The Knowledge Economy and Distressed Communities

I: Defining the Knowledge Economy

Mark I. Wilson
Geography/Urban and Regional Planning
Michigan State University
INTRODUCTION

One defining element of our current era is the nature of the economy and the work we perform each day. The preeminence of knowledge and information is central to the many economic, social, and political actions that shape our lives. While knowledge and information have always been important and played a role in economic growth and development, the current evolution of advanced economies places a premium on the generation and management of knowledge. The shift from the physicality of agriculture and manufacturing to the intangibility of information carries with it significant changes in the occupations and industries of most economies and societies. Changes in what we make and the skills valued in the marketplace carry implications for individual well being, as well as the welfare of the places created by the industrial age that must now adapt to a new form of production. This paper is one of a series that examines the knowledge economy, placing emphasis on the experience of, and implications for, distressed communities, and on Michigan’s preparedness to be, and benefit from, a knowledge economy.

Among the changes being experienced as part of structural change are the rise of research and development functions; the growing importance of education and training to meet demands for workers able to contribute value added in a knowledge economy; and the polarization of population into those able to obtain education and benefit from a knowledge economy, and those isolated and exempt from its benefits. The evolution from an agricultural to an industrial society required the adoption of new skills, and also a spatial reorganization of production, with cities far more effective means for the organization of production. As we move from an industrial to a knowledge-based economy we need to prepare for the social and spatial changes that might accompany this powerful economic realignment. The move from farm to factory to office, and from tangible to intangible production, characterizes the changing condition of many economies during the past decades.

THE KNOWLEDGE ECONOMY

The change in the way production is organized carries with it major social, economic, and political change; for work, workers, and the places where we live and work. Economists, political scientists and sociologists have long recognized the importance of linking the nature of work to the condition of our lives and our daily well-being. Structural change for the past century has been examined by scholars intent on tracking the evolution of economic processes. The preeminence of information and knowledge was forecast as the core product of advanced economies by Toffler (1970) and Bell (1973) among others. Bell presents a postindustrial society where science and technology rise to a central position to fuel a services economy based on knowledge. Bell correctly predicted the rise of professional and technical classes as a result of the need for an educated workforce, yet the expectation that knowledge work would provide a better life for workers is tempered by the past two decades when skilled workers did benefit, but those with less education gained little from the knowledge economy. At the same time, analysts, such as Gershuny (1978), started raising questions about the negative implications of the knowledge economy, such as its power to alienate and to divide groups within society.
During the 1980s the growing importance of technology and advanced processes were recognized and sought after as engines of economic growth. In part, the focus was on manufacturing and ways to innovate in the design and production of industrial and consumer commodities. Ann Markusen, Peter Hall and Amy Glasmeier (1985) wrote *High Tech America* at this time and noted the importance of this industry and the breadth of its impact. Of significance were their findings of the large scale of job creation in high tech manufacturing and the ability of this sector to develop in both new and old industrial cities and regions. By recognizing the ability of many areas to offer appropriate conditions for high tech industry, the authors also illustrate the mobility of these economic activities, a prescient recognition of the globalization of production to come during the 1980s and 1990s.

The importance of information is closely tied to the development of technologies to gather and manage this resource. Information technologies, initially computers and later the Internet, were developed to improve information processing, offering new ways to collect and manage information. As information was mined for its value, emphasis started to shift in its economic valuation, with core information growing in value relative to the traditional products of the manufacturing era. Stephen Saxby (1990) underscores the significance of technology and information, noting that the marriage of the two has

…provided a stimulus that can be seen not just in terms of new products, services, wealth and success for the richer nations, but in the far-reaching implications for business methods, design and manufacturing techniques and the way individuals interact, travel, entertain themselves, obtain information and communicate.(Saxby 1990, p3)

The significance of this change is examined in detail by Manuel Castells (1996) who opens *The Rise of the Network Society* by recognizing a “technological revolution” that is “reshaping, at accelerated pace, the material basis of society.” The implications of this revolution range widely, affecting many elements of our daily lives, such as the work we do, the sources of information we receive, the spatial structure of production, and the growing division between those who benefit from a knowledge economy, and those who cannot find a role or who are excluded. Before continuing it is valuable to identify some of the divisions that are associated with the knowledge economy.

- Economic divisions between industries and workers that form the core and periphery of the knowledge economy.

- Geographic divisions between cities and regions that contain clusters and agglomerations of knowledge production, contrasting locations that cannot compete in a knowledge economy. Expanding consideration beyond the nation, we can consider the divisions between countries that gain or lose in a knowledge environment.

- Social divisions between owners of knowledge capital and their workers, and those whose capital is not recognized as economically valuable.
Political divisions between the interests of the knowledge economy and those representing the interests of excluded or peripheral participants.

EMPLOYMENT AND WORK IN THE KNOWLEDGE ECONOMY

The scale and scope of change associated with the knowledge economy can be illustrated for the United States by examining structural change in terms of employment in industry and occupation, by the education needs of the workforce, and through the role of computers and information technology. Recent trends in employment and occupational structure in the United States illustrate the changing organization of US production, and these data suggest the implications of structural change for employment in the future.

**Industry**

The industrial structure of an economy shows the types of goods and services produced, such as manufacturing or construction. As the American economy has developed over the past decades, employment needs have shifted away from agricultural and manufacturing work to service industries such as services and transportation. Figure 1 illustrates the industrial structure of US employment for 1980, 1990, and 2000. Most significant during this period is the decline in manufacturing employment the rise of services, such as business services (advertising, computer/data processing etc); personal services; and professional services (health, education, social, and legal services).
Occupation

In contrast to industry structure, which shows what an economy produces, occupational structure shows the skills needed by an economy for production. Just as the types of goods and services being produced has changed, so has the types of skill needed in their production. The shift to a knowledge economy requires more knowledge workers, and employment to support these workers and the knowledge infrastructure. Figure 2 shows the occupational structure of the US economy for 1983 and 2000. The strongest growth occurs for managerial and professional occupations, which include jobs such as managers, engineers, teachers, lawyers, scientists and physicians, which, in 2000 account for almost one third of the occupations in the US economy. Losses occur for farmers, now only 2.5 per cent of occupations, and for production workers and operators/fabricators who are usually tied to manufacturing.
The occupations that are projected to expand in the coming years also illustrate the importance of an educated workforce. The Bureau of Labor Statistics has identified the fastest growing occupations for the period 1998-2008. Of the thirty fastest growing occupations, twenty require an associate’s, bachelor’s or graduate degree, with the remaining jobs needing on the job training. The fastest growing occupations include such specialties as computer engineers, systems analysts, paralegals, medical assistants, and data processing. Of the thirty occupations with the greatest job growth, nine require some college education as a minimum. The largest growth in absolute numbers is anticipated from a wide range of occupations such as systems analysts, retail sales, cashiers, managers, truck drivers and clerks.

**Education**

As the economy rewards skilled and better-educated workers, the educational attainment of the workforce has increased steadily over the past decades. The ability for high school graduates to find well-paid career paths in manufacturing was a hallmark of post World War 2 American life, yet this outcome had become rare as the economy of the 1970s and later demanded more skills. Of the 110 million workers in 2000, almost one third (34 million) had college degrees, with more
than half of the workforce (65 million) having attended or completed college. Of the growing occupations, such as managerial/professional, college graduates accounted for almost two-thirds (64%) of the occupation group, while declining occupations such as precision production and operators/fabricators have more than two-thirds of their workers with a high school diploma or some high school education. Figure 3 shows the relationship between educational attainment and occupation, underscoring the demands of the economy for more educated workers.

Figure 3

![Bar chart showing employment by occupation and educational attainment 2000. The chart shows that managerial/professional, technical/sales, service, and precision production occupations have a higher proportion of college graduates than declining occupations like precision production and operators/fabricators, which have a higher proportion of workers with a high school diploma or some high school education.]

Source: US Census, Statistical Abstract of the United States 2001, Table 595
Computers

In addition to the forms of work that comprise the knowledge economy is the importance of technology in the conduct of knowledge work. In fact, much of the character of the information age owes its existence to technologies such as computers, telecommunications networks, electronic media, and the Internet. Computers provide the power to generate, manipulate, manage, and index information. Telecommunications allows the movement of voice and data across space, while the information economy is cause and effect of the development and evolution of both computers and telecommunications. Figure 4 shows the level of computer use by education and occupation. Computer use at work is most closely associated for those with college and graduate degrees, and also for those in managerial and technical occupations.

Figure 4

Computer Use by Education and Occupation 1997

Source: National Center for Education Statistics, Digest of Education Statistics 2000, Table 423
THE NATIONAL EXPERIENCE IS ALSO SHARED BY MICHIGAN, WHICH HAS LONG PRIDED ITSELF AS A STATE PROVIDING ECONOMIC OPPORTUNITY. THE EXPECTED CHANGE IN EMPLOYMENT BY INDUSTRY FOR THE PERIOD 1998-2008 IS ILLUSTRATED IN FIGURE 5, AND SHOWS GROWTH PRIMARILY CONCENTRATED IN SERVICES AND WHOLESALE/RETAIL ACTIVITIES, WITH MANUFACTURING BEING A SOURCE OF LOST EMPLOYMENT. THE TRADITIONAL ENGINE OF GROWTH FOR THE STATE, MANUFACTURING, NO LONGER PLAYS THIS ROLE, REPLACED BY SERVICES, WHICH GENERATE BOTH HIGH AND LOW PAYING JOBS BUT LACKING IN THE MIDDLE RANGE OF WAGES.

ASSOCIATED WITH THE CHANGE IN INDUSTRIAL COMPOSITION IS A CHANGE IN OCCUPATIONAL STRUCTURE. IN FIGURE 6, EXPECTED CHANGES IN EMPLOYMENT BY OCCUPATION IN PERCENTAGE TERMS SHOW ABOVE AVERAGE GROWTH IN SALES, MARKETING, TECHNICAL AND PROFESSIONAL CATEGORIES AND SLOW GROWTH IN CLERICAL AND PRECISION PRODUCTION CLASSIFICATIONS.
In absolute terms, Figures 7 and 8 show the level of job gains and losses by occupation for the period 1998-2008. Of the nine occupations expected to provide the most jobs in the state, three (systems analysts, managers/executives, computer support) are usually associated with high wages and career growth, while the remaining occupations, such as clerical sales, cashiers, and laborers, have lower wages and less employment security and benefits.
Figure 7

Michigan Occupations
Major Gains 1998-2008

- Systems analysts
- Retail sales
- Hand packers
- Cashiers
- Sales workers
- Truck drivers
- Managers/executives
- Helpers/laborers
- Computer support

Figure 8

Michigan Occupations
Major Losses 1998-2008

- Bookkeeping/accounting
- Word processors/typists
- Machine tool operators
- Secretaries
- Inspectors/testers
- Machine forming operators
- Computer operators
- Switchboard operators
- Freight/stock movers
The sources of occupational job loss are of concern as many represent mid level work in employment and benefits, such as accountants, machine tool operators, and computer operators, that are being replaced with either higher wage professional work or lower paid service employment.

DISTRESSED COMMUNITIES IN THE INFORMATION AGE

Analysis of the knowledge economy shows the significance of information and knowledge as core functions in an advanced economy. Economic success and wealth accrue to those associated with the knowledge generation functions of the economy, be they skilled and educated workers, owners of capital invested in knowledge firms and industries, or those who serve the economic needs of the knowledge sector. What then is the forecast for communities that do not contain knowledge firms and industries, and whose residents do not have access to the education resources essential for employment success? The goal of this series of reports is to translate the lessons of economic success from the knowledge economy and to consider the implications of structural change for distressed communities.

Communities may be distressed in a number of ways, such as lacking education resources and support for residents, or having no economic link to the growth industries of the day. A community may be in very close proximity to knowledge work and firms yet be unable to benefit because its residents lack the skills and training needed and are excluded from this source of economic growth. Distress stems from the lack of training or preparation for the jobs in demand. As the premium paid to knowledge workers increases, those without sufficient educational preparation slip further behind. The most dramatic example of this trend is the decline in real wages over the past two decades of workers without a college education.

A second source of distress, geographic isolation from economic growth, may be less significant today. As the nature of the economy has changed so has the spatial relationship of economic actors and agents in our society. Associated with the rising value of information and knowledge is the marriage of computers and telecommunications as a force for the management and control of information. Communities disadvantaged by location or geographic isolation may find a niche in the knowledge economy by using information technologies to overcome the friction of distance.

The death of distance, proclaimed by The Economist in 1995 and later elaborated by Cairncross (1997), captures the sense that distance no longer matters. The conquering of distance in electronic terms brought for many the dream of low cost and efficient access to people and information worldwide. The death of distance, however, is too simplistic a claim because it misses so many of the nuances of the structure and character of electronic interaction. Distance may not matter for those in affluent countries, or working in information industries, or for those with business or personal reasons to contact others. Those for whom distance may not matter are a small proportion of the world's population. For many of the world's inhabitants, distance remains a source of social and economic friction, and place matters more than ever.
Often associated with the concept of the death of distance is the mistaken assumption that it also refers to the declining importance of place. Low cost electronic interaction has certainly made it easier for residents of different places to interact, but at the same time it has also brought different places into a common realm where differences matter. Rather than be seen as a force diminishing distance, low cost electronic interaction underscores the powerful value of connecting places. The reason so much effort and investment has been directed at developing electronic infrastructure is because of the value gained from interacting with different places. There are many reasons for wanting to access different places, such as their markets, the information produced or exchanged there, sale of information as an input to production, or to connect people who have family ties across space.

CONCLUSION

As the economy changes and places greater emphasis on knowledge work and employment, communities may find their fortunes deteriorating if they are unable to connect to the prevailing source of economic growth. The positive future foretold by Daniel Bell may have come true for educated workers in a post industrial society, but for the people and places disconnected from the growth sources, the future is far less positive.

REFERENCES


National Center for Education Statistics (2000) *Digest of Education Statistics*

