940; a 154% increase (Mowery & Rosenberg, 2000).

In general, though, for most nonprofessionals, not only were there few jobs available, but for some sectors of the economy, there was a disconnect between available

jobs and trained workers. Jobs were available but unskilled workers did not have the requisite skills and/or they were not in the area where industries were hiring. There also existed a cultural lag time. Nascent industries such as aircraft production, chemical production, electronics, radio broadcasting, and health care were all on the rise, but the timing of this growth and the availability of resources for training—facilities, instructors, training materials, publications, and so on for skills needed by these industries, did not align smoothly. Time was necessary for workers, industry, and educational institutions to synchronize and adjust to the changing diversity of the market place.

While political leaders focused on how to broadly raise the economic performance and thereby lower the persistent high unemployment figures, specific strategies of how to train and relocate workers to find jobs that did exist, or would soon exist, remained a challenge and was largely ignored. Flagging federal, state, and local tax revenues limited government investments in worker training, retraining, and adult education. Accordingly, The New Deal “offered few opportunities for vocational education or actual job training, but by the middle of the 1930s some administration officials and educators implemented job training and retraining programs” (Dorn, 2007, p. 244).

The New Deal projects and programs consisting of the TVA, CCC, National Youth Administration (NYA), and the WPA all offered some training of participants, but largely this training was limited in scale and outcomes. Possibly the largest contribution of these programs, though, would not become apparent until the need for mobilization for war became apparent. The TVA offered training largely in the construction trades that supported the erecting of dams and electrical grids, and the maintenance and operations

of these projects once they were completed, but its scope was limited. After reviewing 47,000 applications, the TVA initially only hired about 2,200 employees in the early 1930s, expanding to 14,000 by 1937 (Dorn, 2007).

The CCC was created by President Franklin Delano Roosevelt to support conservation, recreation, and historical preservation projects. It also was designed to increase “the morale, improve the health, and guide the morals of young men aged 18 to 25, young men having no job and no hope, yet at risk for crime, delinquency, demoralization and radical indoctrination” (Dorn, 2007, p. 251). President Roosevelt took personal interest in the CCC, actually outlining the entire structure on a note pad, and to ensure its success, he used the War Department to lend reserve officers to the initiative, in part to supervise the young men (and women) enrolled the CCC. This strategy eventually proved problematic during wartime mobilization, when many of these reserve officers were called up to service, greatly depleting CCC project oversight, perhaps contributing to its eventual demise. As Dorn (2007) remarked, despite the military regimens, coupled with some training and education opportunities afforded enrollees, the CCC “forest army” (p. 253) of youth left ill equipped and only moderately prepared for occupations, trades, or professions.

The NYA, in terms of training and education, was more successful than the CCC (Dorn, 2007). The NYA was established to provide unemployed youth from low-income families with direct relief efforts, part-time employment, work experience, and training. Furthermore, the NYA used work-study and industry-supported cooperative programs and granted student financial aid to improve access to training. Some of these practices were precursor strategies of later federal programs of the 1950s and beyond. A focus on

citizenship was also a key element. However, accusations that the NYA was part of a larger political agenda permeating The New Deal and furthering the president's agenda contributed to the passage of the Hatch Act of 1939 forbidding donations from and political campaigning by officers and employees of the executive branch. The NYA boasted nearly 500,000 members and placed 219,000 in private employment in its first three years of existence (Dorn, 2007).

Support for unemployed adults came in the form of the WPA. It was clearly the largest New Deal work-relief program and was formed, due in large part, to the absence of unemployment insurance programs offered by state and local governments. The WPA offered "*made work* (emphasis added) to preserve the work routines of unemployed heads of households" (Dorn, 2007, p. 239) while exchanging government-sponsored project and service work for financial assistance to marginalized⁶ or unemployed workers until they could return to previous or better jobs.

Funding for WPA projects could not be used for military war machines or munitions and were thus largely focused on infrastructure development such as roads, bridges, and waterways, as well as civilian and military airports. As wartime mobilization efforts increased, WPA projects also included the renovation of installations and military infrastructure such as military hospitals, barracks, roads, shipyards, coastal defenses, and airfields (Dorn, 2007).

While the WPA initially focused on made work, it eventually included training marginalized workers as well. According to Dorn, (2007) "while the original mission of

⁶ "Marginal workers" tended to be women, minorities, youth, and disabled who were subject to discrimination and largely unskilled. Marginal jobs are characterized as "undesirable because they were boring, low-paid, intermittent, dead-end and they lack autonomy" (Hodson & Sullivan, 2008, p. 327).

the WPA meant to *preserve* (italics original) the skills of blue-collar and white-collar workers, marginalized workers in need of skills dominated remaining WPA rolls after 1940” (p. 375).

Building on the trends already under way in educational institutions nationwide, the WPA training programming included vocational training, adult education, rehabilitation, literacy instruction, and general education. As labor shortages began to grow in 1940, the WPA joined forces with labor and industry to actively recruit and train these workers, plugging them into jobs. As Dorn (2007) explained:

Adults who enrolled in WPA schools favored vocational education and literacy courses. The WPA eventually offered courses in trade, industrial, commercial, and business subjects, and classes in agriculture, subjects in household and domestic service, nursery assistance, and arts and crafts. (Dorn, 2007, p. 272)

One of the major drawbacks of the WPA was that it was legally limited to only assist unemployed workers certified by local relief agencies, greatly restricting labor mobility and perhaps contributing to the prevention of workers upgrading skills or the acquisition of new ones. Nonetheless, by March 1937, the WPA had enrolled nearly two million men and women in more than 139,000 classes. By the WPA’s termination in 1942, it had helped approximately 1.3 million foreign-born residents and illiterates achieve basic literacy and taught language skills to 4.5 million adults. Furthermore, more than 200,000 adults took occupational classes related to parenting, homemaking, health, and leisure-time activities (Dorn, 2007).

Aside from The New Deal programs, other training avenues available for American citizens included high schools, large-firm sponsored schools, correspondence

and extension schools, and education by radio. Large firms continued to train some of their own workers in-house, but increasingly, they partnered with local school systems to reduce costs. Supervisor training and internships were also available as larger companies sought to bring in college-trained workers.

By the mid 1930s, adult education steadily became more mainstream despite underfunding, and:

...evening vocational education schools attracted adults: home economic classes enrolled over 152,000 in 1932, and industrial classes enrolled 118,000; the latter increased to 146,000 students in 1935. Part-time trade extension courses enrolled 97,800 in 1936. The unemployed began to recognize that their future prosperity required retraining or learning new skills adapted to changing technologies.

(Land, as cited in Dorn, 2007, pp. 224-225)

Apprenticeship opportunities began to increase. In 1937, the National Apprenticeship Act was implemented, promoting apprenticeship programs by giving technical assistance to unions and employers. Leaders recognized the need to meet the increased demand for skilled workers nationwide.

Despite all the billions spent on work-relief programs and their training initiatives, the U.S. workforce was unprepared for the sea change that was about to occur. In 1939, Germany invaded Poland, prompting President Roosevelt to declare a limited national emergency. Soon there was a large demand internationally and domestically for manufactured goods and agricultural products produced in the U.S. Just like during World War I, demand for skilled workers to fill expanding industrial capacities emerged. For instance, during the 1920s through the 1930s, composition of the U.S. workforce was

composed of approximately 20% to 25% skilled workers but by 1941, due to new technological advancements throughout numerous sectors, particularly defense-related industries, the composition of the skilled and semiskilled workers in the workforce surged to 35% and 40%, respectively (Dorn, 2007). In just a few months, America lurched from chronically high unemployment to a veritable worker shortage. Between the increased production demands and the call-up of hundreds of thousands of military personnel, labor shortages began to occur nearly overnight. As was the case in earlier eras, the capacity to train and retrain workers who stood idle for many years during the Great Depression, unwilling or unable to accrue increased skills, was extremely limited.

In June 1940, with U.S. involvement in the war in the balance, President Roosevelt declared a state of unlimited national emergency. Acting under the advice of the National Defense Advisory Commission to launch a national training program to immediately train 1.5 million workers, the president signed the Defense Education Act, authorizing the Vocational Training for Defense Workers program, also called the Vocational Education for National Defense (VE-ND) Act (Dorn, 2007). This act was a crucial turning point: it freed U.S. mobilization for defense and war in the near term, as well as set the precedent for future federally funded worker training, the hallmark of the national U.S. workforce training system instituted during the second half of the century.

The Defense Education Act allocated \$15 million in June 1940 and an additional \$26 million in October 1940 to the Office of Education to fund and coordinate training programs. The United States Employment Service was responsible for the recruitment, classification, and placement of workers in training programs or factories. The WPA Bureau of Training, located within the Office of Education, determined training needs,

planned programs, offered technical assistance, and coordinated services. The existing work relief agencies of the CCC, NYA, and WPA, along with public vocational schools, provided the training because these organizations already had established infrastructure and capacity in place. The U.S. Department of Labor (DOL) also increased apprenticeship training in defense industries (Dorn, 2007).

Two types of training were permitted under the VE-ND Act: preemployment and supplementary training. Preemployment training was intended to renew worker skills and discipline. Supplementary training paid for workers to upgrade their skills while earning wages from existing employment. During the mobilization and war, more than 330,000 workers received a stipend while attending classes in skilled trades, machine shop operations, and mechanical pursuits, preparing these workers for work in aircraft construction, armament production, radio repair, electronics repair, and shipbuilding. By March 31, 1945, the VE-ND Act had spent nearly \$327 million, training 2.6 million in preemployment training and over 4.7 million workers in supplementary courses (Dorn, 2007).

One additional and unique training program that emerged during the war mobilization effort and functioned through the war was the Training-Within-Industry program (TWI; Huntzinger, n.d.). Established in 1940 by the National Defense Advisory Commission and later run by the Federal Security Agency as part of the War Manpower Commission, it was one of the first emergency services responding to the crises of limited production capacities U.S. industries faced during mobilization and wartime (Huntzinger, n.d.).

TWI was led by the “Four Horsemen” (Huntzinger, n.d., p. 5): Channing Rice Dooley, Walter Dietz, Mike Kane, and William Conover. The training program was focused on training workers and supervisors, assisting them to become more productive, deliver higher quality products, and increase safety. Training consisted of adhering to a four-step process: job instruction, job methods, job relations, and program development. The magnitude and scope of TWI was immense. Hundreds of manufacturing facilities located nationwide employing tens of thousands of workers and hiring many new ones every day, all needed assistance in increasing manufacturing capacity and product quality. To meet these needs, TWI developed a network of industrial professionals to teach these training methods directly to production supervisors, who then taught their workers. The effectiveness of the program is credited with the dramatic increase in U.S. production capacities nationwide, and its effects were long-lasting. TWI ultimately served to help Japan rebuild after the war, eventually become an integral part of what is known today as Japanese management or “lean manufacturing” (Huntzinger, n.d. p. 4).

The dual aspect of the economic recovery of the 1930s and the war mobilization efforts leading up to World War II revealed another dual aspect: truism of economic and human capital development. Human capital development by itself was not enough to grow the economy, nor was simply focusing on creating jobs, particularly when technological innovations and advancements contribute to the continuous diversity of sectors, industries, work, and skills. For an economy to grow, jobs created must be filled with workers capable of delivering the required skills and migrating to the geographic location where the jobs are located. Workers tend to pursue skill and education upgrades when and where they believe investments in those skills will have sufficient returns for

the time, energy, and financial resources required. The two are inextricably linked to deliver economic success.

Junior/Community Colleges

During the Great Depression, the number of two-year colleges and total enrollment rose rapidly, nearly doubling by the end of the decade. As Cohen and Brawer (2008) remarked, “By 1930, there were 440 junior colleges, found in all but five states. Total enrollment was around 70,000, an average of about 160 students per institution. By 1940, there were 610 colleges, still small, averaging about 400 students each” (p. 39) with enrollment effectively doubling in size. Unlike their four-year counterparts, two-year college enrollment flourished despite the bad economy; the reasons for their success are many. University and four-year college tuitions proved too costly for many students and families suffering from financial pressures at home due to the depressed economy. Graduation rates from high school were higher than in years past, up more than 50% from a decade earlier. Also, youth unemployment was high due to the poor economy, reaching nearly 25% in 1937, encouraging students to stay in school (Brint & Karabel, 1989). In contrast, two-year colleges were perceived as affordable, geographically advantageous, more accessible than universities, and provided parents reassurance that their children were on the path to success, while still being closer to home for two more years.

The national movement to vocationalize two-year colleges continued through the 1930s and many college presidents took specific actions to begin steering students in this direction. Expanded use of skill assessments on students at enrollment to help determine their capabilities was increasingly common, as well as the use of guidance counselors to help students find their best educational path, even if it meant steering them away from

academics toward trades and work-related training. Colleges were also finding ways to tap into federal funding to help pay for vocational training. According to Cohen and Brawer (2008), “the 1939 Commission on Junior College Terminal Education had noted that at least 62 junior colleges in 14 states were receiving federal funds that had been appropriated under the 1917 Smith-Hughes Act and the 1937 George-Deen Act” (p. 254).

Despite the focused attention towards growing vocational educational opportunities, students demurred. There have been several reasons postulated, as noted by Cohen and Brawer (2008). First, the terminal nature of vocational education simply did not appeal to the thousands of students flocking to junior colleges; they wanted options going forward and terminal programming did not meet their needs. Second, vocational programs were expensive and colleges simply could not afford to offer all of the most relevant or popular programs. Third, because many of the early colleges were joint ventures with high schools, terminal education did not match the educational philosophies of the administration or instructors running the colleges. Many in the local communities who were supporting the college through taxes preferred the prestige of a “real college” (Cohen & Brawer, 2008), even if it was simply one that offered access to four-year degrees—certainly though, not an institution focused simply on terminal vocational training. Finally, business and industry demands for postsecondary vocational training simply did not exist; duplication of the programs already offered by secondary schools was not appealing to some college administrators (Cohen & Brawer, 2008).

Enrollment in Mississippi’s two-year colleges followed the national trend of increasing in number of institutions and enrollments. Student attendance increased from 2,761 in 1932 to 4,074 during the 1939-1940 sessions. Junior college locations were also

expanding; Meridian Community College was established, making the total count 12.

Five additional schools also achieved regional accreditation: Holmes Junior College, East Central Junior College, Jones County Junior College, Copiah-Lincoln Junior College, and Meridian Community College. Nine of the 12 colleges had received regional accreditation by 1940:

...and this accomplishment represents the purpose and philosophy of the junior college leaders to establish and develop a collegiate academic program meeting the standards of other junior college programs in the southern region and over the nation, while also meeting the standards of the lower division collegiate work in the senior colleges and universities. (Young & Ewing, 1978, p. 19)

Increasingly, Mississippi junior college presidents realized that terminal educational initiatives were important to “provide job opportunity training for students who did not desire college transfer and pre-professional courses” (Young & Ewing, 1978, p. 17). Despite the general consensus that junior colleges in Mississippi were beneficial, it was not until the 1941-1942 and 1942-1943 legislative sessions that the state appropriated \$60,000 towards vocational educational training delivered through the two-year college system. Growing campus physical plants to meet the needs of expanding vocational training initiatives proved problematic, given the lack of state funding available. Consequently, in 1935, the state legislature authorized two-year colleges to borrow money that would be matched by the federal grant funds provided through the PWA to build and upgrade facilities. In the face of the economic challenges of the Great Depression years, junior colleges nationwide as well in Mississippi found their services in greater demand, and through visionary leadership, effective management practices, and

a continued commitment to its democratic foundations, these colleges solidified their place within the American educational hierarchy.

1941-1950: Wartime Controls and Post-War Recovery

Introduction

The United States declared war on Japan on December 11, 1941. Germany and Italy declared war on the United States three days later—World War II had begun. Capitalizing on the substantial command and control apparatus of The New Deal(s), President Roosevelt successfully led the nation through wartime mobilization to a wartime footing. U.S. industry responded by expanding operations fueled by huge increases in federal spending on war machines and materials, along with domestic and international market demands for numerous products and services. These same industries entered a new era of organization and growth, far surpassing those of any other nation and propelling the United States to a position of economic dominance called the “American Century”(Galambos, 2000).

In the early days of World War II, technological innovations continued to diversify the economy and, consequently, worker skills. Educational institutions initially suffered due lagging enrollments, but by the mid-1940s, enrollments surged. Fears of a postwar recession or even depression, coupled with a new international geopolitical environment with the rise of Soviet power, compelled U.S. leaders to think and act innovatively to forge increased access to education and training, which contributed to the growth in higher education enrollments. In 1946, President Truman established the President’s Commission on Higher Education and, by December 1947, the Commission

published its seminal report entitled “Higher Education for American Democracy” (President’s Commission on Higher Education, 1947) that elevated the role of the two-year college in America’s educational system. By June 1950, the United States found itself embroiled again in another war on the Korean peninsula, largely due to America’s new role as the international leader of freedom and human rights.

Economy, Technology, and Demographics

During this era, the U.S. economy demonstrated large expansion, initially due to huge increases in federal spending for the war effort, but later, due to expanding domestic and international markets. Real gross domestic product (GDP) increased 46.8% and real GDP/capita likewise increased 29.1%. The deflationary policies of the Great Recession were reversed, due in large part to wartime controls over economic inputs and outputs, and inflation averaged 5.61% for the decade. The Dow Jones Industrial Average (DJIA) from January 1, 1941, to December 31, 1950, grew 6.22% (Williamson & Johnston, 2010). Unemployment in 1941 was 9.9%, however by 1944, unemployment had declined to 1.2%. In 1945, unemployment rose nominally to 1.9% and, by 1950, unemployment had risen to 5.3%. The average unemployment rate for the decade was 4.53% (BLS, 2011).

The stabilization and recovery of the economy after the Great Depression was due in large part to the beginning of World War II, and not necessarily on the strong centralized controls instituted by President Roosevelt during the 1930s (Galambos, 2000). However, building on the centralized controls established during The New Deal(s), the Roosevelt administration was able to help organize, prepare, and execute national resources for World War II much more effectively than the similar attempts of leaders

leading up to and during World War I. This superior performance was accomplished, in part, because of the extent of the controls Roosevelt's administration implemented. To wit, "during the war about half of American industry was owned by the government. Indeed, the United States came as close in the 1940s as it ever has to having a socialized economy" (Galambos, 2000, p. 948).

In 1940, to bring the nation's labor, industry, and military establishments under control and improve the efficiency and effectiveness of the mobilization effort, President Roosevelt reconstituted the National Defense Advisory Commission. The commission planned and coordinated industrial production, employment, housing, transportation, munitions and armaments, finances, the movement of labor, price stabilization, and consumer protection agencies. Eventually, in 1941, the National Defense Advisory Commission activities were absorbed by the Office of Production Management (OPM), the War Production Board, and the War Manpower Commission (Roosevelt, 1941, 1942a, 1942b, 1942c).

The War Production Board exercised general direction over the war procurement and production program (Roosevelt, 1942b). The War Production Board determined the policies, plans, procedures, and methods of the various federal departments, establishments, and agencies that supported war procurement and production, including purchasing, contracting, specifications, and construction. The War Production Board was also responsible for the conversion, requisitioning, plant expansion, and financing of industry expansion. Finally, the War Production Board supervised the Office of Production Management in the performance of its responsibilities and duties (Roosevelt, 1941).

As part of Executive Order 8629, Roosevelt (1941) made the Office of Production Management responsible to:

...increase, accelerate, and regulate the production and supply of materials, articles and equipment and the provision of emergency plant facilities and services required for the national defense, and...to insure effective coordination of those activities of the several departments, corporations, and other agencies of the government. (para. 4)

The OPM also surveyed, analyzed, and summarized the coordination of the stated requirements of the war and U.S. Navy and other departments and agencies of the government, and of foreign governments for materials, articles, and equipment needed for defense. Under Roosevelt's (1941) authority, the OPM was tasked to the following:

...advise with respect to the plans and schedules of the various departments and agencies for the purchase of materials, articles, and equipment required for defense, to coordinate the placement of major defense orders and contracts and to keep informed of the progress of the various programs of production and supply. (para. 6)

A good example of the effectiveness of the OPM was demonstrated in the agricultural sector. Farm equipment manufacturers were caught between being asked to produce military equipment and farm equipment. The OPM stepped in to help manage what was to be produced and in what quantities by which manufacturers. Caterpillar, for instance, was asked to reduce its output of tractors while building engines for tanks. Even with this level of oversight and intervention to attend to matters of the war effort, innovation in the agricultural sector continued, and:

...in fact, it may have spurred new technologies. New challenges created innovation. During this decade, tractors got smaller and more powerful, self-propelled combines were introduced, hydraulic systems made it possible to control larger implements, the Vise Grip pliers were invented and tractors replaced horses on farms forever. (Ganzel, 2003b, para. 10)

These new agricultural technologies introduced between 1940 and 1950 helped to propel the percentage of workforce employed in agriculture down from 19.2% to 12.7% (Hodson & Sullivan, 2008). Roosevelt (1942c) stipulated the WPC would:

...formulate plans and programs and establish basic national policies to assure the most effective mobilization and maximum utilization of the nation's manpower in the prosecution of the war,...estimate the requirements of manpower for industry,...coordinate the collection and compilation of labor market data by federal departments and agencies...and establish policies and prescribe regulations governing all federal programs relating to the recruitment, vocational training, and placement of workers to meet the needs of industry and agriculture. (paras. 4-6)

Along with increased command and control of economic input and output, the federal government also necessarily increased spending and taxes to meet its mobilization efforts. Government spending before the war was consistently about 20% of GNP. During the war, deficit spending increased, with federal revenues reaching nearly 50% of GNP during the war, decreasing to about 30% afterwards (Brownlee, 2000). The U.S. private sector lost some economic input and output controls leading up to and during the war but it did not give up in the burgeoning "innovation system" (Galambos, 2000, p. 948) based on advanced technology, cutting-edge science, and professional expertise.

Federal investments in innovative technology also expanded. Department of Defense expenditures rose from \$29.6 million to \$423.6 million (in 1930 dollars) and overall federal research and development spending increased from \$83.2 million in 1940 to a peak of \$1.3 billion in 1945 (in 1930 dollars; Mowery & Rosenberg, 2000). While these huge federal investments in national research and development substantially grew research and weapons development and the production complex, resulting in the era of “big science” (Hounshell, 1992, p. 56), it did not come along with tight, burdensome controls. Investments in the Manhattan Project, which created atomic and nuclear bomb technologies, along with other contracts to private enterprises and universities for wartime technological innovation projects, signaled a break from the past with the then-reliance on individual inventors to “more advanced university and private-sector research capabilities during the second global conflict” (Mowery & Rosenberg, 2000, p. 819). Western Electric, for example, received \$17 million in contracts and Massachusetts Institute of Technology gained \$116 million through 75 contracts.

A classic example of this relationship between federal funding and university research resulted in one of the most profound technological advancements of the 20th century—the modern electronic computer. Building on the work of the electrically powered mechanical calculator called the “differential analyzer” (Abramovitz & David, 2000, p. 64), which was used to compute firing tables for the U.S. military, the Ballistic Research Laboratory contracted with the University of Pennsylvania to develop a general purpose computer—the Electronic Numerical Integrator And Calculator (ENIAC; Mowery & Rosenberg, 2000). The ability of ENIAC to change programs was limited to manual manipulation of wiring. It was not until 1950 that the first fully operational

stored-program computer was created—the SEAC, built for use at the U.S. National Bureau of Standards.

As Galambos (2000) explained, “in the postwar years [there] was a tremendous expansion in federal support for professional training and research, as well as contractual support for Research and Development (R&D) in fields associated with national security” (Galambos, 2000, p. 948). Correspondingly, there was a growth in contractual arrangements with the private sector that resulted in a postwar research and development system “rely[ing] heavily on federal R&D financing of extramural research” (Mowery & Rosenberg, 2000, p. 820). As Mowery and Rosenberg (2000) explained:

In 1940, the bulk of federal R&D went to support research performed within the public sector—by federal civil servants, as in the National Bureau of Standard, the Department of Agriculture, and the Public Health Service, or by state institutions financed by federal grants, as in the agricultural experiment stations. In the postwar period, by contrast, most federal R&D funds have supported the performance of research by nongovernmental organizations. Moreover, the dramatic growth in federal funding for research in universities contributed to the creation of a huge basic research complex in this sector. Combined with large federal procurement contracts, federal funding for R&D in industry had profound consequences for the emergence of a series of new, high-technology industries in the postwar period. (p. 820)

Proliferation of technologies was further enhanced during this era by the second wave of corporate change that lasted well into the 1950s. The central theme of this change centered on diversification along lines of “technologically similar product or

production processes and resulted in the expansion of companies into related product lines” (Hodson & Sullivan, 2008, p. 363). The result was that large multidivisional, decentralized firms operating worldwide became the predominate structure of American leading enterprises. These enterprises capitalized on the devastated economies in Europe and Asia, helping:

U.S. corporations to recover completely from the effects of the Great Depression, acquire the professional expertise needed to master high-tech forms of innovation, and to extend their operations into foreign markets they had been unable to penetrate before the war. Thus began the self-proclaimed “American Century,” an era when U.S. military power and business influence would, it was assumed, reign supreme—just as the British navy and industry had in the 1800s. (Galambos, 2000, p. 948)

Wartime investments in R&D contributed to a shift in U.S. technological innovation from the position of a net borrower of technology from Europe, exemplified by Germany, France, and Britain, to a net producer of new technologies and products. Federal pressure to produce much-needed materials to further the war effort, coupled with substantial funding, catapulted GPT advancements in the design, production, and use of new and improved internal combustion engines, chemical production and electrical power, and components, to name a few. “One of the most important effects of WWII,” Mowery and Rosenberg (2000) continued, was the “result of collaborative production projects during wartime,...technologies...were diffused widely among U.S. firms. The war effectively reduced technology and patent-based entry barriers within...[i]ndustr[ies]” (p.

856). Furthermore, it was the *D* in R&D that U.S. ingenuity, expertise, and entrepreneurialism encouraged up to this time.

Jet propulsion technologies invented in Britain were transferred to and codified by U.S. firms like General Electric and Pratt and Whitney, leading to their dominance in the 1950s and beyond in jet engine design and manufacturing. Domestic chemical processing innovations, adopted from German expertise in petroleum-based chemicals from the 1930s, led to large growth rates in domestic production in polyethylene (plastics) and synthetic rubber due to U.S. advantages in processing knowledge, expertise, and investment by universities, Du Pont, and Union Carbide. Electronics technologies exploded, led by Bell Telephone Laboratories' introduction of the first transistors in 1947, and for the remainder of the century, U.S. electronics companies dominated research and technological innovations that brought sweeping changes to how work was accomplished and the skills needed for workers to execute jobs (Mowery & Rosenberg, 2000).

One particular example of the effect of technology transfer and subsequent process improvements attributable to U.S. expertise was in the area of agricultural fertilizers (Mowery & Rosenberg, 2000). After World War II, the manufacture of synthetic ammonium nitrate was facilitated by numerous process improvements and abundant electrical power. As a result:

...the great post-1945 growth in agricultural productivity in the United States, and eventually in the entire world, owed an immense debt to the increased use of chemical inputs, including not only synthetic nitrogenous fertilizers but also herbicides and insecticides. The quantities of fertilizer inputs into American

agriculture grew more than fourfold between 1940 and mid-1960s. (Mowery & Rosenberg, 2000, p. 848)

Such input advancements continued to drive a shrinking of the agricultural sector and contributed to the continued major migration patterns from rural to metropolitan areas. Between 1940 and 1950, total population in rural areas changed slightly from 68.7 million to 66.2 million, but metropolitan areas grew from 63.0 million to 84.5 million, a 34% increase. For the first time in U.S. history, the majority of the U.S. population lived in metropolitan areas (Hobbs & Stoops, 2002).

The war era was a time of tremendous innovation and the list of examples is lengthy. For example, Peter Goldmark invented the color television in 1940. The Jeep was invented by Karl Pabst. In 1941, aerosol spray cans were invented by American inventors Lyle David Goodloe and W. N. Sullivan, and Enrico Fermi invented the neutronic reactor. The first electronic digital computer appeared on the scene, invented in 1942 and 1943. John Atanasoff and Clifford Berry and Max Mueller designed the turboprop engine, and Emile Gagnan and Jacques Cousteau invented the aqualung. Through the remainder of the 1940s, other inventions included the kidney dialysis machine, synthetic cortisone, microwave oven, mobile phones and Velcro®. Many of these technologies, however, while invented during the 1940s, would not be commercialized for many years, following the pattern that Mowery and Rosenberg (2000) outlined, reflecting the process of technological change typical to the American 20th-century experience.

Demographically, the U.S. population grew from 131.7 million in 1940 to 150.7 million in 1950. By 1950, the “baby-boom” generation (1946-1964; Hobbs & Stoops,

2002, p. 1) was well under way. The number of children under age of 5 years represented the largest five-year age group for the first time since 1900 (Hobbs & Stoops, 2002). This generation would eventually influence U.S. demographics and economics through the end of the century.

Worker Skills, Training, and Policy Response

Wartime preparation and execution had an impact on the U.S. worker. As the nation began to turn its attention to a postwar recovery, concerns over an impending recession, coupled with high unemployment (similar to what transpired after World War I) began to dominate the American psyche. Determined to get ahead of investor and depositor apprehensions, President Roosevelt (1944) unveiled his Economic Bill of Rights which, in part, afforded every American citizen the right to a useful and remunerative job through general economic security.

Of utmost concern was how to address reemployment of the millions of military personnel returning from the war, as well as limit the impact of those returning on the women, minorities, and youth already employed who backfilled the vacancies created when servicemen and women left for war duty. Two pieces of legislation were enacted to address these concerns and work towards the president's vision of an Economic Bill of Rights: the Servicemen's Readjustment Act of 1944 (the GI Bill) and the 1946 Employment Act (Santoni, 1986). The Employment Act sought to institute economic controls (guided by Keynesian theory) through federal policy intervention limiting business fluctuations thought to contribute to persistent unemployment experienced during the 1930s (Santoni, 1986). While both bills reaffirmed the nation's commitment to full utilization of its material and human resources, the Employment Act went further to

set the (never realized) goal of “continuous full employment and price level stability” (Santoni, 1986, p. 6) through the new theory of “compensatory finance” (Santoni, 1986, p. 10) as a guiding mark for federal fiscal, monetary, and employment policies of the postwar era until the 1970s.

Of the two pieces of legislation, the GI Bill had a more direct effect on workers and their ability to increase educational and skill attainment. Perhaps more importantly, the GI Bill established a new precedent for federal financing of human capital development. The act provided returning veterans subsidized housing and direct monetary support for education and job training. The idea of providing federal financing directly to a large cadre of recipients, instead of simply relying on funding institutional training capacities, represented a shift in policy that would eventually expand U.S. citizen access to higher education and endure through the remainder of the century.

One additional policy driver was the report, *Higher Education for American Democracy*, prepared by President Truman’s President’s Commission on Higher Education (1947). This report reflected a growing concern that America’s postsecondary educational capacity—its resources, equipment, and curriculum—was inadequate to meet the needs of the future. The commission recognized four main forces driving higher levels of demand and subsequently the need for an improved higher education system in the United States.

First, the science and technological advancements that had radically altered work (and play) over the previous half century showed no signs of slowing. The United States’ dependence on borrowed technology from European countries was rapidly changing towards domestic ownership of basic research, patents and technological innovation, and

integration. American universities expanded research capabilities, industrial investment in R&D increased, and military R&D infrastructure developed from the war persisted and even demonstrated a strong inclination to growth over the long term. Overall, the highly integrated U.S. R&D infrastructure, characterized by an efficient, legally supported patent process, strong antitrust regulations, and rapid technology transfer systems emerging from the strong federal government wartime controls, catapulted the United States into a position of dominance in new innovative products and processes, particularly in the electronics industry. Consequently, the demand for new and more complex skills and greater maturity on the part of adults seeking higher education was seen to be prolific and enduring.

Second, U.S. leaders understood that the demographic and geographic diversity of the United States contributed to the potential for disunity. The President's Commission on Higher Education (1947) recognized this threat. So the Commission concluded that an educated populous was less likely to adopt the radicalized political and social movements emerging in the communist countries (Brint & Karabel, 1989).

Third, after World War II, geopolitically, the United States found itself as the sole counterbalance to the forces of communism and remaining dictatorships worldwide, and it bore a new sense of responsibility for leadership in world affairs. After two hot wars, and on the front end of an escalating cold war, U.S. leaders recognized the criticality of expanded human capital development as a strategic national advantage, propelling economic and military dominance. This realization enabled the United States to fulfill its new role as leader of the free world. Finally, the emergence of the big sciences led by the atomic and nuclear technologies harnessed under the Manhattan Project demonstrated the

need for deeper and broader responsibilities of higher education to anticipate and prepare for the social, environmental, military, and economic challenges that come with the application of science for the good of economic and social benefits.

President Truman realized that on the aggregate, more U.S. citizens had to receive higher levels of education and training delivered through postsecondary education to meet these challenges (Brint & Karabel, 1989). To that end, his Commission on Higher Education called for the removal of the many barriers to higher education, expanding access through more schools, improving curriculums, and the provisioning of financial aid to those who would not otherwise be able to afford the costs associated with higher education. Most interestingly, central (but not exclusive) to the commission's proposal to remove barriers and increase access was the expansion of two-year college system. Four main factors drove this opinion.

First, members of the commission recognized that while many more citizens needed to receive postsecondary education to meet the increased skill demands of the technological advanced economy, not all of those citizens desired, nor were necessarily capable of fulfilling the requirements of a bachelor's degree. Not everyone was inclined, either through personal capacity or preference, to become a professional. Second, the university system simply did not have the capacity to handle the impending large influx of students. Third, leaders (particularly university presidents) did not want to over-award the number of four-year and advanced degrees, diluting their value. Finally, the cost of increasing postsecondary education entirely through expansion of institutions of higher learning was too costly, even for the emerging, robust U.S. economy (Brint & Karabel, 1989).

The two-year college system was seen as the most viable option for increasing access at an affordable price for academic transfer, terminal education options, and semi-professional training. Expansion of the two-year college system was seen as a logical shock absorber strategy for the upper tiers of the higher education system during this time of growth (Brint & Karabel, 1989). For cynics, this strategy was little more than a diversion or cooling-off period for students pursuing the dreams of higher education, but instead, ending up with a terminal degree.

Included in this new direction was the redefining and renaming of the two-year colleges from junior colleges to community colleges. No longer was the community college to be simply the junior higher education institution. Instead, this recommendation, it was reasoned, better reflected the vision that the community college deliver comprehensive services to the communities and the people they serve through academic transfer, terminal vocational training, adult education, community service, and leadership. The dawn of the contemporary community college concept was emerging, yet it would not be until the 1970s that the use of the term community college became ubiquitous.

Meanwhile, with the war over, industry rapidly switched back to peacetime production. Contrary to earlier predictions, the U.S. economy did not stall but instead prospered, and after mild recessions in 1945 and 1949, economic expansion predominated the American experience for nearly two decades. Because the United States was virtually the only major economy left intact after the war, markets for new consumable and durable goods domestically and internationally expanded rapidly (Hodson & Sullivan, 2008). Demand for skilled workers, semiprofessionals, and

professional workers likewise expanded, reflecting the impact of technology on products, services, and processes.

These improvements led to the affordability of durable goods such as washing machines, dryers, electric irons, and vacuum cleaners, which freed women from domestic chores and allowed them to continue work outside the home, increase leisure activities, or to pursue educational opportunities (Hodson & Sullivan, 2008). Jobs within the transportation, construction, utilities, finance, real estate, education, professional services, and government sectors all continued to grow and expand, while those in manufacturing, mining, domestic services, and agriculture declined (Hodson & Sullivan, 2008).

Consequently, thousands of veterans and nonveterans, both men and women, recognized this shifting of skills and flocked to colleges to upgrade their skills and thereby get on the path to higher levels of social status and economic well-being (Synder, 1993). Despite an initial drop in enrollment across all colleges at the beginning of the war, by the fall of 1949, impressive gains in the numbers of students enrolled and bachelor's degrees awarded were evident. The total number of two- and four-year colleges rose to 1,851 institutions by the fall of 1949, up from 1,706 in 1939. Four-year colleges rose from a total of 1,252 in 1939 to 1,327 in 1949. Total enrollment likewise increased to 2,444,900 in 1949, up from 1,494,203 in 1939—a 64% increase. Bachelor's degrees conferred to men likewise increased 200% and female recipients increased 34% (Snyder, 1993).

Junior/Community Colleges

The big story and main theme concerning two-year colleges during this era was growth. The number of colleges increased, enrollment rose, and curriculum offerings

became more diversified. But while the idea of the comprehensive community college began to become more of a reality, students nonetheless continued to prioritize academic transfer over terminal certification. The number of two-year colleges increased from 456 in 1939 to 524 in 1949. Enrollment in two-year colleges also increased from 150,000 in 1939 to 229,000 in 1949, or approximately 10% of all higher education enrollments nationwide (Snyder, 1993). Brint and Karabel (1989) attributed these increases to several factors: market conditions, meritocracy, curriculum development, and the psychological impact of the Cold War.

Optimism pervaded the United States during this period as the economy expanded rapidly. Demand for college graduates was rising and citizens responded accordingly, particularly for those in the lower middle class and working-class strata. Those responding saw the merits in receiving higher education and combining the long-held American ideal of being “self-made” (Brint & Karabel, 1989, p. 3) with becoming educated—the ticket to moving up the social ladder involved not just hard work, but also higher education. Curriculums at community colleges adjusted to reflect a temporary movement away from the narrow skills training of terminal education “inimical to democratic principles” (Brint & Karabel, 1989, p. 75) towards transferrable liberal arts, where it was thought that general education was a way to promote national unity and combat the communist ideals espoused by the rising power of the Soviet Union.

Growth in the Mississippi higher educational system mirrored national trends. Enrollment initially declined during the war but then increased for both two- and four-year colleges, from 14,019 to 19,695 between 1939 and 1949 (Snyder, 1993). Enrollment in Mississippi two-year colleges was 4,074 in 1939, fell to a low of 1,375 students for the

year 1943-1944 but increased to 7,047 by 1951 (Young & Ewing, 1978). Two new multicounty junior colleges were established in 1948: Itawamba Junior College and Northeast Junior College, completing the statewide system that had been proposed by the original legislation years earlier (Young & Ewing, 1978).

Students' pursuit of educational opportunities in Mississippi reflected the national trends of continued focus on academic transfer programs leading to professional careers (Young & Ewing, 1978). Increased demand for terminal general education and vocational-technical programs was evident, as well as the blending of vocational programming with liberal arts studies leading to a breadth of knowledge and interest. To meet the large and growing demand for services, junior college presidents proved resourceful and unified. For instance, as the war drew to a close and demobilization efforts freed up excess military equipment, the junior colleges presidents were able to outmaneuver their four-year institutional counterparts and secure 102 temporary housing units transferred from armed service installations made available by the Federal Public Housing Act. Junior college presidents used these temporary units for a variety of purposes, including classrooms, shops, and dormitory housing. The presidents then used the Junior College Association to negotiate an agreement with the State Building Commission to allocate \$62,000 to each college to install these portable buildings (Young & Ewing, 1978). Further demonstrating their increasingly potent lobby, the junior college presidents asked for and were awarded \$450,000 in state funds designated specifically for vocational-technical education in junior colleges in 1950 (Young & Ewing, 1978). Additionally, the legislature provided \$750,000 towards physical plant

expansions, namely building expansions, to help the junior colleges migrate out of the temporary housing units acquired earlier.

In 1950, the Mississippi legislature submitted and the governor signed the Public Junior College Law. This bill accomplished several important objectives. First, it began the official separation of agricultural high schools from the junior colleges, a move that enabled the second major change, local revenue support. This new law provided county supervisors the authority to levy local taxes in direct support of junior colleges serving their districts. The law also broadened and strengthened the role and authority of the college president, effectively increasing its status as a professional position. Shaped by the economic, technological, and educational turmoil and resulting innovative leadership of the previous 50 years, the United States was poised for its impending global leadership role for the next 50 years of the 20th Century.

1951-1970: Postwar Prosperity, International

Introduction

Despite being embroiled in the Korean War, the U.S. economy surged ahead with nearly all of its international competitors still trying to rebuild after World War II. American companies enjoyed substantial growth across the 1950s and 1960s, capitalizing on a large, increasingly wealthy domestic market as well as benefiting from their dominance in many international markets. U.S. labor experienced huge changes as technological advancements carried aircraft and automobile manufacturing to greater heights, ignited the electronics industry, and substantially altered the agricultural sector, shifting large numbers of workers off the farms into other sectors of the economy. For

many, employment was plentiful and wages were growing. For others, particularly those with few or no skills, or those who could not migrate to the industrialized urban centers, high unemployment rates persisted and wages stagnated or even fell. Voices of concern about technology and automation causing structural changes in the economy leading to persistent unemployment were once again rising.

Overshadowing the economic developments, however, was the growing Cold War between the United States and the Soviet Union. Fears of a nuclear holocaust were never far from the thoughts of many citizens in both domains. In 1957, the Soviets successfully launched their Sputnik rocket into space, expanding the superpower conflict even more, and contributed to the perception for some in the United States that the nation was falling further behind in education, technology, and innovation. Compounding these fears, by the mid-1960s, the United States was embroiled in yet another hot war in Vietnam—another extension of the Cold War.

To address the perception that the United States was losing its dominant position as a world leader, Presidents Kennedy and Johnson signed into law many new pieces of legislation that finally delivered federally supported, comprehensive worker education and training programs. Building on many of the theories and programs first introduced during The New Deal(s) and the World War II postwar demobilization effort, these programs would shape U.S. policy for secondary and postsecondary education, as well as workforce development for the remainder of the century, and help solidify the role of community colleges as the comprehensive education and workforce provider its institutional leaders had envisioned.

Economy, Technology, and Demographics

The U.S. economy in general and its industry sectors in particular enjoyed several comparative advantages over most other nations in the postwar era. Heavy investments in capital-using and scale-dependent technologies during the preceding 50 years, coupled with all of the U.S. industries remaining untouched and intact after the war, propelled U.S. productivity ahead of nearly all international competitors. U.S. corporations, having built beachheads during the war internationally, were uniquely positioned to dominate international markets at all levels of input and output. The dominant position internationally led to sustained economic growth through increases in productivity and transfers of wealth (Williamson & Johnston, 2010).

There were four recessions during this timeframe. The first was in 1953 and lasted three years. The 1953 recession resulted from the demobilization effort after the Korean War conflict, coupled with the Federal Reserve reasserting its independence from the U.S. Treasury, constricting monetary supply based on inflationary fears. In 1958, another recession started and lasted three years. Two more minor recessions were experienced in 1960 and 1969.

Domestically, U.S. firms enjoyed relatively large, rich, and homogeneous markets, connected with a unified and growing transportation system, filled with consumers comfortable with “unpretentious and functional design” of products, forgoing the “differentiated, elaborate, and custom-finished look of the old European luxury crafts” (Abramovitz & David, 2000, p. 77). These tastes “fostered the entrepreneurial strategy of catering to and actively creating large markets for the standardized products

and large-scale production” (2000, p. 77) that characterized much of the growing U.S. economy.

The United States’ international comparative advantage and leadership in skill-intensive products such as aircraft, automotive, and steel industries peaked in the 1950s and thereafter declined until the 1980s (Lindert, 2000). This decline is evidenced by forces affecting the GPTs of internal combustion engines, chemical production, and electronics and associated industries. The two largest and most influential industries that used the internal combustion engine were those of automobile and aircraft production.

In stark contrast to the early years of automobile manufacturing, the automobile industry during the 1950s and 1960s experienced little in the way of product design innovations (Mowery & Rosenberg, 2000). However, it did manage to continue to improve production technologies, as indicated by its above-average labor productivity. Automobile manufacturers enjoyed large, homogeneous, increasingly wealthy domestic markets, with virtually little in the way of international competition. By 1970, this situation began to change as the convergence of overseas competitors, namely Japanese automobile manufacturers, began to infiltrate U.S. markets and overtake domestic manufacturers (Mowery & Rosenberg, 2000).

The U.S. commercial aircraft industry was greatly boosted by research and development of jet propulsion and its diffusion from military to commercial use during these eras. General Electric and Pratt and Whitney overcame all domestic competitors and, by the 1960s, dominated the commercial jet engine manufacturing industry. Douglas and Lockheed continued dominance in airframe manufacturing and led the world in

designing and manufacturing aircraft for military and commercial use (Mowery & Rosenberg, 2000).

Innovations in aircraft and component design were also prolific. New metals and alloys for both jet engine manufacturing and airframe designs were being introduced regularly to meet the higher operating temperatures and increased stresses of ever-faster flying speeds (Mowery & Rosenberg, 2000). Electronics were successfully integrated into aircraft designs; semiconductors enabled miniaturization of circuits and, eventually, the addition of minicomputers in aircraft provided increased safety, accuracy, and reliability with navigation, performance monitoring, communications, and on-board safety devices (Mowery & Rosenberg, 2000).

Skill sets required to design, manufacture, operate, and maintain aircraft were becoming more specialized and complex. Higher grade alloys used in jet propulsion systems required much greater knowledge of metallurgy and specialized machining practices (Mowery & Rosenberg, 2000). Electronics sophistication within the cockpit and throughout the aircraft required new skills and knowledge for troubleshooting, replacement, and repair, particularly for aircraft mechanics and maintenance personnel. The image of the aircraft maintenance personnel simply being grease monkeys or wrench turners was changing rapidly as aircraft systems became more complicated and varied.

Important developments in the GPT of electricity occurred both in electrical power generation and electronics. The diffusion of electrical power grid systems and increases in energy transmission nationwide led to less expensive electricity that benefited industry and consumers alike. As Schnapp (2001) explained:

From 1950 to 1960, generation grew by an average of more than 8.5% a year, led by strong increases in residential electricity demand and near completion of rural electrification. Capacity grew slightly more rapidly than generation, averaging almost 9.5% annually. With generating efficiencies still improving, electricity prices continued to decline, as evidenced by drops in residential electricity prices averaging about 1% a year. (Schnapp, 2001, para 21)

In the 1960s, demand grew nearly 7.5% a year, helped by annual declines of more than 1.5% in residential and commercial electricity prices. (Schnapp, 2001, para. 25)

As electricity became more available at cheaper prices, consumer demand increased, particularly at the household level, as more consumer electrical products became available to the market. Consumer adoption of new and improved technological innovations such as dishwashers, refrigerators, ranges, washers, dryers, televisions, radios, and vacuum cleaners led to profound changes in American lifestyles.

Particularly interesting during this time was the lack of adoption and integration of an important electrical innovation by U.S. steel manufacturers during the postwar era, the electric furnace (Mowery & Rosenberg, 2000). The electric furnace eliminated the need for numerous inputs, (i.e., coke, for example), freeing steel plants from the confinement of having to be located near coal fields. Electric furnaces also decreased processing costs compared to traditional steel-making methods. The U.S. steel industry was dominated by huge corporations like U.S. Steel and resisted the new technology, instead relying on the continued use of traditional steel-making technologies. Practically the only new innovation they did try to use in the 1950s was the oxygen converter

(Mowery & Rosenberg, 2000), but diffusion of this innovation failed, setting the stage for a severe competitive disadvantage for the entire industry that would result in their substantial loss of markets in the 1970s and the eventual industry downfall in the 1980s. The introduction of the postwar use of the electrical furnace was restricted to sophisticated alloys and stainless steels (Mowery & Rosenberg, 2000). Eventually, though, the electric furnace would lead to the development of minimills in the late 20th century and help save the U.S. steel manufacturing from complete demise.

Technological innovation reshaped the U.S. economy in two other major industries during the 1950s and 1960s: electronics and agriculture. These forces would forever alter the employment structure and the nature of work throughout the United States and even the world (Mowery & Rosenberg, 2000). The more important in terms of economy and jobs was the birth and growth of the electronics industry. The growth of this industry consisted generally of three main areas of development: electronic computers, semiconductor components, and computer software. Innovative maturation of these industries reflected the general pattern of innovation in the United States throughout the 20th Century, exemplified by the GTPs of internal combustion engines and chemical production.

The electronics industry experienced many interim and intermediate steps of scientific discovery, processing technology innovation, and product commercialization, all of which had to be assimilated at various times and stages for the entire industry to move forward to the next “bottleneck” (Mowery & Rosenberg, 2000, p. 890). Solutions to bottlenecks in pure research and processing were often discovered by government entities, firms, or companies at different times, enabling other important discoveries and

inventions to be put to use. The growth of this industry, though, exhibited distinctions from and commonalities to other GPTs.

One of the major differences the electronics industry experienced was accelerated diffusion and adoption of the technologies, which occurred faster than the other GPTs, the result of the aggressive use of federal antitrust policies and contract requirements by defense agencies working exclusively with private firms. These contracts often required that patents be shared with other companies within and outside of the electronics industry. This diffusion of knowledge increased overall system efficiency, increased competition, and lowered costs, leading to a much higher rate of innovation adoption throughout government, business, and consumers than was earlier experienced by the other GPTs of chemicals and internal combustion engines (Mowery & Rosenberg, 2000).

As Mowery and Rosenberg (2000) explained:

By facilitating entry and supporting high levels of technology spillovers among firms, public policy and other influences increased the diversity and number of technological alternative explored by individuals and firms within the U.S. semiconductor industry during a period of significant uncertainty about the direction of future development of this technology. Extensive entry and rapid interfirm technology diffusion also fed intense competition among the U.S. firms. The intensely competitive industry structure and conduct enforced a rigorous selection environment, ruthlessly weeding out less effective firms and technical solutions. For a nation that was pioneering in the semiconductor industry, this combination of technological diversity ad strong selection pressures proved to be highly effective. (2000, p. 885)

Another major difference was that much of the initial innovation in the electronics industry occurred in firms unfamiliar with defense contracting, which was one of the largest early investors in the industry. The U.S. military showed a propensity to purchase from new and untried suppliers “accompanied by conditions that effectively mandated substantial technology transfer and exchange among the U.S. semiconductor firms” (Mowery & Rosenberg, 2000, p. 884). This strategy led to further high levels of competition among firms of all sizes.

Defense-related investments in R&D were also indispensable to the growth and diffusion of electronic innovation for all firms, but it was particularly so for start-up, entrepreneurial enterprises. These enterprises demonstrated the quintessential entrepreneurial, risk-management spirit by capitalizing on the federally directed diffusion of scientific discoveries by universities and large corporations and rapidly commercializing these discoveries into marketable products and services to meet U.S. and world consumer appetites.

Finally, university research tended to play a more tangential role in the growth of the electronics sector, particularly within the semiconductor industries. As Mowery and Rosenberg (2000) explained:

In some contrast to their prominence in the development of the chemicals industry or the later development of the U.S. computer software industry, U.S. universities played a minor role as direct sources of the technologies applied in the emergent semiconductor industry. (p. 885)

Colleges were quick to develop curriculum and programs to train engineers and scientists heavily sought after by industry. The U.S. technological development infrastructure of

military, university research, corporate R&D, and federally directed patent-sharing requirements contributed heavily to the diffusion of technologies and the rapid introduction of numerous new products and services, greatly increasing the rate of adoption of electronic technologies by private and public entities in the postwar era. Even so, it was collaborative research and investment between government agencies and the major corporations of the time such as Bell Laboratories, IBM, and Texas Instruments that initiated the early breakthroughs (Mowery & Rosenberg, 2000).

The first large breakthrough in the electronics sector, specifically within the computer industry, was in 1944. Army ordnance contracted with developers from the University of Pennsylvania to develop an automatic computation device for calculating ballistic firing tables. This machine was called the ENIAC (Mowery & Rosenberg, 2000). Despite its technological advances, this machine required changes in wiring schemes to change programs and lacked the capacity to be incorporated in diverse applications. It was not until 1950 that the first operational stored-program device, SEAC, was created by the National Bureau of Standards. Stored-program devices allowed operators to upload programs without having to make hard-wired adjustments. This technological distinguisher enabled these devices to be used in much more diverse applications (Mowery & Rosenberg, 2000).

By 1953, the first commercially available stored-program device called the UNIVAC, developed by Remington Rand was sold to the U.S. Census Bureau and some private firms (Craigier, 1997). IBM entered the market in 1953, selling the IBM 701 to the Department of Defense. The introduction of a commercially viable computer may represent the first major electronics, technology-driven paradigm shift that profoundly

affected organizations during the 20th century; the evolution of the computer from a “military tool to a business machine” (Craiger, 1997, p. 89) was complete.

During the 1960s, segmentation of the computer industry increased as minicomputers were introduced. Minicomputers were smaller, more affordable versions of huge mainframe devices and many of these initial designs were sold to academic and scientific researchers who did not require software or product support (Craiger, 1997). Minicomputer proliferation was greatly enhanced by many innovations within the semiconductor industries that enabled miniaturization, high processing speeds, and lower costs to customers. By 1970, the cost of minicomputers was approximately one-tenth that of mainframes in the 1960s, with comparable computing power.

Another critical and far-reaching development in computing started in October 1957 with a totally unrelated event (Napier, Judd, Rivers, & Adams, 2003). In the midst of the Cold War, the Soviet Union successfully launched the first satellite—Sputnik—into space. The predominant thought for most U.S. leaders and citizens was that the Soviets having been the first to reach orbit and beyond was intolerable; the U.S. would not be second to anyone. Determined to catch up to perceived and real deficits in technological innovation, President Eisenhower promptly, within months of the Sputnik launch, created the Advanced Research Project Agency (ARPA) that sponsored research at universities and corporations in strategic areas, including communications and computer technologies (Napier et al., 2003).

Almost immediately, the need for additional computing power to meet the needs of the increased research demands became evident. Instead of acquiescing to the calls for the procurement of more computers, ARPA Director Robert Taylor instead proposed the

creation of a system of electronic links, or a network, that would link together existing computers at participating universities and corporations to increase computing power and to more rapidly share information (Napier et al., 2003). In 1968, the Department of Defense, operating as the ARPA sponsor, released requests for proposals to more than 100 businesses in the United States, such as IBM, Control Data Corporation, and Raytheon Company. In the end, a consulting firm by the name of Bolt, Beranek, and Newman won the contract. In the fall of 1969, the world's first electronic network, ARPANET, was in operation and consisted of four nodes. By 1971, the network had 15 nodes and, by 1972, the first international connection was made to the University of London. This network would eventually be renamed DARPA NET because of its connection to the Department of Defense. The foundational roots of what would later radically reshape business, cultures, and society worldwide was born—the Internet (Napier et al., 2003).

The first major breakthrough in the semiconductor industry occurred in 1954, when Texas Instruments produced the first commercially successful transistor after Bell Labs was forced to share the technology through antitrust policies and regulation. Transistors replaced tube technology, making electronic circuits smaller and more reliable. By 1958, the next leap in technological advancement took place when the integrated circuit (IC) became available for commercial use. ICs further contributed to the miniaturization of circuit design and made computing power available in even smaller packages, resulting in further proliferation of product innovation. Not until 1966 did ICs overtake the production and use of transistors, further transforming the structure of the

U.S. semiconductor industry when most of the top producers shifted their focus and became suppliers rather than users of the product (Mowery & Rosenberg, 2000).

Software development, as a separate industry, did not really begin until computers had proliferated in sufficient numbers and a standard platform was evident. COBOL and FORTRAN, two initial programming languages, were typically bundled within the sales contract by the computer manufacturer (Mowery & Rosenberg, 2000). It was not until the late 1950s and 1960s that independent software firms entered the market, providing custom programming for government and businesses.

Another business sector that experienced growth during the 1950s and 1960s was U.S. agriculture. This timeframe represented unprecedented changes in U.S. agricultural practices, affecting hundreds of farms, thousands of workers, and millions of people worldwide. By many estimates, there was excess U.S. agricultural capacity during the postwar era due to the price support practices reminiscent of The New Deal policies and World War II production controls. Consequently, the 1950s and 1960s represented a rebalancing of production inputs, namely the shifting of farm labor to other sectors. This shift of labor helped U.S. productivity gains overall (U.S. Council of Economic Advisers, 1975). As with many other sectors within the U.S. economy, innovative technologies contributed to this aggregate shift of labor input.

Agricultural innovation during this time was driven by the development of ever more diverse and powerful equipment, improved pesticides associated with complex application processes, increased use of fertilizers, plant and livestock specialization, and irrigation systems. These new technologies were led, in part, by heavy federal investments in research, development, and human capital development. Real expenditures

of public dollars from both federal and state sources indicate slow growth through the first half of the 20th century. Ganzel (2007b) explained the following:

Then, about 1950, spending shot up. Research grants doubled from under \$500 billion in 1950 to over \$1 trillion in 1963. Research spending reached \$1.5 trillion in 1972, and over \$2.5 trillion by 1990. . . . [These figures do not include] money spent by hybrid seed corn companies or food processors or fertilizer companies or pesticide companies—all were making similar investments. (paras. 2-3)

Agricultural scientists and university extension service agents, many based at land-grant universities evolving from the Morrill Acts, bridged the gap between research, development, and the farm (Ganzel, 2007b). Human capital development was a critical piece to the successful adaptation and diffusion of the new technologies to farming regions across the nation, which resulted in increased farm productivity despite the outmigration of labor to other sectors.

New and sophisticated farming practices required farmers to increase their knowledge, skills, and performance to remain competitive and actually lead to increases in specialization. Ganzel (2007b) explained this need as follows:

As the knowledge base for agriculture became more specialized, farmers were rewarded if they specialized. For instance, in the 19th century, farmers needed a generalized knowledge of how best to prepare a seedbed, how to apply manure for nutrients, how to cultivate weeds and how to harvest. He or she needed to know how to feed animals, collect their products (like eggs or cream), butcher them and preserve meat. Most of this knowledge applied to a variety of crops and livestock. But in the last half of the 20th century, researchers were showing which specific

nutrients, applied at certain times and in certain ways would make a big difference in one crop but not another. Equipment manufacturers were developing specialized machines for specific crops and specific planting and tillage practices. Farmers were rewarded with better yields and more money if they understood in depth the crops they were raising and the livestock they were raising. So, in real ways, research changed cropping patterns as farmers began to specialize in a few or even only one species of crop. Animal and processing research encouraged farmers to specialize in one type of livestock, changing livestock patterns. (para. 6)

This trend towards specialization drove increased demand for improved farming equipment. After the war, there was a great pent-up demand for tractors and, by the 1950s, tractors finally outnumbered horses and mules on farms (Bellis, n.d.). “Tractor production reached its highest level in 1951 when there were 564,000 tractors manufactured in the U.S.” [*sic*] (Ganzel, 2006, para. 1) alone. When the pent-up demand was satisfied, production dropped back to about half of the peak (Ganzel, 2006).

Advancements in pest control represented another agricultural improvement, leading to increased farmer specialization and sophistication. Led by the successful introduction and use of the powerful pesticide named DDT into agriculture during the 1940s, the pursuit and use of new and improved pesticides increased.⁷ Ganzel (2007a) explained the impact of pesticides on the agricultural industry as follows:

⁷ DDT’s potential danger to the environment was highlighted in the book *Silent Spring* by American biologist Rachel Carson. Carson’s work underscored the dangers to humans and wildlife, namely birds, of widespread use of chemicals, particularly in the agriculture sector. This work is considered by many to be the beginning of the national environmental movement of the 1960s and 1970s. The U.S. Environmental

Analysis of data right after the war indicated that every additional dollar spent on fertilizer or pesticides generated increased output of between \$3 to \$5 on average. According to the USDA in 1945, the average annual loss in farm income from pests and crop diseases was about \$360 million (over \$4 billion in today's dollars⁸). (paras. 8-9)

Finally, farm land-use policies of the 1950s and 1960s often limited the number of acres farmers could plant. Farmers responded strategically by planting only on the most productive land and used technology to help them increase yields and still turn a profit (Ganzel, 2007a).

User demand for pesticides exploded based on the research and in response to federal farm policies. Between the years of 1945 and 1972, the total expenditures for pesticides rose tenfold (Ganzel, 2007a). Pesticide use increased from below 100 million pounds in 1945 to about 300 million pounds by 1950 and again to more than 600 million pounds by 1960: “[i]n 1952, 11% of corn and 5% of cotton acres were treated with herbicides. By 1982, these percentages had risen to 95% of corn and 93% of cotton acres” (Ganzel, 2007a, para 6.). Between 1947 and 1952, nearly 10,000 new pesticide products were registered with the U.S. Department of Agriculture (Ganzel, 2007a).

Likewise, farm use of fertilizers increased during this period. Postwar synthetic ammonium nitrate production, facilitated by numerous process improvements and abundant electrical power, made huge quantities of fertilizer available at lower prices.

Protection Agency was created in 1970 and DDT was banned from use in the United States in 1972 (Behr, 2009).

⁸ Conversion calculation to over \$4.3 billion in 2011 dollars based on the consumer price index methodology.

Average annual use of commercial fertilizers by U.S. farmers increased from 22.3 million tons during the 1950s to 32.4 million tons during the 1960s (Bellis, n.d.), a 44.9% increase.

Droughts also affected many regions of the country during the 1950s. Although not as severe as the droughts of the 1930s, farmers were nonetheless challenged by this environmental factor. In response, large irrigation systems were found to be an effective but costly option. Farmers with sufficient equity in their property were able to invest in these systems, stabilizing and increasing crop yields even in the face of decreased rainfall conditions (Ganzel, 2007c). Farming as a way of life was changing drastically:

Farming was no longer only a natural process, it became a scientific, industrial process. The farmers who survived and thrived—no matter where they were...were forced to become efficient managers and engineers, applying basic scientific research results to the practical problems of growing food, fiber, and even energy. (Ganzel, 2007b, para. 7)

Those who lacked the ability to purchase the new equipment, invest in new agriculture technologies, or who simply balked at the increased burdens of managing large, complex farming systems left farming to find alternate sources of income (Ganzel, 2007b).

Inevitably, farm consolidation resulted and more farms being merged or sold during this period than in any other period in American history. Between 1950 and 1970, the number of farms declined by half and the average size of farms increased from 205 acres in 1950 to almost 400 acres by 1969 (Ganzel, 2007d). As Ganzel (2007d) explained, “The number of people on farms dropped from more than 20 million in 1950 to less than 10 million in 1970” (para. 3). This decrease translated to a dramatic reduction

in the percentage of workers in the agricultural sector, from 12.7% to 3.7%, an astounding shift in workforce migration from a single industry sector (Hodson & Sullivan, 2008).

Migration patterns reflected events on the farm and U.S. citizens continued to move from rural surroundings to the concentrated industrialized centers of metropolitan areas. Between 1950 and 1970, total population in rural areas decreased from 63 to 66.2 million, and metropolitan areas grew from 84.5 million to 140.2 million (Hobbs & Stoops, 2002). The migration of Blacks from agricultural areas of the South that began in the late 1920s resumed again in earnest in the 1950s as they pursued higher wages and more opportunities in the concentrated urban centers of the North (Goldin, 2000; Heim, 2000).

Labor force participation rates shifted dramatically for women during the period of the 1950s and 1960s. During the 1950s, for White married women 45 to 54 years old, labor participation rates soared from 20% to nearly 50%. In that same decade, labor participation rates for women 25 to 34 years old only increased about a third the amount of the older group; these younger women were predominantly staying at home producing and raising the baby-boom generation (Goldin, 2000). During the 1960s and 1970s, labor force participation for this younger cohort would increase, catching up to the older cohort by 1979. Increased labor participation for women is generally attributed to higher education rates, increased demand for women to fill white-collar and clerical positions, and for the older cohort, decreased fertility rates (Goldin, 2000). Other factors contributed to higher worker participation rates for women. Increased family purchasing power and a greater availability of market substitutes for home-produced goods meant

women did not have to spend as much time preparing meals at home. Increasingly sophisticated and affordable labor-saving domestic technologies such as washers, dryers, vacuum cleaners, and electric irons all contributed to women spending less time on domestic chores and allowing them more time for work or leisure activities outside of the home (Goldin, 2000).

Wage structure differential between races and genders remained flat in the 1950s but started to rise slightly through the 1960s. Contrary to popular opinion at the time, this rise indicated that demand for unskilled labor remained strong in the postwar period (Plotnick, Smolensky, Evenhouse, & Reilly, 2000). This increase in the need for unskilled labor was due in part to foreign demand for U.S. goods (Plotnick et al., 2000). Wage differentials would begin to increase in the 1970s; earnings differences between Blacks and Whites began to close after 1965, characterized by episodic—not steady—increases. While earning gaps based on racial lines began to close, there is little evidence of narrowing of the wage gap between genders during this time (Goldin, 2000).

The U.S. population grew from 150.7 million in 1950 to 203.2 million by 1970 (Hobbs & Stoops, 2002). Immigration contributed minimally and increases were due mainly to increased birth rates and decreased morbidity rates brought on by improved health care and higher standards of living. As Hobbs and Stoops (2002) remarked, “The 1950s represented the second highest decade of population increase during the century in both numerical (28.6 million) and percentage (19.0%) terms” (p. 12). By 1965, half the population was under 25 years of age and the labor force got bigger and younger.

Between 1950 and 1970, sector employment saw large shifts away from blue-collar industries towards white-collar industries, with the largest increases being realized

within service and public sectors (Hodson & Sullivan, 2008). Traditional U.S. employment sectors of agriculture, extraction, and manufacturing all decreased in percentage terms: 12.7% to 3.7%, 1.7% to 0.8%, and 26.3% to 25.9%, respectively. Other sectors experienced increases in employment: trade, from 15.8% to 16.9%; finance and real estate, from 3.5% to 5.4%; education, from 3.8% to 8.6%; professional services, from 5.4% to 8.0%; and government, from 4.5% to 5.2% (Hodson & Sullivan, 2008). Concentration of workers into ever larger workgroups continued until the 1960s so that by 1967, approximately 45% of workers were working for firms employing more than 22 workers. Self-employment, both in farm and nonfarm settings, also continued to decrease as more workers sought employment opportunities within established firms (Goldin, 2000).

In sum, the United States experienced extensive changes during the 1950s and 1960s. Employment shifted from traditional sectors such as agriculture to service and public sectors, coupled with increasingly sophisticated technological innovations from GPTs, particularly the electronics industry, having an impact on all sectors of the U.S. economy. Demand for workers capable of designing, building, and using new and powerful process technologies increased. Workforce demands for white-collar workers increased and those for blue-collar workers decreased. Employment opportunities for unskilled and semiskilled workers likewise decreased as technology and automation were deployed and thus contributed to the unemployment rates indicating structural shifts in the economy. Female workers increasingly shifted from domestic to clerical work opportunities and workers tended to migrate to the concentrated industrial urban areas for higher paying jobs. As a consequence of these changes, political leaders, business

interests, and educational institutional heads increasingly responded to the commonly held belief that structural changes in the economy required leadership in the form of federal and state intervention to remedy underemployment, unemployment, and to increase worker productivity. By the 1960s, these calls resulted in a flourish of federal legislative actions that would forever change the national structure of workforce development.

Worker Skills, Training, and Policy Response

The recessions in 1953 and 1958 highlighted what many leaders thought were structural weaknesses in the U.S. economy. Despite several indicators that showed economic growth and thus recovery from the recessions, unemployment remained high and persistent enough to cause concerns, particularly in regions of the country that were experiencing above-average unemployment. The general belief during this time was that structural unemployment was caused by the increased use of technology and automation in nearly all sectors of the economy. Similar to the situation in the 1920s and 1930s, many leaders believed that technology was increasing the gap of employment opportunity between those workers with relevant skills and those without.

During the 1950s, debates ensued as to the level of federal intervention in remedying structural shifts in the economy that led to unemployment. New Deal influences were still quite strong, but for some, particularly those in the Eisenhower administration, including President Eisenhower himself, the traditionally held views that education and training was best left to the states to manage remained predominant. Increasingly, however, policy solutions to this structural unemployment were thought to be best solved through workforce strategies instead of policies targeting aggregate

demand forces. Political attention centering on the building of national workforce development programs gained momentum during the Eisenhower administration but not until the Kennedy and Johnson administrations were in place did concrete action take place in addressing the needs of workers through comprehensive federal and state policy making and the resulting necessary funding streams. When the arguments for comprehensive federal involvement in workforce training solidified into bipartisan support in Congress, coupled with strong leadership from the White House, legislative action came in a flourish (Kerman, 1974).

President Kennedy was inaugurated in 1961 and his domestic agenda included plans for increased funding for education and worker training. In 1961, President Kennedy signed into law the Area Development Act. Under this act, Congress was allowed to set aside funds to invest in depressed areas of the country for job creation and retraining of the unemployed, who had been displaced by automation in industry. Despite the belief of members of Congress that the government had some responsibility to address the structural changes within the economy, coupled with new visionary leadership in the executive branch, the act remained focused on providing financial assistance to distressed communities, instead of to individual workers. The program followed typical economic development strategies that included incentives to attract industries, improve institutional facilities, and provide much-needed infrastructure in these struggling communities. Because the act was limited in scope, it failed to reach vast numbers of the unemployed, who totaled nearly 5 million (6.3% unemployment rate) by February 1961 (Kremen, 1974).

By 1962, Congress presented the new president with the Manpower Development and Training Act (MDTA), which finally signaled success in redefining federal involvement in direct federal assistance to experienced workers and their needs to upgrade skills and migrate to find new and better jobs. This act introduced programs that provided funding for the retraining of dislocated workers and the unemployed as a result of structural changes brought about by automation. In his speech detailing the new act, President Kennedy acknowledged the new role that federal policies can have with regard to manpower training and the impact they should have on the U.S. economy:

The Manpower Development and Training bill, which passed the Congress on Tuesday, is perhaps the most significant legislation in the area of employment since the historic Employment Act of 1946. . . . The new training program will give real meaning to the Act by making possible the training of the hundreds of thousands of workers who are denied employment because they do not possess the skills required by our constantly changing economy. Their training is important both to them as individuals and to the economic health of the entire Nation.

Thorough guidance and assistance from the United States Employment Service in helping them to choose the kind of work for which they are best suited and a concerted effort to help assure that a suitable job rewards their initiative.

This far-reaching bill not only addresses itself to the problems of the present, but requires us to anticipate future needs as employment conditions change.

(Kennedy, 1962, paras. 2-6)

This act empowered the DOL, for the first time, to take direct action in developing a national workforce development system (Kremen, 1974). This action included the imperative to study the nation's manpower supply and report to Congress annually through a manpower report. The act solidified DOL control of on-the-job-training (OJT) but kept vocational training responsibilities within the Department of Health, Education and Welfare (Kremen, 1974).

Underpinning the basic tenets of the MDTA was the Employment Act of 1946 and the goal of 100% employment. As Kremen (1974) explained, the bill authorized the secretary of labor:

...to plan, encourage, and coordinate OJT and other related training programs.

The DOL's jurisdiction also included the selection of participants in the training programs and the determination of those skills and occupations in which to train them..The bill granted federal training allowance to trainees for up to 52 weeks.

(Kremen, 1974, para. 76)

Participation was open to anyone who met the specific criteria of the allowance. The act further directed the secretary to provide training through any appropriate and expeditious agency—public or private. Finally, the act outlined the role of the Department of Health, Education and Welfare in the provision of vocational education (Kremen, 1974).

In 1963, following President Kennedy's assassination, Lyndon Johnson was sworn into office and, not long afterwards, signed into law the Higher Education Facilities Act with a great flourish. Education was an important priority to President Johnson and, in light of the national and international challenges, he recognized

education as an imperative to not only a strong economy, but a strong democracy. Upon signing this new legislation, President Johnson shared with the nation that:

...a great former President of the Republic of my State said, "The educated mind is the guardian genius of democracy. It is the only dictator that free men recognize and the only ruler that free men desire." So this new law is the most significant education bill passed by the Congress in the history of the Republic. In fact, this session of the Congress will go down in history as the Education Congress of 1963. (L. B. Johnson, 1963, para. 2)

This act provided aid for the construction of academic facilities. Twenty-two percent of the funding under Title I, which provided grants for undergraduate facilities, was earmarked for community colleges and public technical institutes. In fact, the law specifically called for 25-30 new community colleges to be constructed every year.

President Johnson went on to say:

This legislation is dramatic, and it is concrete evidence of a renewed and continuing national commitment to education as the key to our Nation's social and technological and economic and moral progress. It will help meet the demands of our economy for more skilled personnel; it will enable many more of our young people to cope with the explosion of new knowledge and to contribute effectively in a world of intellectual, political, and economic complexity. (L. B. Johnson, 1963, para. 16)

President Johnson later signed into law the Vocational Education Act in 1963 that further reflected a reprioritization and expansion of federal financial assistance to vocational education (Wolfe, 1978). As Wolfe (1978) explained:

The Act redirected vocational education programs from that of training specific categories such as agriculture, home economics, practical nursing, and fisheries to that of preparing all groups in the community regardless of their vocational emphasis or attachment to the labor force. The Act was also designed to assist those persons who had difficulty in succeeding in regular vocational education programs because of socioeconomic or academic reasons. (Wolfe, 1978, p. 4)

This legislation provided \$630 million (in 1963 dollars) to be distributed through four vocational education programs to be deployed at the state and local levels (Wolfe, 1978). States were authorized to use the funds for numerous activities at the secondary, postsecondary, and adult educational levels to include vocational education and training, cooperative vocational education, construction of area vocational schools, stipends for applicants with acute economic needs, industrial arts, work study, and support services for women who desired to enter occupations predominated by men (Wolfe, 1978).

In 1964, President Johnson campaigned on his domestic agenda (building on President Roosevelt's New Deal programs), entitled the Great Society (Wolfe, 1978), and won the 1964 presidential election. This agenda proposed, among other things, an intense focus on federal involvement and support of secondary and postsecondary education. Federalism in education, training, and worker training continued to expand under Johnson's leadership (Wolfe, 1978).

To address concerns of rising costs of college when higher educational opportunities for young adults were clearly needed to meet the rapidly changing structure of the U.S. economy and demands for higher skilled workers, President Johnson, in 1965, signed the Higher Education Act. Building on earlier pieces of legislation such as the

Servicemen's Readjustment Act of 1944 and Higher Education Facilities Act of 1963, this Act was designed to assist students, particularly those from lower socioeconomic strata, by providing scholarships, loans with reduced interest rates, and work-study programs (Landsberg, 2006). Other priorities within the act included funding for extension and continuing education programs, library collections, expanding the number of librarians, strengthening developing institutions to meet minimum standards of accreditation, increasing postsecondary teacher quality, and resources and materials to improve undergraduate quality of instruction (Landsberg, 2006).

During the mid-1960s, adult literacy and basic education ("adult basic education" [ABE]; Imel, p. 1) initiatives gained popularity. ABE programming gained distinction in 1966 with the passage of the Adult Education Act, the purpose of which was helping disadvantaged adults increase their education levels and literacy skills (Imel, 2005). Federal funds were distributed to states, which then used these funds for ABE delivery in a variety of training institutions and settings, from education agencies and community-based organizations to community colleges and correctional institutions (Imel, 2005). The Economic Opportunity Act provided special work and training programs for disadvantaged and unemployed, particularly long-term unemployed, older workers, youth, minorities, and other low-income persons. A variety of specialized programs funded under the act were implemented through government and nongovernment organizations (NGOs).

One of the last workforce development programs during this decade was introduced in 1968: the Work Incentive Training (WIN). WIN was established to help Aid to Families with Dependent Children (AFDC) recipients gain full-time employment

(Cohen & Brawer, 2008). Many of these recipients often demonstrated deficits in employability factors. Training programs were developed to facilitate movement of able-bodied recipients off welfare rolls and onto payrolls by providing training, work experience, and resources to find permanent jobs. As Cohen and Brawer (2008) remarked, “On this surge of funding, occupational education swept into the colleges in a fashion dreamed of and pleaded for but never previously realized by its advocates” (p. 245).

Junior/Community Colleges

The new economic realities of the 1950s and 1960s reflected the increased use of technology and innovation, and were echoed in the number of postsecondary institutions and enrollments on the rise. The total number of postsecondary institutions rose from 1,852 in 1950 to 2,525 in 1970 (Synder, 1993). Interestingly, the single largest percentage increase in two-year colleges occurred between 1960 and 1970. Two-year colleges (public and private) also rose in number from 540 in 1950 to 582 in 1960, a 7% increase, and increased again to 886 in 1970, a 52% increase in just 10 years (Snyder, 1993). As the number of institutions available for students to attend increased, so did enrollments. Enrollments in four-year programs increased 203% between 1950 and 1970, but the number of bachelor’s degrees awarded between 1950 and 1963 decreased by 9% overall, with degrees awarded to men decreasing 34% and degrees awarded to women increasing by 34% (Snyder, 1993).

Enrollments in two-year programs grew substantially through the 1950s and 1960s, with the largest growth towards the beginning of the 1960s as the leading edge of the baby boomer generation reached college age. Between 1950 and 1963, there was a

292% increase in enrollment in two-year programs, followed by a 173% increase between 1963 and 1970 (Snyder, 1993). Acceptance of two-year colleges as a viable option for continued education, both for academic transfer and technical training was increasing, too. The volume of students enrolling in two-year colleges and then transferring to four-year colleges increased from 17% in 1946 to 40% in 1970 (Brint & Karabel, 1989). Correspondingly, between 1960 and 1968 the proportion of students enrolled in occupational programs increased nationally from less than one-quarter to nearly one-third (Brint & Karabel, 1989).

Despite increases in the number of students attending community colleges, these institutions were not experiencing the expected or desired increases in occupational training. Leaders of these colleges expected that fully a third to half of community college enrollments should be in occupational education and vocational training, a rationalization based on estimates that the new economy would need considerably more semiprofessional and technical trained operators to meet the demands of industry and research (Brint & Karabel, 1989). In 1947, the Truman Commission had estimated that for every one job requiring four years of education, there would probably be at least five jobs requiring two years of education (Brint & Karabel, 1989).

The use of the community college programming by students had begun to change from earlier years of selecting academic transfer or terminal programs; vocational training was attracting increased attention. Careful analysis of enrollments during the 1950s and 1960s indicates that increasing numbers of students were blending vocational and collegiate educational courses (Cohen & Brawer, 2008). Many of these students

would then opt for transfer to four-year colleges rather than terminate at the end of two years (Cohen & Brawer, 2008).

The increased federal support from numerous legislative acts during the 1960s helped postsecondary institutions meet the burgeoning enrollments but many of the bills introduced did not directly benefit community colleges. Project administrators tended to award funding to noncollegiate postsecondary institutions instead (Brint & Karabel, 1989). Even without directed financial support, funding for community colleges did start to increase; for instance, federal funding specifically for community colleges increased from \$7.4 million in 1964 to \$31.4 million in 1966 (Brint & Karabel, 1989).

During the 1950s and 1960s, the junior college system in Mississippi continued to mature. By 1961, most of the agricultural high schools that initially launched the two-year college system had closed, but all the colleges remained open (Young & Ewing, 1978). There were a total of 16 junior colleges actively enrolling students; this number included the two new colleges for Black students, Coahoma Junior College and Utica Junior College. All Mississippi junior colleges except the two newest ones were regionally accredited by the Southern Association of Colleges and Schools by 1962, and all “had firmly established themselves as leaders in higher education on the state and regional levels and were participating in all areas of development of the junior college movement on a national basis” (Young & Ewing, 1978, p. 35). In fact, J. M. Ewing, president of Copiah-Lincoln Junior College, served as the national president of the American Association of Junior Colleges (Young & Ewing, 1978).

Junior colleges in Mississippi were providing an answer to both the system of higher education and the students attending and the Mississippi junior college system

offered much-needed additional capacity to handle the increased enrollment rates.

Between the 1951-1952 sessions and the 1971-1972 session, enrollments had increased from 7,047 to 60,869 students. By 1968, 34.7% of total undergraduate enrollments were associated with junior colleges (Brint & Karabel, 1989) and by 1972, seven out of every 10 high school graduates who attended college programs started their postsecondary education at a junior college (Young & Ewing, 1978).

Accessibility was a key asset of the junior college system and the associated increases in enrollment (Young & Ewing, 1978). Aside from strategically located main campuses within districts throughout the 82 counties, many colleges were also opening branch attendance centers in smaller communities within their district. Another strategy that enhanced the attraction of junior colleges was the development of bus transportation systems. In 1953, the first bus route was established in Wayne County and, by 1971, 15 junior colleges operated at least one bus route. Bus routes helped unify district citizenship support of the junior colleges and encouraged many from rural communities to enroll and attend college (Young & Ewing, 1978). Finally, enrollment costs in postsecondary education were rising and junior college provided many with a far more affordable option than attending a four-year college straight out of high school.

Programmatically, the junior college system had firmly established itself as a fully comprehensive educational system (Young & Ewing, 1978). The junior colleges were providing IHL-recognized and accepted academic curriculums articulating to four-year degrees. Vocational, technical, and short-term industrial training offered by the junior colleges helped meet the needs of a wide variety of students. Junior college leaders during this period also began to appreciate their critical role in community and economic

development. Colleges expanded their training options to accommodate not just traditional students, but also nontraditional, older workers, and offered their facilities, day or night, for start-up and preemployment training for new and expanding industries (Young & Ewing, 1978).

Three pieces of legislation were passed in Mississippi during the 1960s that made a positive impact on the junior college system. The first was House Bill 215 in 1964 that established junior college districts as individual and separate jurisdictional entities and bodies politic and corporate (Young & Ewing, 1978). House Bill 215 established 13 multicounty district junior colleges and approved three additional junior colleges within these districts. The second bill in 1966 was referred to as the 307 law; it allowed counties to withhold up to \$2 million of state ad valorem tax. This law, along with another similar act in 1968 authorizing boards of trustees of public junior colleges to borrow money for 15 years, gave college leadership confidence in the availability of future funding to begin long-range building programs (Young & Ewing, 1978).

The third important act was the Junior College Vocational and Technical Training Act of 1964 (Young & Ewing, 1978). This act recognized the need for the training of a skilled and semiskilled labor force to advance economic development activities. Funding from these acts, plus state and federal funding, allowed the construction and equipping of 25 area vocational-technical training centers throughout Mississippi. By 1972, the state had appropriated more than \$4 million and the colleges spent more than \$32 million (1972 dollars) on construction of buildings and equipment procurement for the purpose of vocational curriculum delivery (Young & Ewing, 1978).

1971-1980: Inflation, Regulation, and Stagflation—Economic Instability

Introduction

The decade of the 1970s heralded the beginning of the end of the U.S. economic domination worldwide. Although the U.S. economy would remain nearly twice as large as that of its nearest competitor for the next 20 years, several nations and business industries would forge assaults on the U.S. position as the global leader. The rise of new global competitors in manufacturing, particularly Japanese and German automobile and steel industries, led to higher unemployment and wage rate stagnation domestically. Thousands of U.S. manufacturing jobs were displaced, with many workers moving permanently to service-oriented jobs. Complicating the reality of this new global economic were overall flat GNP, high inflation, recessions, and skyrocketing energy costs. Federal response to these economic and social challenges were new programs, agencies, and regulations, exacerbating an already challenging competitive environment for companies and industries.

Other aspects of the U.S. economy were brighter. New sectors and industries began to grow, offering new opportunities for work and wages elsewhere. The shift of computer technologies from mainframes to mini and personal computers spawned a revolution in computer-driven technologies that bolstered some areas of the sagging manufacturing sectors. Related technologies and industries to support computer manufacturing introduced many new industries and sectors, helping the U.S. economy to expand and grow in areas never before seen.

The 1970s also signaled the coming of age for community colleges. International competition and technology altered the fundamental composition of the U.S. economy,

business and industry strategies, and even the nature of employment. Citizens of the United States soon recognized that postsecondary education and higher order skills were needed to be competitive, find jobs, and achieve prosperity. Postsecondary institutions helped the U.S. economy move forward, and the community college system expanded access and affordability to those seeking more skills, employment, and increased wages.

Economy, Technology, and Demographics

Inflation in the 1970s concerned policy makers. The average rate of inflation from 1971 to 1980 was approximately 8.21% (Williamson & Johnston, 2010). The U.S. economy endured a major shock—rising oil prices. There were three main causes. First, OPEC members moved the pricing of oil to gold, increasing the cost of oil. Second, the 1973 Yom Kippur War, when Syria and Egypt attacked Israel, triggered another spike in oil prices. The third force was OPEC's oil embargo in response to the U.S. backing of Israel during the Yom Kippur War. This embargo increased prices and cut supplies of oil. For U.S. citizens, the net effect was increased gas prices, long waits in lines at the pumps, and continued inflation throughout the economy.

Wall Street reflected these challenging economic conditions (Williamson & Johnston, 2010). The DJIA annualized growth rate grew only 1.4% from January 1, 1971, to December 31, 1980. The S&P500 fared little better, achieving only a 3.95% growth rate for this same period. Advanced technological firms performed better than traditional industries and sectors, and investor interests in these new and growing industries was demonstrated as equity investments left traditional sectors in favor of new technology

stocks . The NASDAQ outperformed both the DJIA and S&P500 by growing 7.38% from February 5, 1971,⁹ to December 31, 1980 (Williamson & Johnston, 2010).

By 1975, inflation began to subside and the economy began to recover; unemployment peaked at 8.5%, the highest rate of unemployment since the Great Depression. Stagflation continued to drag on the U.S. economy despite the recovery, and by the late 1970s, inflation began a rapid increase. In 1980, Paul Volcker, the new chairman of the Federal Reserve Bank, abruptly decreased the money supply, triggering a steep interest rate increase. This move effectively slowed consumer spending and business production, cooling the economy, and successfully broke American expectations of continued inflation. As the economy slowed, unemployment began to rise rapidly again, leading to even higher unemployment rates during the early 1980s (BLS, 2011).

Succeeding the social regulations begun during President Roosevelt's New Deal and continued by Kennedy's New Frontier and Johnson's Great Society, government regulation of business continued in the late 1960s and early 1970s (Vietor, 2000). Health and safety and environmental protection movements gained political power to address the social costs of industrialization. By early 1970, more than 23 new legislative acts were promulgated, placing a crimp in the operations of business and industry. These new acts required management and oversight and, in 1970, the U.S. Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) were established. In 1972, the Consumer Product Safety Commission began its work (Vietor, 2000). By the mid-1970s, amid seemingly endless domestic challenges, international threats, and leadership malfeasance, Americans' faith in the government establishment

⁹ First date for data for the NASDAQ composite recorded.

faded. More bluntly, “the intellectual and political legitimacy of government economic intervention, established during the Great Depression and embodied in New Deal policies had been thoroughly eroded” (Vietor, 2000, p. 996).

By the late 1970s, as inflation and unemployment continued its drag on the U.S economy, Americans’ outlook on the future was grim (Vietor, 2000). U.S. industries and corporations were experiencing lower profits due to losses of markets from foreign imports. Inflation raged and unemployment was a constant threat to many. The social upheavals of the 1960s had given way to increased activism in environmental and safety protectionism, which only exacerbated an already dire situation for U.S. companies. Threats to U.S. leadership and dominance were seemingly everywhere. A general malaise plagued the country and President Carter, sensing the country’s need for vision and leadership, called upon Americans to respond accordingly (Vietor, 2000).

Government and political leaders failed to innovate and successfully lead the U.S. economy out of its doldrums, but corporate leaders did not have the luxury of waiting for macroeconomic improvements to occur. Early in the 1970s, business leaders were forced to innovate to keep firms competitive and began experimenting with what would become the third major corporate transformation: conglomeration (Galambos, 2000). Conglomeration involved the diversification of a business into fields (products, services, and markets) that were not related to their business’s core competencies by either technology or markets. Conglomeration theoretically promised steady growth and increased profits because the corporation would be less vulnerable to single-industry business cycles (Galambos, 2000).

Pressures on U.S. competitive edge and the need to adapt through conglomerations was such that, by the early 1970s:

...large foreign companies in consumer electronics, steel, machine tools, metals, tires, and automobiles made deep inroads into markets long controlled by U.S. corporations. Japanese and German firms led the way, armed with superior products offered at prices U.S. corporations could not match. When the first wave of global competition hit the American economy, neither the country's business leaders nor its politicians could offer satisfactory solutions to the problems business faced. (Galambos, 2000, p. 958)

The new era of global competition was under way and many U.S. business sectors were not prepared for the onslaught (Lindert, 2000). Two industries in particular, automobile and steel manufactures, paid the price for poor management and restrictive labor practices of the previous two decades. The auto industry quickly conceded competitiveness and substantial market share to foreign firms, suffering from its failure to innovate either in design or processing during the 1950s and 1960s (Lindert, 2000). There were many reasons postulated for the loss of American competitive advantage and leadership in the auto industry. According to Lindert (2000), a lack of focus on quality and productivity that allowed foreign firms, particularly Japanese companies, to overtake U.S. automakers.

By the 1970s, the U.S. steel industry was in big trouble. Japanese steel firms had secured long-term coal contracts with Australia and Brazil, allowing them to purchase iron ore at costs 43% cheaper than what U.S. firms could pay for it. Japanese companies also negotiated long-term contracts with Australia for coal. The combined cost savings on

iron ore and coal contributed to a 15% difference in average steelmaking costs in favor of the Japanese (Lindert, 2000). Wage rates disparities between the United States and Japan also supported Japanese advantages. Productivity differences of 13-17% in favor of the Japanese firms further exacerbated the situation.

Failure of the U.S. steel firms, both at the management and labor levels, to willingly adopt improved productivity enhancements such as oxygen furnaces, continuous casting mills, or the use of specialized minimill production facilities all contributed to the industry's downfall (Lindert, 2000). U.S. steel makers claimed strict pollution controls, government subsidies, and price controls undermined U.S. steel manufacturing competitiveness, but these reasons explain less than 8% percent of the cost gap. The bottom line was that, by 1976, Japanese steel firms were able to produce steel 44% cheaper than U.S. firms (Lindert, 2000).

Consequently, during the late 1970s and well into the 1980s, U.S. steel manufacturers lost domestic and international markets (Lindert, 2000). Claims that the Japanese were dumping low-priced steel in the United States led to government intervention. Several tariff measures were put in place to protect the industry, but to little avail. As a strategic move to circumvent tariffs, foreign steel firms built minimills throughout the United States (Lindert, 2000). Eventually, failing U.S. steel companies closed or consolidated with other more profitable firms. These structural changes in the U.S. economy led thousands of steel employees to be laid off, further contributing to the already high unemployment rates caused by an overall weak economy.

Where the automobile and steel manufacturers failed to innovate, the electronics industries continued to capitalize on technological advancements, making strides in new

products that would contribute to fundamentally changing the way organizations and workers delivered products and services (Mowery & Rosenberg, 2000). Throughout the 1970s, computers and computer systems got faster, cheaper, and smaller. Technologies became ubiquitous, increasing computing efficiencies and demand for new infrastructures. Shipments of minicomputers, for example, which were smaller, cheaper, and in some cases, more powerful than several of the larger mainframe systems, gained supremacy on mainframe computers, eventually eclipsing their sales in 1983 (Mowery & Rosenberg, 2000).

Despite the popularity of minicomputers, computer systems during this era remained centralized, complicated, and not user-friendly (Mowery & Rosenberg, 2000). Workers who used or worked on these machines were highly trained and had special technical skills and knowledge. Access to the benefits of using computers was limited within organizations and the computer work was so specialized that management information systems departments, given responsibility for computers and programming, were often isolated from most other organizational departments. This separation contributed to the notion promoted by management that, while computers systems were important, they were not vital to the day-to-day operations of the business (Mowery & Rosenberg, 2000).

The evolution of computing systems and the subsequent revolution in bringing computing power out of isolation and into ubiquity during the 1980s began in 1973 (Computer History Museum, n.d.). In this environment the Xerox Corporation, through its recently created world-class research facility, Palo Alto Research Center (PARC), created the world's first recognizable personal computer—the Alto. The Alto was the

first workstation to boast another new invention, the mouse, and had the ability to store files simultaneously in windows, used menus and icons for navigation, and could link into a network. Xerox failed to commercialize the Alto, but did give several devices to universities (Computer History Museum, n.d.).

PARC capitalized on the computer's ability to network and devised a method to link the Alto computers together to form a local area network (LAN). The LAN used coaxial cable, allowing numerous computers, printers, and other peripherals to be networked or linked together (Computer History Museum, n.d.). This network would be called the Ethernet. Xerox also failed to commercialize the Ethernet and not surprisingly, Ethernet inventor Robert Metcalfe, in an entrepreneurial fashion typical of the electronics industry, left Xerox and created his own company—3Com Corporation. 3Com was one of the first successful companies in computer networking and thus capitalized on its early dominance to revolutionize the computer networking industry in the 1980s (Napier et al., 2003).

While Xerox experimented with networking computers locally, other computer scientists were developing new ways to link computers globally. For example, MILNET was established as a private military network in addition to ARPANET (Napier et al., 2003). As networks proliferated, it became clear that standardization of protocols was essential to their continued expansion. To satisfy that requirement, the transmission control protocol was created by Vinton Cerf at Stanford Research Institute and Robert Kahn at DARPA. Eventually, the National Science Foundation absorbed the costs of supporting many of these networks through the creation of higher speed interconnections that eventually became the foundation of the modern Internet network (Napier et al.,

2003). The U.S. technological R&D system that evolved out of World War II combined the efforts of government, university, and privately funded research in large and small corporations. These collaborations contributed to the proliferation of technology development and acceptance through shared costs, knowledge, information, and expertise. Internationally, there was no equal to this highly integrated and efficient system (Napier et al., 2003).

One of the most important achievements of the computer industry in general and within the semiconductor industry in particular was the introduction in 1971 of the Intel 4004 microprocessor (Mowery & Rosenberg, 2000). The microprocessor expanded computing and processing power to the masses. This technology opened huge new product and market opportunities for a plethora of new products and industries. This innovation changed the shape of the entire computer industry for the next 25 years. The microprocessor eliminated the need for the design of customized chip sets for each individual application designed by a computer manufacturer. Instead, the microprocessor made it possible to produce a powerful, general-purpose solution for diverse utilization. This technology also economized the scarce resource of engineering design talent.

The microprocessor “broke a bottleneck that [had] limited technological progress and slowed the diffusion of computer technologies” (Mowery & Rosenberg, 2000, p. 896). This technology opened large markets for new computers and producers of standardized or packaged computer software for desktop computers and workstations. This new technology paved the way for the sale of standardized computer software in the general marketplace instead of just for internal, centralized use, making the personal

computing workstation and personal computing ubiquitous (Mowery & Rosenberg, 2000).

Subsequent to the introduction of the microprocessor, the Altair 8800 computer kit, manufactured by MITS, was released commercially. The Altair 8800, based on the Intel 8080 microprocessor, was marketed as a personal computer through *Popular Electronics* magazine (Computer History Museum, n.d.). Orders for the new device exploded as hobbyists flocked to the new technology. Two hobbyists in particular, Steve Wozniak and Steve Jobs, began experimenting with the Altair and eventually designed their own personal computer. In 1976, Wozniak and Jobs released the Apple I personal computer and, by 1977, they introduced the popular Apple II. The Apple II boasted a printed motherboard, switching power supply, keyboard, case assembly, manual, game paddles, A/C power cord, and cassette tape with the computer game *Breakout*. The Apple II could be hooked up to a color television set, producing brilliant color graphics (Computer History Museum, n.d.). The stage was set for the personal computer revolution of the 1980s.

The introduction of the microprocessor, in addition to changing the market for computer systems, revolutionized the software industry (Iyer, 2010). Independent software development companies popped up, grew, and prospered as customer demands for custom and standard software increased. The word processor, created by Micropro International and the introduction of computerized spreadsheets by Dan Bricklin and Bob Frankston (designed and released for public use on Apple II systems) revolutionized standard off-the-shelf software (Iyer, 2010). These software packages decreased reliance of business leaders, managers, and clerks on MIS departments and increased the ability of

end users to take advantage of computing power to increase individual productivity and efficiency. These new innovations contributed to proliferation of new, diverse, and in some cases, higher order worker skills and knowledge.

Major inventions of this decade would revolutionize industries and economies in the coming years (Computer History Museum, n.d.; Iyer, 2010). Among them were computer-related items included the dynamic random access memory, created by Intel; the floppy disk, created by David Noble at IBM; video games, created by Nolan Bushnell; the laser printer, created by Gary Starkweather at Xerox; and the ink-jet printer, created by Siemens. Personal entertainment devices developed during this decade included pocket calculators, created by Sharp Corporation; digital cameras, created by Steve Sasson at Kodak; cell phones, created by Bell Laboratories; the personal stereo, created by Andreas Pavel, that led to the Sony Walkman; and the VCS game console, created by Atari. Among the devices that revolutionized the scientific world was the world's first supercomputer, the eponymous Cray I (Computer History Museum, n.d.; Iyer, 2010).

The technological innovations evolving out of the electronics industry during the 1950s and 1960s perpetuated and further propelled and accelerated the long shift of jobs and skills away from blue-collar industries to white-collar sectors in the 1970s. By 1980, 52% of employees worked in white-collar jobs, compared to just 31% in 1940 (Office of Technology Assessment, 1985). Likewise the shift from agriculture and manufacturing to service industries continued, reaching approximately 63% of the workforce in service in 1980, up from 57% in 1960 (Hodson & Sullivan, 2008).

With the availability of computing systems and white-collar jobs, previous trends of migration from rural to urban reversed during the 1970s; net migration increased 7.4% to nonmetropolitan areas (Johnson, 2003). Of particular note was the growth of populations in polycentric urban centers, suburban areas, and a totally new pattern of high growth in rural counties not adjacent to metropolitan areas. Improvements in transportation networks and growth in incomes, coupled with changing household location decisions, seemed to contribute to this trend (2003). Rural areas seemed to provide better locations for childrearing, amenities, recreational opportunities, and safety (2003). Technological improvements in television entertainment and the introduction of the VCR also contributed to the move away from cities as earlier perceived advantages of urban areas for entertainment dissipated with the advent of these new, home-based services and products (Easterlin, 2000).

The U.S. population increased from 203.2 million in 1970 to 226.5 million in 1980. Immigration contributed somewhat but would contribute even more in the 1980s and beyond. Birth rates were beginning to decline, but decreased morbidity rates through increased health care contributed greatly to the increase in population.

The U.S. economy in the 1970s experienced meaningful and permanent structural changes, fundamentally altering the economic structure. Business strategies and worker skill requirements were more clearly defined. Business and political leadership were challenged to address the colossal changes affecting all aspects of the business and worker environment, and some might argue leadership at all levels was wanting. Many of the forces having positive and negative impacts on the U.S. both had not fully manifested themselves in ways that allowed leaders to recognize what lay ahead and what actions

should be taken next. Despite the uncertainty of what would happen next, the need for continued federal intervention in human capital development to help the U.S. remain competitive was clear. Political leadership, both in the executive and legislative branches, helped federal investments in education and training remain a priority.

Worker Skills, Training, and Policy Response

Within the backdrop of a distressed economy during the early 1970s, Presidents Nixon and Carter faced many staggering challenges. President Nixon was able to enact two pieces of legislation designed to further the human capital development of U.S. citizens. The first law was the 1972 Amendment to Higher Education Act of 1965. This legislation expanded student assistance programs to include students at proprietary institutions. The 1972 amendment also introduced Pell grants to provide direct assistance to students who met certain qualifying criteria. Pell grants were designed to help economically challenged students receive financial aid in place of, or in addition to, student loans. The second piece of legislation, the Comprehensive Employment and Training Act (CETA) of 1973 focused on human capital development.

The Comprehensive Employment and Training Act of 1973 represents a significant shift in intergovernmental responsibilities. The first legislation to incorporate the essential principles of special revenue sharing, this bill represents an important companion piece to the general revenue sharing legislation I signed last year. It also marks the culmination of almost 5 years of manpower reform efforts which began with my proposal for a new Manpower Training Act of 1969. (Nixon, 1973, para. 3)

“CETA [was] to provide training, employment, and other services to economically disadvantaged, unemployed, underemployed persons, leading to self-sufficient, unsubsidized employment” (U.S. Department of Labor, 1975, p. 1). The act was different from its predecessor, the MDTA, in that the MDTA targeted experienced workers affected by structural unemployment and CETA was focused on the economically disadvantaged and long-term unemployed. Much of what was implemented and learned during the previous era through the MDTA, EOA, and WIN was rolled together into CETA, decentralizing, decategorizing, and consolidating many of the existing manpower programs (U.S. Department of Labor, 1975). CETA programming was varied. CETA offered classroom training, OJT, work experience, transitional public service employment, and manpower supportive services including counseling, coaching, child care, and transportation.

President Nixon like his predecessors recognized the importance of human capital development whatever the form, whether supporting higher education or occupational training:

The federal manpower program is a vital part of our national effort to conserve and develop our human resources and to help individuals adjust productively to changing economic conditions—including whatever temporary dislocations may ensue from the current energy shortage. (Nixon, 1973, para. 4)

The continued focus of business and political leaders on the need for federal intervention to support workforce development, postsecondary education, and human capital development stemmed from the enormous economic challenges brought about by fundamental structural changes in the economy due to growing international competition

and the revolutionary technological advancements of the day (Hudson & Sullivan, 2008). Some experts, researchers, and leaders began to signal that the United States was becoming a “post-industrial” (Hodson & Sullivan, 2008, p. 186) society, implying that the U.S. economy was no longer based simply on industrial outputs, but rather, on the rapidly expanding service economy fueled by knowledge and information. More accurately however, the U.S. economy during the 1970s was transitioning to an “advanced industrial society” where “a small but highly productive extractive sector, a larger and also highly productive manufacturing sector, [is coupled with] a growing labor-intensive service sector” (Hodson & Sullivan, 2008, p. 240). The rise of the service sector in the U.S. economy is clear, present, and enduring. In 1950, approximately 52% of the U.S. labor force was employed in the service sector. By 1980, that number had risen to about 67% and, by 2000, just under 80% (Hudson & Sullivan, 2008).

Service jobs are defined as acts provided in return for payment, as opposed to the production of goods from agriculture or manufacturing (Hodson & Sullivan, 2008). Services traditionally have three characteristics: They are bound by time and place, and the patterns of consumption by consumers often define when and where a service is rendered; they typically have low productivity in comparison to manufacturing; and there may have an insatiable demand, that is, customers can generally consume more services or more expensive services than they can produce goods (Hodson & Sullivan, 2008). The rise of service industries often comes from the introduction of newly manufactured products, shifts of unpaid production to paid production of services, and increases of disposable incomes of consumers (Hodson & Sullivan, 2008).

There are six general types of service industries: professional, business, producer, distributive, social, and personal (Hodson & Sullivan, 2008). Each type of service includes various levels and numbers of professional, semiprofessional, management, administrative, and clerical roles. Each role shares many common worker skills and personal attributes and each requires specific skills ranging from the highly specialized, such as doctors, to the unskilled, such as laborers (Hodson & Sullivan, 2008).

Working conditions and compensation throughout service industries vary greatly (Hodson & Sullivan, 2008). High-paying industries include transportation, communication, public utilities, wholesale trade, finance, insurance, real estate, professional and related services, and public administration. Low-paying industries include retail trade, repair services, personal services, entertainment, and recreational services. A variety of factors affect compensation variations in service industries but those that result in higher productivity for customers tend to demand higher pay (Hodson & Sullivan, 2008).

The evolution of high technology has an impact on service industries in various ways. Technology can drive demand for new services and, in the case of new technology being introduced, service industries can demand high prices for the higher skills and knowledge required for information transfer, providing workers with higher wages and benefits. On the other hand, new technologies can automate transactions, commoditizing a service, thus reducing worker skill requirements, and depressing wages (Hodson & Sullivan, 2008). The 1970s signaled a transition point between the old and new economies from an industrial society towards an emerging advanced industrial society. International competitive forces, coupled with burgeoning electronics technologies of

computers, networking and programming, created new demands on federal, state, and local institutions and resources to assist business and workers with accommodating the new economic realities. One of the main institutions that assisted with this transition was America's community college system.

Junior/Community Colleges

The 1970s represented a coming of age for community colleges. As international competition and technology fundamentally altered the composition of the U.S economy, business and industry strategies, and even the nature of work, many U.S. citizens recognized that postsecondary education and the acquisition of higher order skills were a requirement to be competitive, find jobs, and capture the American dream of higher prosperity. As a result, citizens and workers of all types, young and old, rich and poor, Black and White, turned to postsecondary institutions for assistance. The U.S. community college system found itself, finally, in the forefront to help meet these increased demands (Brint & Karabel, 1989).

As enrollments in colleges across the nation continued to rise, the number of postsecondary institutions increased, and the types of programming offered by these institutions adjusted to the increased demands for the training of new knowledge and skills reflective of the advancing technological economy. The biggest story of the decade was the increase in federal funding to support changes in the patterns of student use of college programming. These pattern changes finally began to reflect the vision long held by leaders of America's college systems. Integration of the community college as a vital component of the U.S. educational system, as a shock absorber, conduit, and buffer between secondary schools and institutions of higher learning, was finally being fulfilled.

By 1980, more than 41% of all undergraduates were enrolled in a community college, up from 24% in 1970. By 1978, the volume of all college freshmen enrolled in two-year colleges exceeded 50%, up from 40% in 1968 (Brint & Karabel, 1989).

Funding of community colleges expanded but the composition of contributions to the funds shifted (Cohen & Brawer, 2008). State funding continued to be strong, increasing from 34% in 1965 to 60% by 1980. Federal funding likewise increased from 4% in 1965 to 8% in 1975, representing the highest level in history (Cohen & Brawer, 2008). Amendments to the Higher Education Act contributed \$707 million in 1972 and \$981 million in 1974, with each contribution to be distributed over three years (Brint & Karabel, 1989). Local funding for community colleges, however, dropped to 24% from a high of 44% in 1959. This drop was attributed to financial stress at the local level due to the weak economy. Tuition contribution grew from 11% in 1959 to approximately 15% by 1980 and reflected the increased use of student loans and Pell grants as financial resources (Cohen & Brawer, 2008).

The number of postsecondary two-year and four-year institutions continued to increase as federal, state, and local investments materialized (Snyder, 1993). Between 1970 and 1980, the number of postsecondary institutions increased from 2,525 to 3,152. Four-year institutions grew from 1,639 to 1,957. Two-year colleges increased from 886 to 1,195, a 35% increase (Snyder, 1993). While the aggregate number of institutions increased, the rate of growth slowed. The reduction in growth rate of two-year colleges reflected two realities. First, federal and state funding was tight during the recession in the mid-1970s. Second, research in the 1970s indicated that the relationship between a state's population density and the number of community colleges probably had a

maximum (M. J. Cohen, as cited in Cohen & Brawer, 2008). M. J. Cohen (as cited in Cohen & Brawer, 2008) observed that community colleges tended to be built where 90-95% of a state's population lived within approximately 25 miles of a campus. Based on this observation, M. J. Cohen postulated that there should be approximately 1,074 community colleges to effectively serve the nation. This research proved to be accurate, and by 2001, there were 1,076 community colleges operating within the United States (Cohen & Brawer, 2008).

As the numbers of colleges increased, the aggregate enrollments for postsecondary education continued to rise as well. Total enrollment in postsecondary education increased from 8.5 million in 1970 to 12 million in 1980 (Synder, 1993). Most interestingly, by 1979, enrollments by female students (5,877,000) exceeded male students (5,863,000) for the first time in history (Snyder, 1993). Additionally, community college enrollments grew, but at only half the rate experienced in the 1960s. Enrollment increased by approximately 95% during the 1970s, compared to the 203% increase over the period from 1950 to 1970 (Snyder, 1993).

With community colleges enjoying increased attendance, colleges also celebrated shifts in programming use by students. Vocational enrollments increased significantly (Cohen & Brawer, 2008). Associate of arts degrees conferred in occupational fields rose from 43% in 1970-71 to 63% in 1979-80 (Cohen & Brawer, 2008). Overall, between 1970 and 1977, the proportion of full- and part-time students enrolled in occupational programs rose from less than one third to over half (Brint & Karabel, 1989).

One reason for the increase in associate of arts degrees was that technological advancements throughout the economy were shifting and changing existing work-skill

requirements (Brint & Karabel, 1989). Another reason was the introduction of new industry sectors accompanied by evolving occupations with drastically changing skill requirements. Two-year colleges responded by offering expansive curriculums and course work better reflecting the changing market demands for work skills, knowledge, and information (1989).

Another reason attributed to the increased occupational program attendance was the growing perception that the return on investment for bachelor's degrees was decreasing (Brint & Karabel, 1989). This perception was a matter of supply and demand. In the early 1970s, the weak economy decreased demand for those with college degrees in both the private and public sectors. Also, students who had enrolled in four-year colleges in the late 1960s began to graduate and enter the job market during the economic downturn. The net result was that many new college graduates were forced into positions not aligned with their degrees. In 1972, approximately 30% of men and 25% of women who graduated with a four-year degree took nonprofessional and nonmanagerial jobs (Brint & Karabel, 1989). Media coverage exacerbated the situation that "good" professional jobs were unavailable and, by the mid 1970s, many students graduating from high school turned to vocational and occupational education as an alternative to the expense of a four-year degree (Brint & Karabel).

Another reason given for the increase in interest in occupational programming was a new marketing strategy introduced by community colleges during the 1970s. The use of the term "career education" (Brint & Karabel, 1989, p. 110) came into vogue. The trends in educational circles and at two-year colleges signified a subtle shift in the way vocational education was marketed to students. "The term vocational education carried

with its connotations of dead-end jobs, then career education suggested orderly, upward movement” (Brint & Karabel, 1989, p. 111).

Increased enrollments in occupational programming not only reflected the economic realities for traditional students, but also indicated demographic shifts as other nontraditional students began to seek postsecondary education (Brint & Karabel, 1989). More minorities, low-ability students, women, older, part-time, and disadvantaged students turned to postsecondary education in community colleges as a way to achieve their piece of the American dream. Increased attendance by nontraditional students reflected improved marketing and new outreach strategies such as expansion of satellite campuses and the offering of weekend and evening classes. Better access was coupled with higher availability of federal student aid and funding sources, enabling more students to afford tuition and fees. Loan and grant funding rose from \$120 million in 1974 to almost \$450 million in 1978 (Brint & Karabel, 1989).

Accompanying the changes in student demographics were important administrative, structural, and programming adaptations that community colleges implemented to better accommodate these new types of students. Demand for liberal arts classes decreased as more part-time students dropped in and out at their convenience, taking courses more out of interest than within a planned program. Colleges were forced to become more flexible through innovative course scheduling and personnel management. Many of the new students, too, presented with decreased academic achievement and required remedial courses. Developmental education departments at community colleges sprang up and expanded to meet the demands where, increasingly,

more students were enrolled in basic reading and writing than were enrolled in traditional liberal arts classes (Brint & Karabel, 1989).

Community colleges also broadened their roles into community development activities as the economic challenges of the 1970s, stressed state budgets, and state and local political leaders increased their focus on the economic development strategy of industry recruitment to boost sagging state tax revenues. Competition between regions, cities, towns, and localities throughout the U.S. became fierce and the use of recruitment packages to entice industries to build or relocate became increasingly popular. Workforce training through community colleges began to be included in these packages and college leaders responded accordingly. Community college leaders arrange programs designed to effectively play their role in the recruitment strategy (Brint & Karabel, 1989).

The increased activities of two-year colleges within and throughout communities led to another linguistic change during the 1970s. That change was the near-universal acceptance and adoption of the term community college recommended nearly 25 years earlier by the Truman Commission (President's Commission on Higher Education, 1947). This new terminology more fully reflected and better conveyed the comprehensive nature and distinct service area within which community colleges operated. The use of term community college eliminated the old reference to junior college and its inference as a subordinate position to four-year colleges, improving its perception of and marketability to the citizens and students of its service area (Brint & Karabel, 1989).

During the 1970s, America's community college system found its role in postsecondary education. Community colleges had secured access to relatively reliable markets and funding streams. Community colleges solidified their reputation within the

minds of its customers as open and accessible institutions capable of delivering quality and relevant education and training. The community college system provided a pathway, for those willing to invest themselves, to achieve the American dream.

1981-2000: Deregulation, Reaganomics, and the Flattening of the World

Introduction

The two decades immediately preceding the close of the 20th century involved nearly incomprehensible economic, technological and geopolitical changes, and evolution on all fronts. In the United States, three presidents oversaw these remarkable changes: Ronald Reagan, George Herbert Walker Bush, and William Clinton. Internationally, geopolitical tensions rose in the 1980s, when President Reagan confronted the Soviet Union head-on, ending the détente of the 1970s. Eventually, this conflict between the superpowers ended in the peaceful demise of the Soviet empire, signaled by the felling of the Berlin Wall November 9, 1989, during the early months of President Bush's term. Within a year, however, President Bush would lead an international coalition into the Persian Gulf War, which began on August 2, 1990, and would last through February 28, 1991.

Economy, Technology, and Demographics

President Reagan entered office on January 20, 1981, amidst some of the worst economic conditions the United States had experienced since the Great Depression. Two major forces contributed to two recessions that struck the U.S. economy in short order, a condition popularly called a double dip recession (BLS, 2010). The Federal Reserve had implemented strict monetary supply policies in the late 1970s that were followed by the

Iranian revolution in 1979. The revolution led to large increases in the price of oil and produced the energy crises of the early 1980s. Constrictive monetary policies tamed inflation, which began to decline from a peak of 13.52% in 1980 to between 3% and 4% percent after 1983, lasting through the end of the decade (Williamson and Johnston, 2010). Correspondingly, due to tight money supplies resulting from actions by the Federal Reserve, businesses curtailed expansion. Unemployment rose rapidly from 7.1% in 1980 to a peak of 9.7% in 1982 and would remain above 7.0% through 1986 before reaching a low of 5.3% in 1989 (U.S. Bureau of Labor and Statics, 2010; Williamson & Johnston, 2010).

Political leaders turned to revamping the tax code to broaden the tax base, which they hoped would increase tax revenues overall, while protecting the wealth of U.S. citizens. In 1986, the administration signed into law in the Tax Reform Act, which proved to be a major shift in federal tax priorities, and demonstrated unprecedented interest-group pluralism (Brownlee, 2000). The act reflected three main objectives. First, as Brownlee (2000) explained, “it was more interested in improving economic incentives for enterprise capitalism than in protecting corporate bureaucracies or the real-estate industry. Corporations received major tax increases in 1986, and the real-estate industry was a major loser” (Brownlee, 2000, p. 1057). Second, the act had to have bipartisan approval and support, which successfully coalesced behind the leadership of senators Daniel Moynihan (Democrat) and Bill Bradley (Republican). Third, because of the new economic environment, monetary policies, and administrative priorities, “every reduction in tax rate or increase in tax preference had to be paid for through a reduction in tax preference elsewhere in the tax code” (Brownlee, 2000, p. 1058). The act managed to

both broaden the income base and create a more uniform, “equitable” (p. 1058) system, which sacrificed progressive rate structures.

There were major winners and losers in the wake of the Tax Reform Act of 1986. It removed tax expenditures favoring the middle class and eliminated investment tax credits for corporations, but provided worthwhile benefits for lower- and upper-income tax payers. It reduced the rates for top brackets, but cut special deductions and credits, “eliminating tax-based privilege and reaffirming the duties of citizenship” (Brownlee, 2000, p. 1085). The act also “preserved progressivity and ‘ability to pay’ while promoting efficiency and uniformity” (Brownlee, 2000, p. 1085). In the long run, political leaders hoped the expected increase in tax revenues, coupled with the “peace dividends” of the collapse of the Soviet Union and the end of the Cold War would reduce deficits and provide for increased investment in national infrastructures (Brownlee, 2000).

Laissez-faire economics championed by the Reagan administration were exemplified by the adoption a philosophy held by University of Chicago economists (Behr, 2009; Vietor, 2000). Prevailing beliefs among these economists was that market outcomes were preferable to government controls and that regulatory priority should be focused on protecting competition, instead of competitors, thereby putting consumers’ interests first. Capitalizing on American sentiments of the late 1970s, political representatives increasingly were willing to allow businesses a wider birth and allow market discipline and competition regulate business practices (Behr, 2009; Vietor, 2000).

Under the Reagan Administration, even more ambitious attacks on regulation spread to include environmental protection, nuclear power, consumer product safety, occupational health and safety, agriculture, broadcasting, cable television, and financial

services. In the first couple of years of the Reagan administration, regulatory expenditures decreased by 3% and the number of regulatory personnel dropped from 119,000 to 101,000. Sharp reductions in enforcement budgets were forced upon the EPA and OSHA. Despite its best efforts, the administration failed to enact a strategic plan to overhaul federal regulatory policies and momentum was lost. By 1983, amid continued macroeconomic challenges and dwindling legislative influence in Congress:

...intellectual and policy focus of regulatory reform had drifted away from the removal of government controls and toward the development of market-oriented administrative controls that would encourage limited forms of rivalry or emulate competitive markets with new and elaborate regulatory mechanisms. (Victor, 2000, p. 1010)

“Regulated competition” (Victor, 2000, p. 984) backfilled the drastic deregulation approaches originally intended by the administration and was designed with more market-sensitive instruments. The result of this competition was an increase in market efficiency because it exposed industry to competition and business cycles with no protection on the downside (Victor, 2000). This lack of protection was the fundamental asymmetry of regulated competition. Antitrust and regulatory changes introduced increased market discipline and resulted in consolidation and, in some cases, business failures. For those businesses that survived, work force reductions were necessary to allow for adoption of technological innovations in response to domestic and international competition. Generally, sector efficiencies resulted, increasing competitiveness (Galambos, 2000).

Throughout the 1980s and well into the 1990s, enterprises sought to increase competitiveness through various means (Galambos, 2000). Increased focus on core competencies propelled some corporations to spin off divisions and departments that did not enhance the organization's competitive advantage. Acquisitions and mergers accelerated for firms scaling up to meet new domestic and global competition. Decentralization, facilitated by expanding technological innovations like computers, the Internet, and the World Wide Web, eliminated redundancies, hierarchy, and flattened organizational structures. Plants were closed and relocated closer to customers, cheaper labor, or critical supply chains. These changes to existing businesses were balanced by the launch of new businesses at record rates (Galambos, 2000). Capital flowed to high technological enterprises that were commercializing new products and services with dizzying pace. The American economy was churning in unprecedented ways and directions.

Although U.S. corporations had always been active and expansive in international trade and competition, the nature of this competition began to change fairly incrementally during the 1980s. The status quo exploded during the 1990s. This new force was called off-shore outsourcing (Galambos, 2000).

Through much of the 20th century, U.S. policy makers refrained from protectionist tariffs and championed international open-trade policies (Galambos, 2000). The United States was the founding police chief of the General Agreement on Tariffs and Trade, initially signed in 1947, which sought to reduce tariffs and other trade barriers between countries, emphasizing reciprocity and mutually advantageous benefits. Because the U.S. was the de facto leader of free and fair trade, policy makers tended to not to be

overly active in erecting barriers or pick sector favorites. Instead, as Lindert (2000) remarked, “the government of the U.S. has always been defensive and reactive, intervening only to prevent imports, seldom to promote exports, and almost never with planned industrial ‘targeting’” (p. 449). Liberalized U.S. policy through omission enabled two powerful forces—off-shoring and outsourcing—by U.S. corporations to become business strategies that helped businesses be competitive. These same policies caused substantial disruption in many sectors of the U.S. economy and workforce.

Off-shoring is the movement of plants and facilities from the United States to a foreign country (Galambos, 2000). The off-shoring firm would operate largely as it did when it was located in the United States, producing the same product(s). The difference was that this plant enjoyed cheaper labor, lower taxes, subsidized energy, and lower health-care costs (Galambos, 2000).

Outsourcing is the movement of a specific business function such as accounts receivable, accounts payable, or call centers to an outside firm. That outside firm is paid to perform the exact same function, but at a lower price, and ideally at equal or higher quality (Lindert, 2000). Much of the outsourcing during the 1990s was performed by companies in India, where large numbers of highly educated, English-speaking engineers and business managers lived. These workers were capable and willing to do the outsourcing work, at low price points compared to costs in the United States.

Liberalized “free” and “fair”¹⁰ trade policies resulted in off-shoring activities starting in the 1970s (Hodson & Sullivan, 2008). Off-shoring picked up its pace in the

¹⁰ “Free trade is defined as trade unrestricted by tariffs and other regulations. Fair trade brings worker rights, workforce safety, and environmental regulations into trade negotiation” (Hodson & Sullivan, 2008, p. 391).

1980s before truly manifesting itself broadly upon the U.S. economy during the 1990s. Outsourcing began in the late 1980s and picked up pace during the 1990s, eventually exploding at the turn of the 21st Century (Hodson & Sullivan, 2008). Predicated on the evolution of economic development in nations along a continuum from dependency¹¹ to world systems¹² theories, the movement and flow of capital, goods, and people resulting from the comparative advantages of nations encouraged globalization on a scale never before seen or experienced in world history (Hodson & Sullivan, 2008). Off-shoring and outsourcing, enabled by technological innovations, allowed corporations to respond to international competition by shifting capital and relocating work globally.

During the 1980s and 1990s, the effects of outsourcing and off-shoring were extreme for manufacturers, particularly in the textile, apparel, furniture, consumer electronics, and electronics semiconductors industries (Hodson & Sullivan, 2008). Corporations in these industries searched for cheaper labor, as well as other competitive advantages elsewhere outside of the United States. As a result of outsourcing and off-shoring, companies shut down and relocated plants with an increased pace to countries such as Mexico, China, Brazil, and Taiwan (Hodson & Sullivan, 2008).

By the late 1980s, the U.S. economy began to recover and, by the end of the decade, produced some strong economic performance data that indicated the nation was on a road to recovery from stagflation of the 1970s. Between 1980 and 1981, real GDP

¹¹ “Dependency is the unequal power relationships between industrialize and less industrialized countries, where the less-industrially developed nations are dependent on the more advanced nations” (Hodson & Sullivan, 2008, p. 383).

¹² “World system theory states that relationship between core and peripheral nations is largely affected by the on-going and constant changes of trade relationships, leading to an integrated economic system” (Hodson & Sullivan, 2008, p. 384).

increased 31.7% and real GDP/capita increased 22.5%. Inflation dropped substantially and averaged only 3.95% (Williamson & Johnston, 2010). These improved economic conditions, revamped tax codes, and reduced federal regulations contributed to the explosion of technological innovation during the final two decades of the 20th Century. Industries associated with the three GPTs of internal combustion engines, chemicals, and electrical/electronics each experienced reversals of fortune from the previous decades.

After the near demise of Chrysler Corporation in 1978, saved only through federal government intervention, the Japanese invasion in the American auto market peaked in 1980-1982. Market penetration of Japanese firms was confirmed when they captured 22% of the U.S. market, attributed primarily to offering products at lower prices and higher quality than U.S. automakers. By 1989, U.S. auto manufacturers closed the price gap to within \$500-\$600 of Japanese manufacturers and lowered rates of defects per car to within about .3 to -.6, compared to Japanese products (Lindert, 2000). Beginning in the 1980s and lasting through the 1990s, U.S. firms improved productivity, materials sourcing, and quality systems as they returned to and adopted the best practices first introduced to U.S. firms during World War II that the Japanese had perfected during the 1950s-1970s (Lindert, 2000).

Key trends that led to the successful turnaround for U.S. auto manufacturers were restructuring (closing and consolidation of plants), changes in leadership, management, and new labor pay systems (Lindert, 2000). As U.S. firms recovered, Japanese companies initiated another strategy of first building branch plants, and later even entered into partnerships with U.S. auto companies to produce their products domestically. Despite the economic and employment turmoil, U.S. net employment in the sector remained

constant as the closing and consolidation of U.S. firms were offset by the opening of the new Japanese plants (Lindert, 2000).

The U.S. aircraft industry also experienced consolidation during the 1980s as Boeing and the Douglas Aircraft division of McDonnell Douglas became the sole airframe manufacturers, and Pratt and Whitney and General Electric survived as the only engine manufacturers (Mowery & Rosenberg, 2000). This industry was the closest to a monopoly that U.S. regulators allowed throughout the 20th century (Lindert, 2000). Several factors saved them from regulatory actions. Mowery and Rosenberg also point out that barriers to entry such as immense lead times and highly sophisticated design and manufacturing techniques effectively prevented new firms from entering the field and competing for contracts. These companies also contributed greatly to the economic strength of the United States, most notably in their impact on balance of international trade and their substantial contribution to domestic employment (Mowery & Rosenberg, 2000). Finally, tight integration with the Department of Defense that delivered contracts for sophisticated military aircraft to these manufacturers was a key component to President Reagan's strategic military build-up during the 1980s, and connection that ensured the industry would avoid antitrust action (Mowery and Rosenberg, 2000).

The GPT industry in the chemicals sector that demonstrated the most growth and achievements during the postwar era, particularly during the 1980s, was pharmaceuticals. As Mowery and Rosenberg (2000) explained, "During the postwar period the U.S. became and has remained the largest source of new pharmaceutical products as well as the largest market for such products" (p. 862). Immediately after the war, federal support for biomedical research grew approximately 18% per year between 1950 and 1965.

Afterward, this growth declined up to the 1980s. Through the 1980s, national and federal expenditures for health R&D exploded, from approximately \$6 billion in 1980 to more than \$11 billion in 1988 (Mowery & Rosenberg, 2000).

Two major discoveries that contributed greatly to pharmaceuticals were the identification of DNA in 1953 and a technique for gene splicing in 1973 (Mowery & Rosenberg, 2000). Subsequent to these discoveries, the nature of pharmaceutical research migrated from the science of chemistry to that of biology. Biotechnology, centering on the revolution in molecular biology, has benefited from huge federal expenditures on R&D. President Nixon's "war on cancer" is one example (Mowery & Rosenberg, 2000, p. 864). Annual federal spending on biotechnological R&D is estimated to have been approximately \$500 million during the 1980s, increasing to more than \$3 billion by 1990 (Mowery & Rosenberg, 2000).

A remarkable feature of the American biotechnology industry in the commercialization of new products has been the integrated relationship between large, established firms and small, start-up enterprises (Mowery & Rosenberg, 2000). The established firms have developed expertise in the organization and management of clinical trials, federal regulation, and marketing capabilities. Start-ups bring innovation to the equation and skill in linking R&D to marketable products worthy of commercialization. This collaborative effort has introduced a new paradigm in industrial structure, firm organization, and specialization (Mowery & Rosenberg, 2000).

The electronics GPT during the 1980s enjoyed exceptional growth both in innovation and productivity, which led to a second major technological paradigm shift—that of open-networked organizations (Mowery & Rosenberg, 2000). This new

performance method by which businesses and individuals performed their work had modest beginnings but eventually evolved along a continuum as new technologies emerged, fundamentally changing not only business activities, but also entire economies. The introduction of the first personal computers in the late 1970s and the early 1980s enabled the computing power to move out of the centralized departments of large firms and directly into the hands of the end user. Every company or organization of any size could have access to the power of a computer. In 1981, IBM offered the first widely available commercial personal computer, featuring the new Microsoft MSDOS operating system. Subsequent to this product's introduction, market acceptance of personal computers exploded. The result was a plethora of new products by numerous enterprises in all three sectors: computers, semiconductors, and software programs (Mowery and Rosenberg, 2000).

In 1982, Commodore introduced the Commodore 64 (C64). The C64 contained several new features that distinguished it from its peers, including impressive graphics capabilities. The C64's popularity also contributed to the release of thousands of software programs by numerous software development firms designed specifically for this platform. "By the time the C64 was discontinued in 1993, it had sold more than 22 million units and was recognized by the 2006 *Guinness Book of World Records* as the greatest selling single computer model of all time" (Computer History Museum, n.d., para. 68). In 1983, Compaq Computer Corporation successfully reverse-engineered the IBM computer and recorded first-year sales of \$111 million, the highest sales ever by an American business in a single year. Additionally, this new product propelled IBM-compatible computers toward market domination so that, by 1996, the IBM platform

achieved an 83% share of the personal computer market and became the industry standard (Computer History Museum, n.d.).

In 1984, Apple introduced the Macintosh, which featured the first mouse-based personal computer coupled with a graphic user interface and driven by a different operating system than those used by IBM and IBM-compatible systems (Computer History Museum, n.d.). The Mac, as it came to be known, also boasted new proprietary applications such as MacPaint and MacWrite, which introduced to the market for the first time, “what you see is what you get” (Computer History Museum, n.d., para. 74) word processing. While this platform outshined all other personal computer systems with a new and innovative user-friendly interface system, coupled with highly interactive programs, the Macintosh failed to achieve the same market acceptance and penetration that the IBM systems enjoyed.

The proliferation of new computer products caused intense competition in the semiconductor, computer, and computer programming industries (Mowery & Rosenberg, 2000). Competition drove down prices for components and systems, making personal computers more affordable. Consequently, throughout the 1980s, personal computer use as a workstation grew exponentially both at home and at work. Computer use by executives, managers, clerks and, as time went on, nearly all employees in businesses became the primary business tool and a staple on nearly every desk. Computers allowed workers to interact with the new technology for a host of purposes, greatly expanding worker and business productivity (Mowery & Rosenberg, 2000). However, the real power of computing was limited because computers were still essentially isolated,

preventing new technologies from interacting with other new technologies in the same way people actually work most effectively—through communication (Craigier, 1997).

By the mid 1980s, this limitation began to dissolve. With the help of companies like 3Com, market adaptation of new networking technologies allowed computers to be linked together and networked through the use of Ethernet, powered by centralized servers, into LANs and wide-area networks (Computer History Museum, n.d.). With these new networks, computer technologies such as programs, printers, and other peripherals could be shared within enterprises, reducing costs and encouraging proliferation. Early adopters further spread these technologies horizontally and vertically throughout their organizations, greatly expanding the effectiveness of business as ideas, information, and knowledge were more easily shared and distributed. Redundancy, duplicity, and a host of other inefficiencies were eliminated, increasing the effectiveness of business transactions and personal work (Craigier, 1997). As time progressed, the cost of doing business continued to drop and worker productivity increased, which further propelled acceptance of the technologies and their ubiquitous use deeper into organizations and wider throughout numerous industry sectors.

Where computing was once limited to simply controlling costs of physical, financial, and human resources, it now could be integrated into global control of accounting, payroll, marketing, production, scheduling, management, and personnel systems. In effect, the isolated business units and their practices of previous generations were transformed into single enterprises (Craigier, 1997). Even with these advances, the true power of networking had yet to be realized until the introduction of hypertext documentation systems in 1980, followed by the development of Web browsers in the

1990s. These technologies increased the ability for individuals or organizations to upload and search for information and data worldwide on the Internet (Craig, 1997).

Throughout much of the 1980s, a young software consultant and programmer named Tim Berners-Lee worked at the European Particle Physics Laboratory (CERN), where he experimented with how to track the documents of thousands of researchers, hundreds of computers, and thousands of software applications and operating systems from a single workstation (Napier et al., 2003). Eventually, Berners-Lee discovered how to link text and other objects from multiple computers to a single computer so that information stored on all the workstations could be shared with anyone, anywhere, at any time. By 1991, his new innovation was introduced to the world as the World Wide Web (www). Closely following on the heels of the www, CERN released critical web server software that retained web pages on servers and allowed visitors to access them (Napier et al., 2003).

One of the key developments of the Internet was the expansion of telecommunications infrastructure, including high-speed Internet access, which took off during the 1990s (Computer History Museum, n.d.). The huge potential economic upside to investments in electronic commerce encouraged large amounts of investment capital to flood the market, which propelled network service providers such as WorldCom, Exodus Communications, Global Crossing Holdings, AT&T, and several other companies to expand operations in a rush to build national and international communications networks (Craig, 1997). These networks included the laying of vast quantities of fiber optic cable necessary to handle the anticipated huge volumes of electronic data soon to be handled by the networks.

The final component that made the Internet and www powerful and user-friendly was the development of web browsers and search engines. Berners-Lee made the first web browser, but it took Marc Andreessen and Netscape to create the first commercial browser in 1994 (Computer History Museum, n.d.). By 1995, David Filo and Jerry Yang launched Yahoo, and in 1998, Sergey Brin and Larry Page launched Google (Computer History Museum, n.d.).

The combination of the Ethernet, Internet, www, graphical web browsers, and the proliferation of fiber optic cable developed worldwide capacities for the next generation of organizational and worker collaboration into globally cooperative, multidisciplinary work teams (Craiger, 1997). The power of globalized networking opened the door to the open-networked organization (Craiger, 1997). Open-networked organizations and enterprises of all kinds evolved from the expanding telecommunications infrastructures, communicating more efficiently and effectively with suppliers, customers, affinity organizations, and even competitors. By the 1990s, this power was unleashed into full commercialized form, catapulting electronic commerce e-business strategies into play, a move that fundamentally altered the international economic, political, and social environments. Pulitzer Prize-winning author Thomas Friedman declared in his book *The World is Flat* that the technological revolution of the 1980s and 1990s “will be seen in time as one of those fundamental shifts or inflection points, like Gutenberg’s invention of the printing press, the rise of the nation-state, or the Industrial Revolution” (p. 48); these changes caused the world to change “in profound and unsettling ways” (p. 48).

The cell phone industry followed the same pattern of technological innovation in the United States during the 20th century as most other technologies had done before it

(Mowery & Rosenberg, 2000). Successful technological innovations in one sector were often limited by technological restrictions in another sector. Elimination of technological bottlenecks often required incremental developments within and between independent sectors. Eventually, enough barriers were identified and removed that commercialization began before the delivery of a comprehensive system was realized. Such was the case for the cellular industry (Mowery & Rosenberg, 2000).

Despite the realization of switching technology, full system deployment of cellular systems remained blocked for nearly 10 years by federal regulatory requirements. In 1971, AT&T Bell Labs submitted a request to the Federal Communications Commission for cellular service. Not until 1982 did the commission finally allocate the radio frequencies needed for cellular service to become an active system (Tech-FAQ.com, 2009).

Bell Labs was not the only enterprise experimenting with cellular phone technologies; its main competitor in the race to deliver portable communication was Motorola (Marples, 2008). Martin Cooper, a Motorola engineer, helped to design a practical portable device and made the first successful modern cell phone call in 1973 in New York City. His first call was to a friend who worked at Bell Labs. This first cell phone call represented a fundamental technology and communications market shift toward the person and away from the place (Marples, 2008). Full commercialization of the technology took ten years and, in 1983, Motorola unveiled to the world the first truly portable cellular phone called the Motorola DynaTAC 8000X (Tech-FAQ.com, 2009).

The net effect of the technological innovations and advancements of the 1980s and 1990s on the nature of work and workers' skills was profound. Modern research has

resulted in three competing theories about the impact of technology on the nature of work and worker skills. According to the first theory, advanced technology creates a wider gap between high- and low-skill jobs, or a “bi-modal” [*sic*] (Johnson, 1991, p. 7) distribution of the workforce. This theory recognizes that as new technologies are introduced, there is a demand for highly trained and educated workers to further develop, expand, and integrate these new technologies into the workplace. At the same time, the new technologies make processes more efficient, requiring fewer skills to actually operate the new systems. Bimodal distribution theorizes that the resulting workforce is approximately 80% semiskilled or unskilled workers and 20% highly skilled workers (Johnson, 1991).

According to the second theory, advanced technology creates jobs at both middle- and high-skill levels, particularly within high technology sectors. Data from several high technology sectors indicates that as technologies are introduced to systems and processes, more technicians and computer specialists are needed to run and maintain these systems (Johnson, 1991). The net effect is that technological innovations in high technology sectors increases the demand for higher skilled workers overall. The third theory is based on the opposite of the second theory; technology decreases the overall skill requirements of the workforce. This theory tends to acknowledge that while technology initially increases skill requirements, in the long run, skill requirements tend to decrease as systems and processes are simplified by the maturation of the technology implementation and equipment and processes increasingly become more “user friendly” (Johnson, 1991, p. 10).

While these three theories seem to contradict each other, the reality is that technology has resulted in the lessening of skills for some workers while increasing skill requirements for others. As Johnson (1991) concluded, “it appears as though the overall effect of technology on the skill requirements is small. On an individual basis, however, the effect of technology on skill requirements appears to be quite drastic” (p. 11).

Ultimately, the net effect of technology on individual workers and their ability to adapt to the rapidly changing employment environment is evident and profound. Workers of the late 20th century and early 21st century must have increasingly transferable, basic skills such as reading, writing, and computational abilities. Workers must also demonstrate higher order cognitive processing skills conducive to problem solving, decision making, and creativity (Johnson, 1991). These are skills that contribute to flexible behavior, collaboration, and communication, all requisites of open-network organizations. Finally, workers must demonstrate the willingness and ability to learn. Employees who demonstrate this ability also have the competence to acquire new skills as new technological advancements are made and implemented within an organization (Johnson, 1991).

The technological innovations of the 1980s and 1990s not only introduced many new products and services, altering forever the nature of work and worker skills, but also were part of other major forces that contributed profound changes to the U.S. economy. Among these changes were labor participation rates by gender, wage gaps by labor skills, and the quality of schooling to support labor skills. Migration patterns also changed during this time.

Labor participation rates for men declined through the 1980s, but the rates for women of all ages continued to climb, exceeding 50% (Goldin, 2000). The wage gap between skilled and unskilled workers increased substantially during this time, reaching levels not seen since before World War II. Workers' loss in relative economic position led political and institutional leaders, as well as researchers to question the quality of American schools, the ability of the advanced industrial society (Goldin, 2000) to absorb less skilled labor, and the roles of international trade and immigration policies. Theories postulated for the forces contributing to the increased gap were technology, international comparative advantage, variances in access to and quality of training and education for workers, and the decline in private-sector unions. Previous gains in wage differentials for African Americans between 1965 and 1975 were effectively reversed during the 1980s, even for those with college educations. On a positive note, the wage differential for women closed during this period, particularly for young, educated women (Goldin, 2000).

Migration trends of the 1970s from urban to rural reversed direction abruptly during the 1980s as citizens in rural areas moved to urban areas; populations in rural counties declined from 82% to 61% (Easterlin, 2000). This reversal was predicted to be an aberration in the coming decades. According to Easterlin (2000):

...the ongoing process of modern economic growth, through its continuing impact on technology and per capita income, and also via a more pronounced impact on leisure time, [had] gradually relaxed the pressures for geographic concentration (in urbanized areas)...Differences in the cost and market advantages of different locations lessened, although they did not disappear. In addition, the growth of

income, rise in leisure, and technological changes within the home began to loosen the ties that had bound consumer residence decision so tightly to place of work. As a result, consumer preferences and household (location) decision making began independently, to alter population location more noticeably. (p. 529)

One of the major contributors to the anticipated long-term trend (despite the reversal of the 1980s) of migration from urban to rural areas and the weakened bonds between residence and the workplace in the coming decades were technological innovations and the deployment of infrastructure, particularly in computers and telecommunications industries. As these sectors merged and improved services, many firms, particularly those in the service sector, began to permit workers to work from home. Consultants, salespersons, computer specialists, technical writers, and industrial artists, for example, who rely heavily on computers and the Internet to communicate with customers and do their work were able to work from home instead of having to be “co-located” with their home office (Easterlin, 2000, p. 534). Not only was the nature of work altered, but also the physical location where work took place was changed.

Net U.S. population growth continued its trend upward, growing by more than 22.2 million between 1970 and 1980 and 32.7 million between 1990 and 2000 (Hobbs & Stoops, 2002). Several factors contributed to this increase. Fertility rates dropped substantially after the mid 1960s, trending to what many referred to the “baby bust” (Hobbs & Stoops, 2002, p. 49), and reaching the lowest point of the 20th century by 1980. Life expectancy rates continued to increase but at a slower pace than in the previous 20 years.

The drop in fertility rates was based on several theoretical factors. First, the “relative income” (Easterlin, 2000, p. 509) theory, which postulated that after the 1960s, relative incomes began to decline and younger populations postponed marriage and childbearing, aspiring for higher material acquisition. Second, with the increased labor participation rates of women, the price-in-time theory postulated that the loss of wages during childbearing years caused women to delay or forgo pregnancy to remain in the labor force and earn wages. Finally, social attitudes of women, especially those better educated, career-oriented and financially independent, may have contributed to the decrease as they opted for a “freer” lifestyle (Easterlin, 2000, p. 508). The drop in fertility rates would eventually play a role in decreased attendance in postsecondary institutions during the 1980s and 1990s.

The rise in life expectancy rates, which expanded from the mid 1960s and through the 1980s, was the result of several factors. Public Medicare and Medicaid programs continued to open access and extend advanced treatments and medical services to poorer populations (Easterlin, 2000). The push for improvements in lifestyles triggered reductions in reduced cigarette smoking, better diets, and increases in exercise. Arguably the most important change was the impact of technological advancements in the detection, treatment, and control of communicable and infectious diseases, early diagnosis and treatment of cardiovascular and pulmonary disease, cancer, and degenerative diseases, which improved the effectiveness of health care (Easterlin, 2000).

Another force leading to increased population was immigration. Legal immigration during the 1980s doubled that of the 1950s and accounted for an estimated one third of the total increase, effectively offsetting the drop in childbearing by the

domestic population (Easterlin, 2000). President Bush signed the Immigration Act of 1990, which increased legal immigration to the United States by 40%. More than 700,000 new immigrants were admitted annually, up from 500,000 prior to the bill's passage. Illegal immigration, estimated at 200,000 per year, also added to the population (Easterlin, 2000).

Worker Skills, Training, and Policy Response

Arguments against federalism in workforce funding that had dominated political thinking during the first half of the 20th Century had been resolved by the 1980s. No longer was the question whether workforce funding would occur. Instead, the question was how it would be handled. Increasingly, from the introduction of the GI Bill in the 1940s to the ADA and MDTA of the 1960s, political and federal agency leaders wrestled to balance federal support of human capital development with adequate funding and programmatic management. Finding balance was a growing challenge.

Within the backdrop of a struggling economy, soaring federal deficits, and high unemployment rates, congress presented President Reagan with the Job Training Partnership Act (JTPA) in 1982, which replaced the CETA, as the new president's job creation program (Guttman, 1983). CETA had proven to be inefficient, plagued by a proliferation of programs, power struggles between funding "sponsors" (Guttman, 1983, p. 4), and unstable funding. Responding to state and local pressures, agency heads and political leaders introduced the Job Training Partnership Act. The act was designed to eliminate these problems through precedent setting, and new and improved partnerships between state and federal agencies, while maintaining the legacy of federally sponsored

workforce training and education introduced earlier by the MDTA and ADA (Guttman, 1983).

The design of the JTPA reflected lessons learned from CETA and political leaders' desire to demonstrate improved responsibility with taxpayers' money (Guttman, 1983). The act contained permanent authorization, which provided long-term stability, making programs more effective in the delivery of services to workers over the long run. The JTPA contained provisions for advanced funding, which also improved program delivery and increased overall efficiencies. Finally, the JTPA introduced a new focus on program performance standards, eliminating reliance on process requirements dictated by federal agencies, which made local program delivery more flexible and effective (Guttman, 1983). As one website noted:

...[the Job Training Partnership Act] provided block grants to the states for training and related services for economically disadvantaged people, especially those receiving cash assistance and food stamps. State and local governments administered these programs within federal guidelines. The aid was intended to increase the participants' future employment possibilities and earnings and to reduce their dependence on welfare. Services provided by this program included job training, help in finding work, counseling, and other assistance designed to prepare the participant for a job. (Welfare-to-Work Programs, n.d., para. 11)

Another major piece of legislation introduced during this decade, which demonstrated continued commitment to an interest in federal sponsorship of human capital development initiatives by political leaders, was the Montgomery GI Bill (H.R. 1085) by President Reagan in 1987 (Montgomery, 2010). This bill reflected genuine

maturity of thought about federal involvement in workforce training, particularly as it relates to servicemen and servicewomen. The bill also stands as a monument to the visionary leadership of G. V. “Sonny” Montgomery, Mississippi’s congressional representative from the third district. A 35-year veteran of the U.S. armed services himself, Representative Montgomery served as chairman for the Committee on Veterans Affairs, which gave him unique insight into the needs of servicemen and servicewomen in remaining competitive in a rapidly changing economic environment (Montgomery, 2010).

The primary motivating factor behind the Montgomery GI Bill was the fear of the unknown consequences that could result from the U.S. military movement toward an all-volunteer force after the draft ended in 1973. The fear was based on the concern that the military force structure might evolve into a hollow force, devoid of educated, motivated, high-performance men and women who were capable of operating technologically advanced equipment. Representative Montgomery believed that “our all-voluntary military concept would fail if we did not create a quality, post-military service educational scholarship as an incentive for our youth to serve, and to give them access to post-secondary education and training, as well” (Montgomery, 2010, p. 15).

Traditionally, federal funding for education and training of military servicemen and servicewomen had occurred only during or immediately after an armed conflict (Montgomery, 2010). World War I, World War II, the Korean Conflict, and Vietnam all had temporary funding bills for veteran training. In 1977, Congress introduced the Veteran’s Educational Assistance Program, which proved largely ineffective because veterans demurred from using it, for numerous reasons (2010). The Montgomery GI Bill

changed this pattern by introducing the new concept of permanent funding for education and training for those who served or were military veterans, during war or peacetime.

While the concept was revolutionary, the reasoning behind it proved to be sound. Senator Alan Cranston outlined this reasoning as follows:

The dividends our country has already reaped from past GI Bills [are] so vast as to be virtually incalculable. However, it is widely accepted that for every dollar spent in GI Bill benefits, the nation is returned \$3 to \$6 in increased revenues...

While there has been a major emphasis on building a 600-ship Navy, for developing and acquiring the very best and fastest plans for our Air force, and for purchasing the latest in high technology and weapons for our troops, we must not overlook the fact that we will always need to recruit the very best young men and women for positions of leadership and responsibility in our military in order to guarantee that America's defense of today and tomorrow will remain strong. A New GI Bill will help us maintain this strength to defend our shores as well as those of our allies throughout the free world...

Finally, the young people going to school under the New GI Bill will pay more in taxes over their lifetimes because more education will increase their income.

Veteran's Administration statistics show that in 1985, the median income for veterans with a high school diploma was \$19,720. For veterans who were college graduates, the median income jumped to \$35,800. This 83 percent increase in income associated with additional education results in significantly increased federal, state, and local income taxes flowing to government coffers.

(Montgomery, 2010, p. 142)

The Montgomery GI Bill reflected the recognition by U.S. leadership to the inherent value of federal and state investments in a highly educated and productive workforce (Montgomery, 2010). Congressman Montgomery further elaborated that:

...current and future veterans, trained under the Montgomery GI Bill, represent part of our ongoing potential for achieving world leadership in current and emerging fields such as nanotechnology, robotics, biotechnology, communications, engineering, health care, logistics, transportation, and manufacturing...veterans personify economic strength. (Montgomery, 2010, p. 178)

Evolution of the computer, semiconductor, software programming, and computer/electronic network industries brought enduring changes to the nature of work, how workers interacted with each other, and how they related to superiors. Increasingly, white-collar jobs were more autonomous and required self-initiation, creativity, problem-solving abilities, and flexibility. Perhaps most importantly, continuous and lifelong learning became a way of life for the modern worker, and there were several options for workers to find financing to pay for postsecondary education to enable them to remain competitive in rapidly changing work environments.

Junior/Community Colleges

The economic forces and business practices of the 1980s and 1990s, largely propelled by the increasingly globalized economy, caused great disruption in America's business sectors and workforce (Cohen & Brawer, 2008). Technology was both a contributor to and an answer for enterprises starting up or shutting down, and work place skills becoming more complex or simple for semiskilled or even unskilled work.

Business cycles, restructuring, and churn contributed to large numbers of workers searching for assistance from government agencies and educational institutions to upskills, increase educational attainment, or migrate to find better work and higher wages.

Business spun out workers not essential to core activities to cut costs. In the early 1980s, many of these employees were blue-collar, semiskilled workers in manufacturing plants or unskilled laborers throughout all sectors (Cohen & Brawer, 2008). By the late 1980s and 1990s, downsizing in the services sector hit semiprofessionals, professionals, managers, and technicians, throwing millions of white-collar workers into unemployment or prolonged underemployment. Economic and business churn, coupled with new technologies, led to new market opportunities for businesses and workers. New enterprises in high-tech and low-tech sectors were launched at record rates.

Whether the enterprises were high-tech or low-tech, they searched more and more for workers with skills that just a few years earlier did not exist. Health care, biotechnology, telecommunications, computers, networking, retail, restaurants, and hospitality industries demanded workers with higher literacy, education, business skills, and interpersonal attributes that would help make their operations competitive and sustainable. Many workers, displaced by the new economic environment, turned to institutions of higher learning for help. Most notably, they turned to community colleges because this institution had the capacity and resources to help workers get back on the path of employment success (Cohen & Brawer, 2008).

Enrollments in community colleges continued to increase from 1,195,000 in 1980 to 1,408,000 in 1990 (Snyder, 1993). At the same time, community colleges began to

experience challenges due to changes in student demographics, shifts in programming use, and declines in institutional financial streams. The educational level of students dropped and community-education programming demands rose in importance (Cohen & Brawer, 2008).

Increased participation by minorities in community college programming during the 1970s continued to rise during the 1980s and 1990s (Cohen & Brawer, 2008). The number of 18-year-olds in America peaked in 1979. Community colleges made efforts to attract older, adult populations to enroll, replacing the loss of younger students. As older students swelled the ranks of community colleges, part-time enrollment increased as adult's balanced family, work and education responsibilities. Between 1970 and 1980, part-time enrollment tripled from just over 1 million to nearly 4 million (Cohen & Brawer, 2008) and college leaders were compelled to adopt new programming options to accommodate this shift in how students were using college course offerings.

During this time, the overall level and mixture of community college financial resources declined and shifted (Cohen & Brawer, 2008). Funds from tuition rose from 15% to 18%. Federal funding remained steady from the previous decade of 5%, but state funding decreased from a high of 60% in 1980 to 48% in 1990. Local funding increased slightly from 13% to 18% (Cohen & Brawer, 2008). Community college leaders found themselves hard-pressed to accommodate increased enrollments with declining revenues. Creative and innovative management practices were needed to maintain the traditions of open enrollment for many colleges.

Community colleges also bore the brunt of poor secondary educational attainment in the 1970s, as more and more students enrolling demonstrated woefully inadequate literacy abilities (Cohen & Brawer, 2008). As Cohen and Brawer (2008) explained:

...the available evidence suggest that the academic achievement of students in schools and colleges registered a gradual improvement between 1900 and the mid-1950s, an accelerated improvement between the mid-1950s and the mid-1960s, a precipitous, widespread decline between then and the late 1970s, before stabilizing in the early 1980s. (Cohen & Brawer, 2008, p. 283)

As a result of entering students' underwhelming academic aptitude, colleges had to increase development education departments and programs to assist students to meet college standards and to keep dropout rates from rising drastically.

Community college developmental education programs were designed and implemented to teach literacy—the essentials of reading, writing, and arithmetic. Courses and training for broader skills were found to be necessary to help students contend with basic living skills and to find work. Time management, study habits, personal financial management, and other life skills as well as resume writing, interview techniques, and interpersonal and communication skills all became necessary elements of community college developmental education initiatives to help students find success during and after college (Cohen & Brawer, 2008).

Developmental education instructors tended to be leaders in the adoption of new technologies to improve instructional effectiveness (Cohen & Brawer, 2008). Computer-assisted instruction for math, reading, and writing became ever more important in helping students rapidly improve their literacy skills and move into the mainstream. These

instructors also used technology to manage and improve student flow and expand the provision of academic support services to academic and vocational areas, improving student outcomes (Cohen & Brawer, 2008). These activities helped move developmental education instruction from the periphery into the mainstream and gain general acceptance as a critical piece of the comprehensive nature of the community college (Cohen & Brawer, 2008).

The community education role of community colleges continued to be important. Short-term, not-for-credit industry training programs and contract training for industry gained importance as new markets and enduring funding streams (Cohen & Brawer, 2008). During the 1980s, international competition and consolidation within many industry sectors led to increased numbers of plant closings and relocations overseas. Headcounts of noncredit students grew from 90% of the credit student headcount in 1995 to exceed that of credit students by more than 8% in 1999 (Van Noy, Jacobs, Korey, Bailey, & Hughes, 2008). Competition among and within communities to backfill lost plants became even more intense, and community college involvement in economic development incentive packages increased even more. The demand to train displaced workers unemployed due to plant closing or for new industry propelled the colleges to innovate with program delivery (Cohen & Brawer, 2008).

Community colleges were uniquely positioned for this role because the investments in vocational training over the years had already equipped them with the resources and know-how to train industry skills. Even so, restructuring of the delivery method needed to change to better accommodate customized training for specific businesses and industry. Courses had to be adjusted to reflect short training cycles. Most

courses were delivered as not-for-credit, but some visionary colleges devised curricula that facilitated articulation of short-term training courses into for-credit coursework. Convenience and accessibility to training were essential. Evening and weekend courses accommodating work schedules became common. Training classes were also held at the business site. For the truly entrepreneurial states and colleges, portable training facilities were used to increase flexibility of deliver and reduce costs through redundancy of training equipment (Cohen & Brawer, 2008).

Entrepreneurship training and development became another community development role for community colleges. In 1980, Congress enacted legislation that created small business development centers and some community colleges took advantage of this opportunity to open centers of their own (Cohen & Brawer, 2008). While entrepreneurship training—helping those interested in starting a business to do so—was important in its own right, some colleges also provided it as an elective for vocational students in such trades as construction, electricity, plumbing, and heating and air-conditioning. These courses offered those who aspired to be self-employed the knowledge on how to start and operate a business.

Several theories might explain the evolutionary path that has delivered the contemporary community college, but the one that seems to support the Mississippi model is the theory of the relative autonomy of the state (Dougherty, 2001). As Dougherty (2001) explained:

The theory of the relative autonomy of the state argues that government officials promoted community college expansion beyond the point needed to meet the demands of private interest groups because this met their own values and

interests. Even when students were silent, government officials supported the community college out of their own belief in the value of higher educational opportunity. Even when business was mute, they supported postsecondary education in the name of the credo that government has a responsibility to meet the economy's needs. (Dougherty, 2001, p. 184)

Dougherty (2001) continued:

State and federal elected officials are aware that good economic conditions greatly aid their chances for reelection by providing jobs and rising incomes for citizens and rising tax revenues for new government programs. They know also that to get a healthy economy one needs to provide incentives to attract business investment. One of the major incentives that government has provided business in order to get it to invest capital and thus spur economic growth has been to provide it with publicly subsidized employee training through the vocationally oriented community college. Elected officials are quite clear that they are doing business a favor. But they find it acceptable for two reasons: they believe in business's centrality to our economy; and they view favors to business as the necessary price to securing access to investment capital that can fuel politically popular economic growth. (Dougherty, 2001, p. 185)

The Theory of Human Capital

Introduction

The theory of human capital development attempts to explain the contribution of human capital; one component of a much larger heterogeneous pool of capital, and its

impact on economic growth. The theory evolved from the recognition that traditional economic models did not account for all the factors contributing to modern economic growth, as measured by productivity (Schultz, 1971). Acceptance of the theory led to its use in shaping federal, state, and local government policies aimed at increasing economic development, creating wealth, and reducing the incidence of poverty. As with most economic theories, while it is helpful in quantifying and classifying factors of production, it has its limitations when used to explain, predict, or otherwise rationalize human behavior (1971).

Traditional economic theories focused on measuring the aggregate quantities of production; land, capital, and labor in a nation. The common belief was that economic growth could be measured by and modeled on the abundance or deficiency in these factors; the more abundant these factors were in a country, the more likely that country could grow economically (Field, 2008). By the mid-20th century, economists were questioning the validity of this theory—important factors of production were missing (Schultz, 1971). Numerous countries worldwide were increasing productivity,¹³ despite deficiencies in factors of production. Traditional economic models could not explain accurately the large growth in productivity in the latter 19th and early 20th centuries in the modernizing economies of Western Europe and the United States. Economists were turning to the notion of investment in capital as a way to more fully capture, measure, and

¹³ The growth of productivity—output per unit of input—is the fundamental determinant of the growth of a country’s material standard of living. The most commonly cited measures are output per worker and output per hour—measures of labor productivity. One cannot have sustained growth in output per person—the most general measure of a country’s material standard of living—without sustained growth in output per worker (Field, 2008).

model economic inputs and outputs. Nobel Prize laureate Theodore Schultz (1971) opined:

An investment approach, I am convinced, is required in thinking about economic growth. In this approach the stock of capital is augmented by investment, and the productive services of the additional capital increase income, which is the essence of economic growth. It is a major step toward a general theory when *all* investment resources are encompassed and allocated in accordance with the meaningful economic standard established by the relative rates of return to alternative investment opportunities. Thus, in theory, this approach is grounded on an all-inclusive concept of investment and an accounting of all additional investments gives a complete and consistent explanation of the marginal changes in the stock of capital, of the marginal changes in productive services from capital, and of the marginal changes in income and, accordingly, of growth. (Schultz, 1971, p. 4)

Schultz (1971) endeavored to broaden the economist's definition of capital and began the discussion on how to include and allocate technical change, including research, as a component of capital and thus subject it to measurement and analysis. Schultz recommended to "treat much of scientific research, and also a large part of education and other skill-producing activities, as 'industries' producing new forms of capital that are more efficient than particular old forms of capital" (Schultz, 1971, p. 20). From this point forward, measuring the investment in the input of education and research against the output of productivity (and thus economic growth) freed modern economists from "the wrong road" (Schultz, 1971, p. 24) of classical economic treatment of capital..

Schultz's work was followed quickly by contemporaries Becker (1975) and Mincer (1962), who measured the impact of workers' stock against improvements in productivity and the purported link to increased earnings and wages. The theory of human capital development states that individuals invest in themselves, in their "stock"^{14,15} or capital:

To most people, capital means a bank account, a hundred shares of IBM stock, assembly lines, or steel plants in the Chicago area. These are all forms of capital in the sense that they are assets that yield income and other useful outputs over long periods of time.

But such tangible forms of capital are not the only type of capital. Schooling, a computer training course, expenditures on medical care, and lectures on the virtues of punctuality and honesty are also capital. That is because they raise earnings, improve health, or add to a person's good habits over much of his lifetime. Therefore, economists regard 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, 2002, paras. 1-2)

¹⁴ Stock includes cognitive, technical, and interpersonal skills, leadership, knowledge, wisdom, and experiences that one possesses. Also, in early eras of developed countries and in current under-developed nations, strength and tenacity are important human capital when related to physical work (Becker, 2002).

¹⁵ As Flora and Flora (2003a) anecdotally pointed out with Thad's skill at bird calling (Chapter 4), human capital is far more than simply educational attainment; it "consists of the assets that each person possesses: health, formal education, skills, knowledge, leadership and *talents*" (emphasis added; p. 80).

Individual investment in human capital is a function of discounted earnings (Schultz, 1971). Individuals earn less in the short term while gaining education or training, increasing their capital, expecting higher earnings later. The more capital one has, then the higher one's productivity. Because earnings have a strong correlation to productivity, it is believed that one will be paid higher earnings (than someone without productivity) because they will have higher productivity and thus contribute more to enterprise earnings (Beaulieu & Mulkey, 1995). The resulting increase in worker earnings is the yield on their education, training, and workplace investment (Schultz, 1971).¹⁶

Quantifying the Theory

In calculating the internal rate of return (IRR), one must account for all the costs inherent in gaining training or education—both direct and indirect costs (Henderson, 2008). Direct costs include tuition, fees, books, supplies, and travel (particularly for rural areas).¹⁷ Indirect costs include opportunity costs, which are the value of the next highest valued alternative use of that resource (Henderson, 2008). In the case of education economics, it is the foregone earnings of not entering the labor market immediately.

Aside from just looking at the individual, the social costs and benefits must be taken into account as well. Increased education benefits the society as a whole because educated workers tend to have lower unemployment rates, receive higher wages, are less

¹⁶ Gorman contends that there is growing evidence that current government subsidies for education encourage lower-ability students to incur debt in order to attend a college that do not increase their marketable skills nor their wages, harming both students and taxpayers (2008).

¹⁷ While the cost of room and board incurred attending school typically are not considered a true cost (Henderson, 2008), the cost of travel could be because it is incurred not in the normal course of living, but is an additional expense to receive the education or training.

apt to be radicalized socially or politically, do not resort to crime, and do not depend on social services over the long term. Society benefits because higher educated workers tend to pay more taxes and rely less on governmental services (Henderson, 2008).

As with other types of investments, the law of diminishing marginal returns applies to human capital development (Henderson, 2008). Individuals have a limited time available to them—time spent in education is time spent away from the workforce. The longer an individual is in school and away from the workforce earning income, the higher the return must be after completion of education to justify the time spent getting an education (Henderson, 2008). This logic also may apply to older workers; if older workers wait too long to gain further education, they may not be able to recoup the investment due to their limited remaining time to work, and thus forego the educational opportunity.

Generally, there are two types of training: general and specific (Becker, 1975). General training develops skills that are ubiquitous and can be used in many different ways and in many different settings across jobs and tasks. Specific training delivers skills that are specific to a job or task, and are generally not transferrable to other jobs or tasks. Training is delivered in many different ways but in the contemporary setting, individuals can receive training through secondary schooling, vocational technical training, OJT, or personal, self-guided study using a host of resources including libraries and the Internet (Becker, 1975). Training is paid for mainly through three sources: the individual benefitting from the training, the individual's employer, or the government.

The theory of human capital development assumes that individuals making the investment decision are rational beings and are self-actualized; that is, they understand

the investment decisions they are making and are self-motivated to act upon those decisions (Becker, 1975). The theory also assumes that the marketplace is open, homogeneous, and equally accessible to everyone, and that there is no bias in the marketplace; in other words, gender and racial equity exists (Becker, 1975).

The assumption of an open, homogeneous market place then leads to the conclusion that the skills and talents an individual brings to the marketplace are rewarded by competitive financial returns (Becker, 1975). Another assumption is that individuals who invest in education are mobile and can relocate to where jobs are available. The final assumption is that there is labor market information symmetry—the individuals know what economic trends are, what jobs are coming open, and what skills are required to secure these jobs. According to Becker (1975):

...on-the-job and school training are not the only activities that raise real income primarily by increasing the knowledge at a person's command. Information about the prices charge by different sellers would enable a person to buy from the cheapest, thereby raising his command over resources; information about the wages offered by different firms would enable him to work for the firm paying the highest. In both examples, information about the economic system and about consumption and production possibilities is increased, as distinct from knowledge of a particular skill. Information about the political or social system—the effect of different parties or social arrangements—could also significantly raise real incomes. (p. 39)

There are two main arguments against the accuracy of the theory of human capital development, based on two sides of the equation: labor supply and labor demand. On the

supply side, criticisms are that the theory is insensitive to the forces acting upon an individual that are out of the individual's control (Schulz, 1970). The socioeconomic status of an individual has an impact on his or her ability to be successful in school and occupational choice. Familial attributes of financial, human, and social capital, along with community attributes of structure and social capital, all are argued to contribute to an individual's ability, motivation, and efficacy in selecting educational advancements and career choices (Schulz, 1970).

On the demand side, criticisms of the theory of human capital development center on the job screening, dual economy, and dual labor markets perspectives (Schulz, 1970). Job screening arguments are that employer hiring and compensation are based more on a signal, presumably a certificate demonstrating achievement, rather than an individual's demonstrable skill. Dual-economy critics state that the wages an individual earns are less a result of the human capital gained than whether the worker is in a core sector industry or secondary sector industry; core sector industries pay higher wages than do secondary sector industries (Schulz, 1970). Similarly, dual-labor market critics state that the wages an individual earns are less a result of the human capital gained than whether the worker is in a primary or secondary labor market; jobs in one market have a distinct set of characteristics relative to the other market (Schulz, 1970). Primary labor market jobs are stable, wages tend to be higher, working conditions are good, investment in worker training is evident, and worker turnover is low. Secondary labor markets are unstable and jobs insecure, wages are low, working conditions are poor, there is little training, employee commitment is low, and advancement is unlikely (Schulz, 1970).

Rural Issues

Defining Rurality: Describing and Measuring

Practitioners, researchers, policy makers, and even residents to describe and measure what constitutes “rurality” in different ways. These differences are due, in part, to people’s tendency to describe what is rural in comparison to and distinguished from what is urban; the exercise is dichotomous. Compounding this conundrum is the reality of “rural and urban are multi-dimensional concepts makes clear-cut distinctions between the two difficult” (Cromartie & Bucholtz, 2008, para. 1). This confusion is particularly true given the contemporary forces acting on rural places. Urban-rural migration patterns, economic globalization, digital communications, and other forces all add up to the blurring of the rural-urban divide, contributing to the notion that “the idea of rurality as an isolated island of cultural specificity and traditionalism has become anachronistic” (Cloke, 2006, p. 19). Some would venture further and argue that technological advancements, migration, social interactions, and other forces have eliminated the dichotomy of rural and urban environments, and therefore the definition of rural is moot (Cloke, 2006).

Nevertheless, popular notions of what defines the places, spaces, and the societal construction of rurality remain firmly etched in the minds of those who populate or visit rural places. As Cloke (2006) remarked:

The rural stands both as a significant imaginative space, connected with all kinds of cultural meanings, ranging from the idyllic to the oppressive, and as a material object of lifestyle desire for some people—a place to move to, farm in, visit for a vacation, encounter different forms of nature, and general practice alternative to

the city...Rurality is characterized by a multiplicity of social spaces overlapping the same geographical areas, so while the geographic spaces of the city and the countryside have become blurred it is in the social distinction of rurality that significant differences between the rural and urban remain. (pp. 18-19)

Despite an obvious blurring of the lines between urban and rural in some places, there is, as Marini and Mooney (2006) explain, “still, in the fundamental demographic fact of low population density, both a material as well as a socially constructed and meaningful difference associated with the rural in general and with rural economies specifically” (p. 92).

If rural is different from urban, then rurality can be described and defined sufficiently to be meaningful. There are three theoretical frameworks that rurality can be defined within: functional, political-economic, and social constructions (Cloke, 2006).

The functional framework defines rural places in terms of areas that:

1. Are dominated by extensive land uses, notably agriculture and forestry;
2. Contain small, lower order settlements that demonstrate a strong relationship between building and extensive landscape, and which are thought of as rural by most of their residents;
3. Engender a way of life that is characterized by a cohesive identity based on respect for the environmental and behavioral qualities of living as part of an extensive landscape. (Cloke, 2006, p. 20)

The political-economic framework defines the “social production of existence” (Cloke, 2006, p. 20) of rural areas. Through this framework, it has been argued that the national and international dynamics of the political economy have acted deeply on rural

areas, effecting the blurring of the rural/urban divide. However, structural problems common to urban and rural areas are often manifest differently in rural areas—that there is a “rural dimension” co-constituted by three basic characteristics:

1. A pleasant environment that will attract the willing or unwilling unemployed;
2. A spaced-out geographical structure that leads to accessibility problems and costly public services;
3. A distinctive local political ideology that favours the market, the volunteer and the self-helper rather than public sector intervention.

(Cloke, 2006, p. 21)

Social constructions of rural places are the third theoretical framing of rurality. This framework attempts to distinguish between rural places and urban environments by identifying and describing the social, cultural, and moral values that are often identified with rurality, rural spaces, and rural life.

Measuring Rural

According to Cromartie and Bucholtz (2008), measuring rural first requires the decision of what is urban. What remains is then defined as rural. The act of defining the boundaries of what is urban is the challenge. Cromartie and Bucholtz outlined two main challenges. First is the choice of an appropriate urban boundary, and second is the choice of population threshold. When choosing a boundary, there are three concepts to be considered: administrative, land use, and economic. The administrative concept:

...defines urban along municipal or other jurisdictional boundaries...land-use...

identifies urban areas based on how densely settled an area is...The economic

concept...recognizes the influence of cities on labor, trade, and media markets that extend well beyond densely settled cores to include broader commuting areas.

(Cromartie & Bucholtz, 2008, para. 7)

Because measuring what is rural or urban is complex, policy makers and researchers use several systems. The three main systems of defining rural, urban, metropolitan, and nonmetropolitan areas are the U.S. Census Bureau, the OMB, and the U.S. Department of Agriculture Economic Research Service (USDA ERS).

The U.S. Census Bureau (1995) defines an urbanized areas (UA) and urbanized clusters (UC) by population density. According to this definition, each UA includes a central city and the surrounding densely settled territory that together have a population of 50,000 or more and a population density generally exceeding 1,000 people per square mile. A county is a political distinction and is not incorporated in the classification scheme, so one UA may cover parts of several counties. Under this definition, all persons living in UAs and in places (e.g., cities, towns, villages) with a population of 2,500 or more outside of UAs are considered the urban population. All others are considered rural. Likewise, UCs are defined similarly to UAs but are smaller. UCs contain a population of at least 2,500 but less than 50,000 persons (Cromartie & Bucholtz, 2008).

The most widely used rural definition based on the economic concept is the OMB. The OMB defines areas as metro on the basis of standards released in January 1980. According to this definition, each metropolitan statistical area (MSA) must include at least:

- one city with 50,000 or more inhabitants; or

- an urbanized area (defined by the Bureau of the Census) with at least 50,000 inhabitants and a total MSA population of at least 100,000 (75,000 in New England; Cromartie & Bucholtz, 2008).

These definitions provide that each MSA must include the county in which the central city is located (the central county) and additional contiguous counties (fringe counties), if they are determined to be economically and socially integrated with the central county. Any county not included in an MSA is considered to be a nonmetro county (Cromartie & Bucholtz, 2008).

The final way in which rural areas are defined is by the USDA ERS, which uses rural-urban continuum codes. In many cases, counties are too large to accurately represent labor market areas, and thus metro and micro areas may and usually do include land that is rural both from a land-use and an economic perspective. To distinguish metro counties by size and nonmetro counties by their degree of urbanization or proximity to metro areas, the USDA defines codes 0 to 3 as metro and 4 to 9 as nonmetro. Using this coding scheme, 4 = urban population of 20,000 or more, adjacent to a metro area; and 9 = completely rural or urban population of fewer than 2,500, not adjacent to a metro area. (Parker, 2010; Reynnells & John, 2008).

Main Challenges of Contemporary Rural America

Unique and substantial formative changes affect rural America. Among these changes are demographic shifts; racial and ethnic diversification; economic shifts from agriculture, extraction, and manufacturing to tourism and service sectors; challenges of human capital development (e.g., education, migration, healthcare) compounded by

“rural friction”¹⁸; governmental decentralization; and land-use debates (Brown & Swanson, 2003). Despite disagreement on the hierarchy of many of these challenges, there is general agreement that rural areas “will not succeed if they employ ‘go it alone’ strategies. Only through cooperation between communities, among interests within communities, and between local governments, NGOs, and the private sector will rural areas be able to prosper in the new millennium” (p. 14). Policy makers, institutional heads, business leaders, and community leaders must be creative, innovative, visionary, and, willing participants in a collaborative effort to overcome the challenges awaiting rural areas in the 21st century.

Rural American Population

Adapting to unpredictable fluctuations in population changes and the resulting demographic and social trends that are transforming the ethnic composition of rural America into an increasingly multicultural rural population presents unique challenges for rural leaders. Demographic changes in rural America over the past 20 years have shown a net growth, reversing early 20th-century migration patterns from rural to urban areas (Johnson, 2003). Although the reasons for this trend are still being assessed, the “means were decisive: the improvement in infrastructures and telecommunication technology reduced the space in which transactions take place. Electronic information and financial exchanges have practically abolished the obstacle of distance” (Grimes, as cited in Marini & Mooney, 2006, p. 95). This new outmigration represents those who

¹⁸ Rural friction is roughly defined as the complications that arise in rural places due to limited resources and competing service providers. Space further contributes to friction where time delays for program and project implementation, transportation issues, and decreased communication contribute to challenges faced in rural areas (Glasgow, 2003).

have left the urban for the rural to raise families or enjoy the amenities of rural living while telecommuting to work (Johnson, 2003).

Changes in rural America's racial and ethnic composition and the continuing impoverishment of a disproportionate share of rural African Americans, Native Americans, and Hispanics are a concern if equal access to wealth generation and prosperity opportunities are to be realized. Ninety-five percent (95%) of rural African Americans continue to live in the South, and the current situation is a legacy of past racial, class, and political inequalities (Harris & Worthen, 2003). Global and national economic restructuring in tandem with the restructuring of the welfare state have exposed rural African Americans to high levels of economic and social insecurity (2003). Compounding ethnic tensions and societal challenges is the growth of the Hispanic population; they are the fastest growing rural minority and their migration from the Southwest to the Midwest and deep South is growing (Saenz & Torres, 2003). Native Americans are the most rural of all minorities and their turn to gaming as an economic development strategy may have had unintended negative social consequences and remain far behind all other minorities in social and economic gains (Gonzales, 2003).

Rural and urban families are changing in many of the same or similar ways and are facing similar challenges unique to the American experience. The changing structure of rural families and vulnerabilities faced by different types of families and family members, given emerging structural and economic changes, is particularly daunting for those in rural areas. The separation of home and work has fragmented rural, urban, and suburban families alike. The demand of commuting to nonlocal jobs has strained

intergenerational and other relationships, posing critical challenges for socialization and child rearing in rural communities (MacTavish & Slamon, 2003).

Three segments of the rural population—elderly, youth, and women—are particularly at risk of being disadvantaged by economic restructuring, policy changes, and social reengineering (Glasgow, 2003). Population aging is a society-wide phenomenon; however in rural areas, elderly may be particularly exposed because, second only to spouses, children are the most likely to provide care-giving activities and services to their elderly parents. Rural friction may prevent the elderly from receiving the type of care they need from their children (2003). Children raised in rural settings are more likely than are their urban counterparts to be left behind in the rapidly changing economy and society, contributing to higher rates of poverty, welfare dependency, delinquency, drug use, adolescent sexuality, pregnancy, childbearing, lower educational achievement, and decreased access to preventative healthcare (Lichter, Roscigno, & Condron, 2003).

Women in rural settings are particularly stressed because they often are single mothers fulfilling two roles: primary provider and family caregiver. Employment opportunities in rural settings for single or married women have not enabled them to increase wealth and prosperity, further contributing stress and uncertainty (Tickamyer & Henderson, 2003). People who reside in rural areas, too, are at a higher risk of being poor than are their urban counterparts, but their poverty is often hidden and unrecognized. Rural persons who follow society's prescriptions to work and stay married obtain less protection from poverty than is the case in urban America (Jensen, McLaughlin, & Slack, 2003).

Rural Economy

Attracting and retaining an adequate supply of high-quality jobs is one of the foremost challenges of rural America. Particularly difficult for those in rural America is obtaining well-paying, secure jobs in more remote areas, including areas that previously depended on family farming. Agriculture and natural resource-based employment has declined in rural areas but continues to dominate economic life in some regions of the country. Manufacturing, too, has declined as a share of rural employment due, in large part, to globalization but it still accounts for one fifth of rural jobs, a higher level than in urban areas. Dependence on services is much lower in rural areas than in urban ones, and rural services are more likely to involve low-wage, low-skill, seasonal, and/or involuntary part-time employment (McGranahan, 2003).

Global, national, and regional economic restructuring has contributed to polarization within rural America. Rural areas close to metropolitan centers are able to benefit from the expansion of urban influence, while more remote rural places are not able to keep up economically through recruitment of industry (Falk & Labao, 2003). Increasingly, entrepreneurship development is being recognized as an additional economic development strategy to recruit and retain industry. Rural societal and cultural biases, technical resource limitations, scant access to debt/equity capital and/or strategic marketing information, and insufficient entrepreneur education, training, mentoring, and coaching all contribute to the unique challenges rural areas face in implementing this strategy as a real economic development option (Center for Rural Entrepreneurship, 2010).

Commuting is an important aspect of urban/rural interdependence and it also facilitates urban deconcentration. Commuting to nonlocal jobs has strained intergenerational and other relationships, posing critical challenges for socialization and child rearing. On a positive note, commuting permits individuals to have a wider access to economic opportunities, and may serve as a substitute for rural/urban migration. On the accompanying negative note, communities that experience high out commuting rates commonly face higher levels of economic and social risk (Tigges & Fuguitt, 2003).

Farming is being increasingly abandoned as a household livelihood strategy (Buttel, 2003). While farming is on the decline, employment in tourism is on the increase. Tourism is not an option for all rural areas; not all rural places have natural features or other amenities that attract tourists. Tourism can have both positive and negative consequences for the people and places concerned (Krannich & Petrzela, 2003).

Rural Community

Given the increased decentralized and privatized environment within which rural communities now function, local governments and institutions must develop and evolve new roles, particularly facilitation and networking, rather than merely technical assistance and general services provisioning. Rural communities must also attend to and build social capital, acting on common and collective goals to meet the economic, social, and demographic challenges ahead. The ability of communities to act locally, solving problems and taking advantage of local assets, is based on the capacity for collective action called “community agency” (Luloff & Bridger, 2003, p. 203). Another approach to community development is called entrepreneurial social infrastructure, which incorporates bonding, connections between homogeneous individuals, and bridging,

which links heterogeneous groups to each other outside of the community (Flora & Flora, 2003b). Community agency is particularly important, given the global forces at work in rural settings, the transitory and inconsistent extent of government intervention, and responses to rural challenges.

Political, social, economic, and cultural globalization are exerting greater impact on local activities and decision making, compromising the quality of life for rural communities and people. Transnational corporations, multinational trade agreements such as the North American Free Trade Agreement, and global economic regulatory organizations like the International Monetary Fund and World Trade Organization, all have an impact on localities, perhaps to a greater degree than do nation-based policies. As Bonnao and Constance (2003) remarked, “Local, regional, and national public policy-makers [*sic*] must take into consideration this new context in order to optimize the chance of creating and implementing effective initiatives designed to better the lives of rural peoples” (p. 241).

Warner (2003) contends that government decentralization and privatization are reducing local governments’ ability to produce and deliver services, administer municipal functions, and plan and execute strategies for future development. Local governments are being forced to scale back or cease service delivery altogether. Accordingly, local governments, NGOs, and the private sector must collaborate and coordinate managerial, functional, and administrative capacities for rural communities to remain viable and competitive (Warner, 2003).

A specific area of concern is that educational attainment levels in rural areas lags behind those of urban areas. Certainly, on average, rural areas have been making strides.

According to Beaulieu, Israel, and Wimberley (2003), in nonmetropolitan areas:

...schools, as the prime engine for improving educational performance of students...have only modest impacts on test scores...Family social capital...prove[s] to be vital in shaping test score outcomes for students...The family is the most important conduit for realizing educational success, while the broader community in which they are embedded plays a secondary role. (p. 287)

Indeed, leaders of institutions, businesses, and communities must become versed in the results of this research. They must find new and creative ways to contribute to the bridging and bonding necessary for young people to value education, remain in school, and learn to be life-long learners as a meaningful pathway to wealth creation and long-term prosperity (Beaulieu et al., 2003).

Access to quality and affordable health care is another area of concern. Rural residents have poorer health than do their urban counterparts and access to health care services disproportionately favors metropolitan/urban residents. Policies of cost containment diverge from national health goals and have a negative impact on the nation's human capital investment strategies (Morton, 2003). Unique, inventive, and creative social capital development to help build resource sharing and effective networking will help remedy these challenges in rural places.

The Changing Interface

As the urban/rural interface widens and becomes less distinct, the competition for use of and access to the resources and landscapes of rural areas intensifies between long-

term inhabitants, new migrants, and visitors. Policy makers, community leaders, and business interests increasingly must find ways to manage and mediate the competing interests so that future generations of both rural inhabitants and visitors may enjoy the richness and diversity of America's rural places and natural environment (Jackson-Smith, 2003).

At the forefront of the competing interests generated from the expanding urban sprawl and further out, the rural sprawl, is the issue of land use (Jackson-Smith, 2003). Rural localities rarely have land-use policies in place; as commercial development expands into rural areas from the urban fringe, there is virtually no planning or regulatory guidance. Strains on local resources grow from rapid, unplanned development, and often contribute to traffic congestion. Conflicts often ensue between existing long-term inhabitants and new migrants from suburbia or urban areas. One common source of conflict stems from residents desiring to profit from land sales to developers and newer urban-to-rural migrants trying to introduce land-use regulations, blocking these land sales in an attempt to maintain the rural idyllic lifestyle that motivated them to move there in the first place. Land use change in rural places is chaotic, haphazard, and increasingly complex as the demographics shift as a result of urban to rural migration (Jackson-Smith, 2003).

Another arena challenging rural places is the impact of modern agricultural and extraction industries on rural communities and the environment. Agriculture-based communities tend to have a longer term vision for resource use, environmental considerations, and conservation practices. Extraction-based communities, particularly those dominated by multinational corporations or governmental regulations, are more

vulnerable to economic boom/bust cycles, social structure decline, and paralyzing and polarizing conflicts over environmental and conservation issues. Social networking leading to effective local control over resources and land-use in these localities is particularly important for community long-term viability (England & Brown, 2003).

Finally, the relationship between man and beast—that is the relationship between citizens and wildlife in rural areas—is becoming increasingly complex. As urban sprawl and rural sprawl bring more migrants into rural areas, contact with wild animals is increasing. Conflicts arise between the rights of landowners and those of wildlife. Laws such as the Endangered Species Act highlight the conflict between the ideals of environmentalists and those with a more utilitarian view of wild spaces, such as ranchers, woodsmen, hunters, and farmers. Equity between the competing views of locals, new migrants, and visitors must be weighed by policy makers if rural lifestyles and economies are to remain sustainable over the long term (Daniels & Brehm, 2003).

Summary

Policy driven investments in human capital by the United States—principally for workforce development initiatives—were driven by several major forces during the 20th Century: (a) globalization of national economy, (b) explosion and proliferation of technology, (c) demographic migration from rural to urban, and (d) employment shifts from agriculture to manufacturing and later into the service sector. Throughout these changes junior/community colleges served to help workers meet these forces and adapt to the accelerating demands of the workplace. While the effectiveness of community colleges within post-secondary education circles continues to be a source of debate, it is

nonetheless clear that their role within and contribution to workforce development has been and continues to be critical to the future of America's global competitiveness.

CHAPTER III
METHODOLOGY

Introduction

The purpose of this study was to examine the extent to which the rural-urban gap in workforce outcomes is reduced by skill development conducted by community colleges. Specifically, the study examined three important research questions.

1. Are Mississippians in rural and urban settings equally able to secure employment after receiving specialized and advanced training?
2. Are Mississippians in rural and urban settings engaging in specialized and advanced skill development equally able to retain employment over time?
3. Do Mississippians in rural and urban settings experience the same wage increase after receiving specialized and advanced training?

The hypothesis was that skill development reduces the gap between rural and urban workforce outcomes, controlling for individual and local factors. Specifically, it was hypothesized that there are no differences between rural and urban workforce members in their ability to secure employment after training. A second hypothesis was that there are no differences between rural and urban workforce members in their ability to retain employment after training. Finally, this study hypothesized that rural and urban workforce members experience the same level of wage gain after training.

Approval to conduct the study was obtained from Mississippi State University's Institution Review Board for the protection of human subjects in research (see Appendix A). The researcher's committee approved the project in December 2011.

Research Design

The study used a quantitative research design. McMillian and Schumacher (2006) stated that quantitative research utilizes experimental methods and quantitative measures to test hypotheses and generalizations are the outcomes of this test. The meaning of quantitative research was explained by Golafashani (2003) as:

Charts and graphs illustrate the results of the research, and commentators employ words such as 'variables', 'populations' and 'result' as part of their daily vocabulary...even if we do not always know just what all of the terms mean...[but] we know that this is part of the process of doing research. Research, then as it comes to be known publicly, is a synonym for quantitative research. (p. 4)

In order to address the validity of this study, the total population that received noncredit training from the fifteen Mississippi community colleges in 2010 was obtained from the State of Mississippi state integrated workforce management system. A quantitative analysis was performed using SPSS version 14, and the data were presented using tables from two statistical methods, logistic regression and ordinary least squares analysis. Each research question and hypothesis was addressed in detail.

Data Source

The data for this study were sourced from the State of Mississippi's state integrated workforce performance management system. This system was created by the Mississippi State Workforce Investment Board to track and identify best practices in education and workforce outcomes. All 15 community colleges in the state participate in the system by providing data on credit and noncredit activities. For the purpose of this study, only data accounting for noncredit hours in fiscal year 2010 were used. The data represented a total of 91,000 individuals who received training services from these 15 community colleges. All counties in the state were served. Approval to use the data is provided in Appendix B.

Variables

Dependent Variables

This study used three dependent variables. The first dependent variable was attainment of employment after training. This variable was measured as a dummy variable where 1 = *employed* and 0 = *otherwise*. The second dependent variable was employment retention, which was measured as a dummy variable where 1 = *ability to retain employment after three quarters of exiting a training program* and 0 = *otherwise*. The third dependent variable was wage gain, which was measured on a ratio scale (see Table 1).

Table 1. Description of Variables

Variables	Description
Dependent variables	
Employment	Attainment of Employment After Training
Employment retention	Retention of employment 9 months after exit
Wage change	Annualized wage change before and after training
Independent variables	
Metro/nonmetro	
Metro	Metropolitan location = 1; Else = 0
Nonmetro	Nonmetropolitan location = 1; Else = 0
Type of training	
Manufacturing	Training in manufacturing = 1; Else = 0
Healthcare/medical	Training in medical/healthcare = 1; Else = 0
Other	Other training = 1; Else = 0
Gender	
Female	Female = 1; Else = 0
Male	Male = 1; Else = 0
Age	Age of trainee (in years)
Race	
White	White = 1; Else = 0
Black	Black = 1; Else = 0
Others	Other race = 1; Else = 0
Education	
High school or less	High school or less = 1; Else = 0
Some college without a degree	Some college, no degree = 1; Else = 0
Associate's degree	Associate's degree = 1; Else = 0
Bachelor's degree	Bachelor's degree = 1; Else = 0
Graduate or professional degree	Graduate/professional degree = 1; Else = 0
Income: Wage before training	Annual wage before enrolling in training (\$)
Training	
On-site	On-site training = 1; Else = 0
Off-site	Off-site training = 1; Else = 0
County-level control variables	
% < age 19	Percent of county population under 19 years old
% > age 65	Percent of county population over 65 years old
% Black	Percent of county population Black
Median household income	Median county household income
% high school degree or higher	Percent of county population with high school degree or higher
% in labor force	Percent of county population in the labor force

Independent Variables

The independent variables included several individual and local characteristics. At the individual level, the analysis included demographic characteristics such as race, gender, age, education, and income. Race was measured with three dummy variables for Black, White, and other. Specifically, one dummy variable indicated if a person is black by coding as 1 for Black and as 0 otherwise. Another dummy variable coded for White as 1 and as 0 otherwise. Similarly, for the third dummy variable, other groups were coded as 1 and the remaining groups as 0. Gender was also measured as a dummy variable where female was coded as 1 and male was coded as 0. Age and income were measured on a ratio scale. Education was measured using five dummy variables to capture groups with high school or less, some college without a degree, an associate's degree, a bachelor's degree, and a graduate or professional degree.

At the individual level, two other variables were included in the analysis. First, there was a variable that captured the type of employment. This variable was measured with three dummy variables for those who were employed in manufacturing, medical, or other industry. The other variable measured the type of training, using a dummy variable where 1 indicated on-site training and 0 indicated off-site training.

At the local level, several county-level indicators were used to capture metro/nonmetro differences in socioeconomic characteristics. The first variable was metro status, measured with a dummy variable by coding 1 for metro and as 0 otherwise. All the other county-level variables were measured on a ratio scale. These variables included percentage of the county population under age 19 and percentage of the county

population older than 65. Other variables included percent Black, median household income, percent with high school degree or higher, and percent in the labor force.

Statistical Methods

This study used two statistical methods. The study used logistic regression for the first two dependent variables (employment and employment retention). The logistic regression is the most appropriate tool when the dependent variable in the analysis is a dummy variable (Agresti, Alan, & Finlay, 1986). In contrast, when the dependent variable is measured on the ratio scale, the most appropriate method is ordinary least square (OLS) regression (1986). In this study, OLS was used to examine wage gain.

Logistic Regression Model

The general logistic regression model is shown in Equation 1:

$$\log\left(\frac{p_i}{1-p_i}\right) = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 \dots \beta_k X_k \quad (3.1)$$

where

- P_i = the estimated expected probability of gaining or retaining employment (1);
- $1 - P_i$ = the estimated expected probability not gaining or retaining employment (0);
- α_0 = the regression constant - the estimated log odds of the probability of gaining or retaining employment when all independent variables equal 0; and

- β_k to $\beta_k =$ the estimated expected change in log-odds of the probability of gaining or retaining employment for each unit change in the corresponding independent variable.

Here, the log-odds of the probability f gaining or retaining employment was an linear additive function of the independent variables. However, because log-odds make little intuitive sense, this model can be transformed into the multiplicative probability model shown in Equation 2:

$$\left(\frac{p_i}{1-p_i} \right) = \exp \alpha_0 + \beta_1 X_1 + \beta_2 X_2 \dots \beta_k X_k \quad (3.2)$$

This exponential relationship implies that, for every unit increase in the independent variable, there is a multiplicative effect on the odds of gaining or retaining employment. Following this model, two logistic regression analyses were conducted. The first analysis investigated the relationships between each independent variable and employment gain. The second analysis was conducted to determine if the relationship between training and employment retention holds when controlling for the other variables.

OLS Regression Model

The general OLS regression model is shown in Equation 3:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \varepsilon \quad (3.3)$$

where

- $Y =$ the expected value of the average wage gain after training;

- α = the constant/intercept or the expected value of Y when all the independent variables equal 0;
- β = the partial slope coefficient or more commonly referred to as the regression coefficient. β represents the change in the dependent variable Y associated with a 1-unit increase in the independent variable X when all other independent variables in the model are held constant;
- X = the independent variable;
- ε = error terms (1) the effects on Y (the dependent variable) of variables not included in the equation, and (2) a residual random element in the dependent variable.

Typically, seven assumptions must be met to estimate population parameters and conduct appropriate tests of significance. They are as follows:

1. All variables must be measured without error at least at the interval level.
2. The mean value of the error term is 0.
3. The variance of the error term is constant (if not, one is faced with heteroscedasticity).
4. The error terms are uncorrelated; there is no autocorrelation.
5. Each independent variable is uncorrelated with the error term (if not, the result is specification error).
6. There is no perfect collinearity of any of the independent variables (if not, one will encounter the problem of multicollinearity).
7. The error must be normally distributed. This is a need for tests of statistical significance.

For each dependent variable, four models were estimated (see Table 2). The first model included only the urban/rural status variable. The rationale was to first establish a baseline of the relationship between urban/rural status and workforce outcomes. The second model added the type of training received. The rationale was to determine whether the type of training affects the relationship between urban/rural status and workforce outcomes. The third model added all the individual characteristics. The rationale was to see if, after controlling for type of training, the relationship between urban/rural status and workforce outcomes continued to hold. The fourth model added local characteristics. The objective was to see if all the previous factors continued to hold their relationships, controlling for local characteristics.

Table 2. Regression Models

Model 1	Model 2	Model 3	Model 4
Metro = 1 Nonmetro = 0	Metro = 1 Nonmetro = 0	Metro = 1 Nonmetro = 0	Metro = 1 Nonmetro = 0
	Training categories		
	Manufacturing Medical Others	Manufacturing Medical Others	Manufacturing Medical Others
		Individual characteristics	
		Gender Age Race Education Training location	Gender Age Race Education Training location
			Local characteristics % population < 19 yrs. % population > 65 yrs. % Black Median household income % high school or less % in labor in force

Summary

In sum, the analytical and methodological approach presented in this chapter is innovative in three important ways. First, the study uses—for the first time—administrative data from the state longitudinal data system. This system is designed not only to assess how present performance is a product of the past but how past and present performance can be linked to the future. This study is an example of how a system like this can be used for research purposes. Second, the research design includes measures that gauge the ability of an individual to gain, retain, and improve wages after receiving training. In doing so, the study allows one to paint a full picture of workforce outcomes. Finally, this study uses a block regression approach. This approach allows for the identification of differential impacts of different groups of factors on workforce outcomes.

CHAPTER IV

FINDINGS OF THE STUDY

This chapter presents the results of three sets of analyses. The first analysis estimated models examining the extent to which urban/rural differences influence the odds of gaining employment, controlling for individual and local characteristics. The second analysis estimated models examining the extent to which urban and rural differences influence the odds of retaining employment. The third analysis examined the extent to which urban and rural differences influence the average wage gain, controlling for individual and local factors. This chapter begins with a description of all the variables, followed by a description of the multivariate analysis.

Descriptive Statistics

Included in Table 3 are the descriptive statistics for all of the variables used in the study. These statistics show that 80% of those who received training were able to gain employment and, of those, 50% were able to retain their jobs at least three quarters of a year after exiting a training program. The statistics also show that, on average, individuals gained an additional \$4,633 per year after receiving training.

Of all those who received training, 57.4% resided in nonmetro counties and 42.6% resided in metro counties. Approximately half of the participants received some form of training in manufacturing or medical skill development. Specifically, 16.7% received training in manufacturing skill development, and 29.8% received training in

medical skill development. The remaining 53.5% received other forms of training in the service industry and other sectors. More than half (68.2%) of the training was conducted on-site and the remaining 31.8% was conducted off-site. Before training, the average wage was \$33,056.

Table 3. Descriptive Statistics ($N = 49,213$)

Variables	Mean	SD	Min.	Max.
Dependent variables				
Wage change before and after training	\$4,633	\$3,616	\$500	\$15,000
Employment after training (Yes = 1)	0.808	0.393	0	1
Employment retention (Yes = 1)	0.540	0.498	0	1
Independent variables				
Metro/Nonmetro				
Metro	0.426	0.494	0	1
Nonmetro	0.574	0.494	0	1
Employed industries				
Manufacturing	0.167	0.373	0	1
Medical	0.298	0.457	0	1
Others	0.535	0.499	0	1
Individual characteristics				
Female (= 1)	0.579	0.494	0	1
Male	0.421	0.494	0	1
Age (yrs.)	38.932	12.662	16	65
Race				
White	0.608	0.488	0	1
Black	0.371	0.483	0	1
Others	0.021	0.144	0	1
Education				
High school or less	0.367	0.482	0	1
Some college without a degree	0.298	0.457	0	1
Associate's degree	0.142	0.349	0	1
Bachelor's degree	0.130	0.336	0	1
Graduate or professional degree	0.064	0.245	0	1
Income: Wage before training (in \$1,000s)	33.056	23.434	0	327
Training				
On-site (= 1)	0.682	0.466	0	1
Off-site	0.318	0.466	0	1
County-level control variables				
% < age 19	29.102	1.654	24	35
% > age 65	12.967	1.795	9	18
% Black	32.506	16.716	3	87
Median household income	\$45,828	9.366	\$24,000	\$71,000
% high school degree or higher	46.845	8.313	26	67
% in labor force	59.272	4.543	41	71

More than half (58%) of the population were women. The average age was 39.

Whites were the predominant group seeking training and represented 60.8% of the total population. Blacks accounted for 37.1% of the total population, and the remaining percentage included other minority groups including Hispanics and Asians. Participants covered the entire spectrum of education. Those with a high school diploma or less

accounted for 36.7% of the population, and some college with a degree accounted for 29.8%. Those with associate's or bachelor's degrees accounted for 14.2% and 13%, respectively. The remaining 6.4% held a graduate or professional degree.

The participants were from counties where approximately one-third of the population was younger than 19 and 13% of a county's population was over 65, on average. Not surprisingly, 32.5% of a county's population was Black, on average. The median household income, on average, was \$45,828, and a little more than half of a county's population had more than a high school degree.

Explaining the Relationship between Urban and Rural Status and Employment

The results of this analysis are reported in Table 4. Model 1 reveals that the relationship between metro/nonmetro status and employment after training was positive and statistically significant. Specifically, it indicated that metro residents were 32% more likely than were their nonmetro counterparts to gain employment after training. Model 2 adds the type of training that individuals received. The results show that the type of training influenced the odds of gaining employment for metro and nonmetro residents. After controlling for type of training, the odds changed from 1.32 to 1.4, which means that, after controlling for type of training, metro residents were 40% more likely than their nonmetro counterparts to gain employment. Model 2 also shows that those who received training in manufacturing were 8% more likely to gain employment than those who received training in health care or other sectors.

Table 4. Logistic Regression: Effects of Variables on Employment After Training

Independent variables	Employment after training (Yes = 1)			
	Model 1	Model 2	Model 3	Model 4
Metro/nonmetro				
Metro(= 1)	0.28*** (0.02)	0.34*** (0.03)	0.34*** (0.03)	0.22*** (0.05)
Training categories (Ref = Med./health care)				
Manufacturing		0.08* (0.04)	0.12** (0.04)	0.13** (0.04)
Others		-0.06 (0.03)	0.02 (0.04)	0.02 (0.04)
Individual characteristics				
Female (= 1)			-0.01 (0.03)	-0.01 (0.03)
Age			0.003** (0.001)	0.003** (0.001)
Training location				
On-site (= 1)			0.39*** (0.03)	0.40*** (0.03)
Race (White as reference)				
Black			0.10** (0.03)	0.13*** (0.03)
Others			-0.18* (0.08)	-0.18* (0.08)
Education (high school or less as reference)				
Some college without a degree			-0.007 (0.03)	-0.01 (0.03)
Associate's degree			0.22*** (0.05)	0.22*** (0.05)
Bachelor's degree			0.01 (0.05)	-0.001 (0.05)
Graduate or professional degree			0.04 (0.06)	0.03 (0.06)
County-level control variables				
% < age 19				0.01 (0.01)
% > age 65				-0.002 (0.01)
% Black				-0.005*** (0.001)
Median household income (in \$1,000)				-0.004 (0.004)
% high school degree or higher				0.009** (0.003)
% in labor force				0.008 (0.005)
Constant	1.32*** (0.01)	1.42*** (0.02)	0.99*** (0.06)	0.08 (0.49)
Observations	49,213	45,101	36,457	36,457
Wald chi square	143.24	186.77	398.37	441.24

Note. Standard errors in parentheses; *p .05, **p < .01, ***p .001 (two-tailed tests).

Model 3 adds individual characteristics. These characteristics do not influence the odds of gaining employment between metro and nonmetro residents. The model also shows that there was a positive and statistically significant relationship between age and the odds of gaining employment. The coefficient indicates that the odds of gaining employment were 3% higher for every year increase in age. There was also a positive and statistically significant relationship between race and gaining employment. Specifically, Blacks were 11% more likely than Whites and other races to gain employment after training. Similarly, education had a positive and statistically significant relationship with employment. However, only those who had an associate's degree were statistically different from those who had a high school diploma or less. Individuals with associate's degrees were 25% more likely to gain employment after training than those with a high school diploma or less. Having a bachelor's degree or a graduate/professional degree did not improve the odds of gaining employment compared to having a high school diploma or less. This finding is an indication that available jobs in the state were primarily those that required an associate's degree.

Model 4 includes all the local characteristics. Adding local characteristics reduced the effect of urban and rural status on the odds of gaining employment. However, the effects of the other variables remained the same. The implication is clear: urban and rural status is not the only factor that might explain differential odds of gaining employment after training, but the very nature of the place and its local conditions contribute to explain the differential impact of the odds of gaining employment. Specifically, the higher the presence of minorities in the local area, the lower the odds of gaining

employment. In contrast, the higher the household median income in a place, the higher the odds of gaining employment. The other local factors had no impact on the odds of gaining employment.

Explaining the Relationship between Urban and Rural Status and Employment Retention

The results of this analysis are reported in Table 5. Model 1 reveals that metro residents were 30% less likely to retain employment than nonmetro residents. This relationship remained the same after controlling for individual and local factors. This finding means that the relationship between urban and rural status and employment retention did not depend on other individual or local conditions. The negative statistically significant relationship implies that urban areas might have more unstable and volatile economies. In contrast, rural places might have fewer economic opportunities, but provide more stable job tenure. The differential impact on job retention is truly due to the different natures of urban and rural labor markets.

Model 2 shows that training in health care results in more long-term job tenure. Those who trained in manufacturing were 16% less likely to retain employment than those in healthcare, and those who trained in other areas were 20% less likely to retain employment than those in health care. The implication is clear: Health care is a growing sector and provides employment opportunities with longer job tenure.

Model 3 shows that there was a positive and statistically significant relationship between gender and employment retention. Specifically, women were 17% more likely to retain employment than men. Similarly, older individuals were more likely to retain their jobs than younger individuals. Also, those who were trained on-site were 32% more

likely to retain employment than those who were trained off-site. Most importantly, education has the most significant impact on employment retention. The higher the level of education, the higher the odds of retaining employment. Those with graduate or professional degrees were 52% more likely to retain employment than those with a high school degree or less. Those with an associate's and bachelor's degrees were 43% and 26% more likely, respectively, to retain employment than those with a high school diploma or less. Those with some college were 20% more likely to retain employment than those with high school or less. Finally, Blacks were 3% less likely to retain employment than Whites.

Model 4 shows that at the local level, the higher the percentage of people in the labor force, the higher the odds of retaining employment. In contrast, the higher the percent of Blacks in a place, the lower the odds of retaining employment. The results also show that places with high percentages of older individuals were less likely to provide stable employment.

Table 5. Logistic Regression Coefficients: Effects of Variables on Employment Retention

Independent variables	Retention of employment after training (Yes = 1)			
	Model 1	Model 2	Model 3	Model 4
Metro/nonmetro				
Metro (= 1)	-0.34*** (0.02)	-0.30*** (0.02)	-0.35*** (0.02)	-0.39*** (0.04)
Training categories (Ref = Med./health care)				
Manufacturing		-0.17*** (0.03)	-0.03 (0.04)	-0.12*** (0.04)
Others		-0.23*** (0.03)	0.02 (0.03)	-0.04 (0.04)
Individual characteristics				
Female (= 1)			0.16*** (0.03)	0.17*** (0.03)
Age			0.01*** (0.001)	0.01*** (0.001)
Training location				
Onsite (=1)			0.28*** (0.03)	0.22*** (0.03)
Race (White as reference)				
Black			-0.03 (0.03)	0.10*** (0.03)
Others			-0.27*** (0.07)	-0.30*** (0.07)
Education (high school or less as ref)				
Some college without a degree			0.18*** (0.03)	0.19*** (0.03)
Associate's degree			0.36*** (0.04)	0.38*** (0.04)
Bachelor's degree			0.23*** (0.04)	0.28*** (0.04)
Graduate or professional degree			0.42*** (0.05)	0.45*** (0.05)
County-level control variables				
% < age 19				0.01 (0.01)
% > age 65				-0.04** (0.01)
% Black				-0.02*** (0.001)
Median household income (in \$1,000)				-0.03*** (0.003)
% with high school diploma or higher				0.002 (0.003)
% in labor force				0.03*** (0.004)

Constant	0.32*** (0.01)	0.43*** (0.02)	-0.54*** (0.05)	-0.63 (0.45)
Observations	39,798	37,235	30,266	30,266
Wald chi square	284.87	354.99	771.03	1170.31

Note. Standard errors in parentheses; * p .05, ** p <.01, ***p .001 (two-tailed tests).

Explaining the Relationship between Urban and Rural Status and Wage Gain

The results of this analysis are reported in Table 6. Model 1 reveals there is a positive relationship between metro and nonmetro status and wage gain after training. On average, urban residents experienced a wage increase of \$495.97, which was higher than the wage increase experienced by rural residents. The impact of urban and rural status is dependent upon individual and local factors. When these factors were included in subsequent models, the difference between metro and nonmetro status disappeared. The difference clearly indicated that the extent to which people might experience an increase in wages was a function of individual attributes and local conditions.

Model 2 reveals that training in manufacturing produced the highest return on investment. On average, training in manufacturing produced a wage increase of \$1,114.34 higher than the wage increase produced by training in health care and other sectors. This effect remained equally strong controlling for individual and local conditions.

Table 6. OLS Regression of Individual and County Characteristics on Impact of Training and Wages

Independent variables	Model 1	Model 2	Model 3	Model 4
Metro/Nonmetro				
Metro (= 1)	495.97*** (70.46)	381.76*** (77.59)	249.01** (88.74)	67.09 (134.95)
Training categories (Ref. = Med./Healthcare)				
Manufacturing		1114.34*** (110.84)	1118.05*** (130.11)	1110.00*** (131.60)
Others		445.38*** (87.83)	544.49*** (99.30)	550.48*** (100.09)
Individual Characteristics				
Female (= 1)			-562.86*** (87.31)	-556.30*** (87.38)
Age			-39.72*** (3.40)	-39.14*** (3.41)
Race (Ref. = White)				
Black			-25.44 (87.44)	27.37 (91.23)
Others			-20.14 (281.27)	-27.77 (281.07)
Education (Ref.=High School or less)				
Some college without degree			126.51 (99.74)	123.41 (99.75)
Associate's degree			412.34** (130.85)	414.10** (131.12)
Bachelor's degree			86.84 (136.65)	82.33 (137.01)
Graduate or professional degree			152.30 (177.57)	155.73 (178.18)
Wage before training (in \$1,000s)			5.14* (2.08)	4.33* (2.09)
On-site training (= 1)			380.41*** (85.80)	405.80*** (87.40)
County-level control variables (centralized)				
% < age 19				-33.97 (37.04)
% > age 65				-25.14 (41.97)
% Black				-1.15 (3.97)
Median household income (in \$1,000s)				23.84* (10.44)
% high school diploma or higher				2.22 (9.17)
% in labor force				-29.64* (14.54)

Constant	4421.86*** (45.96)	4054.75*** (67.49)	5408.02*** (186.88)	5434.18*** (190.46)
Observations	10,726	10,726	10,726	10,726
Adjust R^2	0.005	0.014	0.041	0.042

Note. Standard errors in parentheses; * p .05, ** p < .01, *** p .001 (two-tailed tests).

Model 3 shows that women were less likely to experience a wage gain than men, with an average difference of \$562.86 in wage gain. Similarly, Model 3 revealed there was a negative and statistically significant relationship between age and wage gain. That is, for every year in age, wage gain declined by approximately \$40. This model also shows that those with associate's degrees experienced the highest wage gains as compared to all other groups. Most importantly, this model shows there was no differential wage gain between Whites and Blacks.

Interestingly, Model 4 shows that the higher the labor force participation rate in an area, the lower the wage gain. This finding is consistent with labor market theory, which indicates that tight markets provide much more competition for wages. Finally, places with higher median household incomes, on average, were slightly more likely to provide a greater average wage increase than places with lower median household incomes.

CHAPTER V

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

This chapter consists of a summary of the study's findings, implications regarding the role of community colleges in the current knowledge-based economy, and recommendations based upon the results of the study for practice and future research. The chapter communicates the overall goal of the study and provides the answers to the research questions based upon the findings of the study and the important role of community colleges in workforce development.

Summary

The overall goal of this study was to assess urban and rural differences in workforce outcomes after receiving training from community colleges. The study was guided by three fundamental questions.

1. Are Mississippians in rural and urban settings equally able to secure employment after receiving specialized and advanced training?
2. Are Mississippians in rural and urban settings engaging in specialized and advanced skill development equally able to retain employment over time?
3. Do Mississippians in rural and urban settings experience the same wage increase after receiving specialized and advanced training?

The first hypothesis was that investment in skill development reduces the rural and urban gap in workforce outcomes, controlling for individual and local factors.

Specifically, the hypothesis was that there are no differences between rural and urban workforce members in their ability to secure employment after training. The second hypothesis was that there are no differences between rural and urban workforce members in their ability to retain employment after training. Finally, this study hypothesized that rural and urban workforce members experience the same level of wage gain after training.

Central to addressing these questions was the determination of the role that community colleges play in workforce development. To this end, an extensive literature review was conducted to examine the establishment and evolution of community colleges since the turn of the 20th Century. The review indicated that community colleges played a role in several phases of the economic history of the United States. As the economy moved from labor-intensive to more technology-driven, community colleges have played a critical role in preparing the workforce with the appropriate technical skills needed at the time. Another important aspect of this literature was that community colleges are critical components of local economic development and, as such, they are agents of economic change in local areas. In their role as economic change agents, community colleges are very close to the business community and better positioned to align workforce needs with skill development. Community colleges originated to serve and reach out to populations in the most rural areas in the country. Community colleges continue to serve rural populations and play a role in reducing the gap between urban and rural workforce outcomes.

From an analytical perspective, this study used an innovative approach to address its central questions. The study used administrative data collected for the purpose of

meeting state reporting requirements. These data were used to estimate several logistic and OLS regression models. The models were designed specifically to address the three central questions concerning urban/rural differences in workforce outcomes after training at community colleges.

The result of this study presents several important implications. First, training is a critical component to gaining and retaining employment. On average, 80% of those who received training from community colleges were able to gain employment. Of those, 54% were able to retain their jobs for the remainder of the year. Most importantly, training generated an increase of \$4,633 in wage gain per year, on average.

Second, the results show that there were differences in workforce outcomes between urban and rural settings. However, individual and local conditions might have influenced the magnitude of these differences. This influence is especially true for employment and wage gain.

Third, individual characteristics matter. Specifically, education is a critical factor in differential workforce outcomes, controlling for individual characteristics. In all cases, those who benefited the most from training were those with two-year degrees, confirming that community colleges play a fundamental role in providing the knowledge and skills for our workforce.

Fourth, local conditions cannot be dismissed in addressing differential workforce outcomes. Critical factors in determining return on investment were workforce participation rates, presence of minorities, and poor economic conditions. Communities with low workforce participation rates were those with tight labor markets, and therefore, showed a smaller return on investment on training provided by community colleges.

Implications for Practice

In the literature, there are two key elements that have driven the design of this research. First, the literature clearly indicates that community colleges play and will continue to play an important role in preparing people to acquire the necessary skills required in a dynamic workforce environment. As indicated in the literature presented in Chapter 2, the role of community colleges has been especially relevant in the development of skills that are normally not acquired in a traditional classroom. The non-credit role of community colleges has been shown to be very relevant from the progressive era to the present. Second, the literature clearly indicates that there is a difference between urban and rural workforce. Specifically, rural individuals are at a greater disadvantage because they tend to be less educated, and their local environments tend to have fewer economic opportunities. The findings of this study clearly show that community colleges have and will continue to play a role in workforce development, and they will play a significant role in reducing the urban and rural gap. The latter finding is very much in line with the human capital development literature.

This study contributes three facets of information to our understanding of the importance of community colleges. First, the study highlights the role that community colleges play in the current knowledge-based economy. There is a great deal of discussion in the academic and political realms on how to overcome the gaps in education and skill requirements for the jobs of the future. At this time, little is known about how educational institutions should contribute to meeting the challenges posed by the 21st Century economy. To be sure, community colleges are the intermediary organizations that link K-12 to higher education and link graduates to the workforce. Most importantly,

community colleges provide programs specifically tailored to address skill development. This study clearly demonstrates how community colleges have adapted and evolved to address workforce challenges throughout the last century. Specifically, the study provides a conceptual framework to examine how community colleges can respond to the workforce needs of any given time.

Second, this study introduces an innovative approach in the use of administrative data. Typically, these data are collected for accountability and reporting requirements. This study shows how such data can be used for research purposes and therefore for knowledge creation.

Third, this study addresses the issue of the rural/urban gap in workforce outcomes. In the policy arena, programs are often designed with an urban bias. This study outlines how urban and rural differences in demographic, economic, and social conditions might result in differences in workforce outcomes. The study shows that a critical role of community colleges is to reach out to diverse populations with different needs. In doing so, community colleges help minimize disparity in urban/rural workforce outcomes.

Recommendations

Practice

The most important practical application of this study is informing policymakers about the role community colleges play in meeting workforce demands as well as reducing the gap between urban and rural. In the current political environment, there is a lot of emphasis on finding best practices to meet the demands of the growing knowledge-based economy and to do so in accountable ways. Often, the focus is on return on

investment. Within this general framework, the potential is to invest too much in urban settings, as they tend to produce a much higher return on investment, according to state and federal performance measures. One implication of this study is that even though rural areas have a lower return on investment, such an investment is critical to reducing the gap between urban and rural. Reducing the gap now rather than later is more cost-effective. This point is often overlooked due to the urban bias in decisions about policy. In the final analysis, the most important practical implication of this study is to increase awareness of the role that community colleges can play as social equalizers

Future Research

Future research should consider expanding this study to other states. Another possible option would be to include data that provide information about career technical programs across community colleges. This study is a starting point rather than a definitive answer to the questions related to the role that community colleges should play in the growing knowledge-based economy.

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APPENDIX A
IRB APPROVAL LETTER

Mike McCrevey

From: mcgrevey1@aol.com
Sent: Monday, December 12, 2011 10:47 AM
To: Mike McCrevey
Subject: Fwd: Study 11-339: The Role of Community Colleges in the Global Knowledge-Based Economy

-----Original Message-----

From: cwilliams <cwilliams@research.msstate.edu>
To: mcgrevey1 <mcgrevey1@aol.com>
Cc: cwilliams <cwilliams@research.msstate.edu>; cwilliams <cwilliams@research.msstate.edu>
Sent: Mon, Dec 12, 2011 9:09 am
Subject: Study 11-339: The Role of Community Colleges in the Global Knowledge-Based Economy

December 12, 2011

Mike McCrevey
P.O. Box 570
Decatur, MS 39327

RE: IRB Study #11-339: The Role of Community Colleges in the Global Knowledge-Based Economy

Dear Mr. McCrevey:

This email serves as official documentation that the above referenced project was reviewed and approved via administrative review on 12/12/2011 in accordance with 45 CFR 46.101(b)(4). Continuing review is not necessary for this project. However, any modification to the project must be reviewed and approved by the IRB prior to implementation. Any failure to adhere to the approved protocol could result in suspension or termination of your project. The IRB reserves the right, at anytime during the project period, to observe you and the additional researchers on this project.

Please note that the MSU IRB is in the process of seeking accreditation for our human subjects protection program. As a result of these efforts, you will likely notice many changes in the IRB's policies and procedures in the coming months. These changes will be posted online at <http://www.orc.msstate.edu/human/aahrpp.php>.

Please refer to your IRB number (#11-339) when contacting our office regarding this application.

Thank you for your cooperation and good luck to you in conducting this research project. If you have questions or concerns, please contact me at cwilliams@research.msstate.edu or call 662-325-5220.

Sincerely,

Christine Williams, CIP
IRB Compliance Administrator

cc: James E. Davis (Advisor)

APPENDIX B

NSPARC DIRECTOR LETTER OF APPROVAL



November 17, 2011

Ms. Christine Williams
Compliance Administrator
Office of Regulatory Compliance and Safety
Mailstop 9563

Subject: Michael J. "Mike" McGrevey's Dissertation Research

Dear Ms. Williams:

Please accept this letter as permission for Mr. Michael J. "Mike" McGrevey to use nSPARC data as part of his dissertation work in the Department of Leadership and Foundations under the direction of Dr. James Ed Davis.

Mr. McGrevey's research involves the study of community college leadership and data residing with nSPARC will be critical to his research. Please note that Mr. McGrevey will not have access to any identifiable data. In fact, all analyses will be conducted by nSPARC staff and only statistical output will be made available to Mr. McGrevey. At no time will Mr. McGrevey have access to identifiable data.

Please do not hesitate to contact me if I can provide any additional information regarding data for Mr. McGrevey's dissertation research.

Sincerely,

Domenico "Mimmo" Parisi
Director