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ABSTRACT

The decline of American industry and its loss of competitive strength in the world economy has led to a need for stimulation of the economy through reindustrialization. Reindustrialization is a part of, or a tool for, economic growth. As such this term is directly linked to productivity and job creation. Several critical elements and procedures are necessary for reindustrialization to occur. These are collaborative policy development, increased investments in plants and equipment, technological innovation, special attention to small business, and investment in human resources. Japan and West European countries have comprehensive approaches to reindustrialization, while reindustrialization policy in the United States is in an embryonic stage. The concept of reindustrialization has major implications for vocational education. Vocational education can have an impact on the process through delivery of education and training that provides general work skill development and occupational skill development. An immediate need exists for retraining and upgrading of adult workers. A well-planned cooperative and coordinated effort must also be conducted by industry and vocational education. Vocational education should conduct assessments to identify training it can provide and then develop and deliver multi-faceted flexible education and training. (YLB)

Information Series No. 233

REINDUSTRIALIZATION:

Implications for Voc Ed

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FOREWORD

Renewed emphasis on productivity in the United States has resulted in a period of revitalization, known as reindustrialization. The author suggests that vocational education can best contribute to the reindustrialization process by providing flexible training and retraining programs.

This paper is one of seven interpretive papers produced during the fourth year of the National Center's knowledge transformation program. The review and synthesis in each topic area is intended to communicate knowledge and suggest applications. Papers in the series should be of interest to all vocational educators including teachers, administrators, federal agency personnel, researchers, and the National Center staff.

The profession is indebted to Dr. James A. Leach for his scholarship in preparing this paper. Dr. I. A. Gazalah of Ohio University; Leonard Lecht of Roosevelt Island, New York; and Dr. Robert Bhaerman of the National Center for Research in Vocational Education contributed to the development of the paper through their critical review of the manuscript. Staff on the project included Alta Moser, Shelley Grieve, Raymond E. Harlan, Dr. Carol Kowle, Dr. Judith Samuelson, and Dr. Jay Smink. Editorial assistance was provided under the supervision of Janet Kiplinger of the Field Services staff.

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EXECUTIVE SUMMARY

In some ways the concept of reindustrialization is not new. The United States has a history of marshalling and managing resources—including human resources—to meet its challenges. Through these efforts, it has become an industrial and economic world leader. Education, including vocational education, has played an important role in preparing individuals for participation in the work force throughout these challenging times.

The concept of reindustrialization, however, now appears to be different in at least four ways. First, the United States can no longer take for granted its economic and industrial leadership position in the world. Second, major economic policy changes are needed for revitalization. Third, the concept of reindustrialization appears to have broad-based support among business, labor, and government leaders, although there is little agreement on the methods to employ or the models to follow. Fourth, although reindustrialization is essential to "rebuild" the economy in the short run, a long-term plan and/or policy for investing in human resources is needed. Faced with accelerating technological advances and keen worldwide competition, a coordinated and cooperative education and training policy will be needed in the decades ahead. Such a policy will be needed to provide the skilled, productive work force required to maintain a viable and strong domestic economy and competitiveness in world markets.

The concept of reindustrialization, viewed in both the short and long run, has two major implications for vocational education. First, there is an immediate need for retraining to upgrade the skills of adult workers. Second, a well planned, cooperative, and coordinated effort must be conducted by industry and vocational education.

The major vocational education research and development thrusts needed to accompany the reindustrialization process correspond with these major implications. The vocational education system at all levels must conduct assessments of its overall operation to identify the types of training it can and cannot provide, given the current and likely future constraints. Based on these assessments, on the need to provide youth with long-term basic work skills and on the short-term retraining and upgrading needs of industry, vocational education must make the adjustments necessary to develop, promote, and deliver multi-faceted, flexible education and training programs.

INTRODUCTION

In some ways the concept of reindustrialization is not new. The prefix *re* implies that industrialization has occurred before. Certainly, the United States has been industrialized. The shift in this nation from an agrarian to an industrial society began during the early 1880s and continued at a fervent pace until the decade beginning about 1955. During that decade, white-collar and service workers outnumbered blue-collar workers for the first time (Toffler 1980).

The essence of American industrialization was economic growth. This growth was initiated and sustained by industry's drive to compete successfully for profits in world markets, as well as the pursuit of prosperity by individual workers. Education for work played an important role in the quest for economic growth. Wirth (1971) notes that it is impossible to pinpoint exactly when the term *industrial education* first came into use, but that it was heard more frequently after the Civil War and was marked from the beginning with an imprecision of meaning. During the early phases of the industrialization of America, it gradually became clear that the new industrial technology-based culture was dependent on formal education and skill training for survival.

Today, once again, there is a need to stimulate the nation's economic growth. Most business, labor, and government leaders agree that the United States economy must undergo a fundamental change if it is to remain competitive in world markets. The basic problems in the economy have been identified as follows: declining rates of productivity, decreasing capital investment, increasing interest rates, lack of effective dialog between public and private sectors, increasing rates of inflation, and unstable sources of energy (Martin 1980). In order to overcome these problems, many leaders have called for reindustrializing the nation's productive capacity. As was the case during the industrialization of America, reindustrialization holds important implications for vocational education.

Dunham (1981) notes that the term *reindustrialization* is not a throw away buzz word, but that it will come to have a profound meaning to vocational education personnel in the near future. Martin (1980) summarizes the recommendations made at a conference on Technology Assessment and Occupational Education in the Future. The presentations at this conference emphasized the concern for lagging productivity in the United States and the need for technically trained and skilled workers. Education, in particular vocational education, was urged to make a major contribution to the reindustrialization process by (1) responding to and becoming a partner with the private sector in order to develop a trained, employed, and productive work force; (2) assisting in reindustrializing the United States at every juncture of the process; and (3) becoming an integral part of the economic development strategies of states, regions, and localities.

The purpose of this paper is to analyze the concept of reindustrialization by synthesizing the available literature on the topic and delineating the implications of reindustrialization for vocational education. In so doing, one of the first questions to arise is simply this: What is new or different about reindustrialization? Should it be thought of simply as extended

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industrialization? The answer is not easy. Nor is there agreement among the principal actors in the process regarding the best methods to use or roles each will assume.

Toffler (1980) cautions against viewing the future as a mere extension of yesterday or today. This warning has special significance for understanding, planning, and conducting the process of reindustrializing the nation's economy. If the concept is viewed in a narrow sense only, i.e., making America's traditional factories more productive, the outcome is likely to be an attempt to use methods that worked well to achieve economic growth during the previous era of the industrialization of America.

The emphasis of reindustrialization cannot be on the manufacture of goods for an industrial society. Ginzberg (1979) notes that since 1969 there has been no overall employment growth in manufacturing in this country. The expansion of the economy in terms of employment has been overwhelmingly in the service sector. The need for economic growth and development may be even more acute now than in previous decades. However, the society within which economic growth must occur has changed dramatically.

Structural pressures on the economy have become apparent. Since World War II, the explosive growth of cities, migration of workers, changing work force composition, fluctuations in the birthrate, and increased educational attainment have constituted severe structural pressures on the nation's economy. Demands on the system are elicited by an ever-aging population, faster rates of economic and technological obsolescence, a generally lower demand for basic consumption goods, and an increased demand for service and quality of environmental factors, especially in the work place.

Advancing technology has had profound effects upon the nature of social institutions. The dominant commodity has evolved from agricultural products, to manufactured products, to information-related products. The United States is becoming a society based on knowledge industries (Strassman 1980).

Postindustrial emphasis on a service economy is resulting in a change in the ratio of white-collar workers to blue-collar workers. During the 1980s, the number of white-collar jobs is expected to increase by 24 percent, while the number of blue-collar jobs is expected to decrease by 25 percent (Odiorne 1980). It is estimated that by 1985, nearly half of the 104.5 million civilian workers will be employed in clerical, technical, and managerial positions (Strassman 1980).

Rising costs of labor are resulting in increased use of equipment to replace unskilled American workers. In addition, there is greater use of foreign labor through imported workers, imported products, or relocation to other countries where the labor costs are lower (Odiorne 1980).

A larger proportion of the adult population is in the work force than ever before and the composition is changing. More females and teenagers are seeking paid employment, while the proportion of men in the labor force is declining (Mark 1979). The proportion of nonwhite workers in the work force also is increasing. More workers have middle-class, urban backgrounds and increased educational levels. There are more dual-career families and more single parents in the work force (Freeman 1979).

New work attitudes also are becoming apparent. Workers are more concerned about the quality and conditions of work. As leisure time takes on added importance, there is a general commitment to fit jobs to life-styles. More people are expecting "good jobs" to mean more than steady work and satisfying pay. They are seeking interesting and challenging work, independence, responsibility, and a greater voice in what goes on in their jobs (Katzell 1979).

In addition to the changing composition of the labor force, the United States is experiencing a shift in the location of population and industries. Dissatisfaction with the contemporary environment is the motivating factor, whether it is viewed from the perspective of the worker (i.e., lack of significant job opportunities) or of the industry (i.e., lack of significant growth potential). Currently, there is an influx of people into the sunbelt regions, thereby spurring the development of the service sector in those areas. Industry also is moving into areas where labor is cheaper. Many of these areas are in the South, thus resulting in a shift in the geographic distribution of employment away from jobs in the eastern and mid-western industrial areas (*The Trend Report* 1981).

Given these changes, the term *revitalization*—rather than *reindustrialization*—may be more appropriate for and descriptive of the tasks at hand. Throughout the remainder of the paper, the term *reindustrialization* is presented in a broad context to mean the revitalization and stimulation of the productive capacity of the nation.

THE CONCEPT OF REINDUSTRIALIZATION

Reindustrialization is a broad concept and means different things to different people. In order to understand the implications for vocational education, it is necessary first to have an overall understanding of the term. This section presents a brief summary of the era of industrialization, discusses the need for reindustrialization, presents the relationships between reindustrialization and other economic development concepts, identifies the critical elements and procedures necessary for reindustrialization to occur, and presents the status of reindustrialization in the United States and in other nations.

Industrialization

Economic growth in the United States in the one hundred years between the end of the Civil War and the beginning of the Vietnam War has been described as the eighth wonder of the world ("The Reindustrialization" 1980). The economic institutions and attitudes during this period were ideally suited to taking advantage of the growth opportunities available in the nation during that century.

Economic policy during that period encouraged economic growth. For example, the Homestead Act of 1862 ensured access to new land by the broad majority and the Sherman Antitrust Act of 1890 allowed small businesses to compete without being engulfed by powerful, big business. In addition, the invention of widely owned and publicly traded giant corporations was ideally suited to taking advantage of the opportunities available in a new frontier. Although there were business slumps during the period, most notably the Great Depression of the 1930s, the wealth created during this period allowed United States's corporations to become great multinationals and the most dynamic force in the world economy ("The Reindustrialization" 1980).

Carnevale (1981) suggests that the seeds of the current economic malaise in the United States were sown by the dramatic successes experienced over the past forty years. The abundance of resources organized for World War II production remained stimulated during the postwar era by the demand for consumer goods encouraged by war wages. The result has been relatively effortless growth.

However, the economic policies which encouraged this growth and the success of American industry were primarily based and dependent on the exploitation of a continental market. The world economy has since become increasingly integrated. Reliance on previously successful economic policies and business management techniques and attitudes has led to serious economic problems and a drastic loss of competitive strength both at home and abroad.

In the 1970s the United States lost 23 percent of its share of the world market, compared with a 16 percent decline during the 1960s. The decline in the United States's position in the 1970s alone involved losses of $125 billion in production and 2 million industrial jobs ("The Reindustrialization" 1980).

The Need for Reindustrialization

Roesch (1981) summarized the current feeling:

> Maybe we have all been spoiled. We have progressed, generation after generation, in this country by being told and believing that our standard of living will always improve; that somehow the United States exists as a country apart; that inflation, recession, unemployment, and shortages are things that occur in other countries. Now a realization has arrived. Now we know it can happen here and we do not like it. So, there is a consensus for change. (p. 4)

The decline of American industry and its loss of competitive strength in the world economy have led many business, labor, and government leaders to call for stimulation of the economy. Terms used to describe the process needed to cure the ailing economy include *reindustrialization, revitalization, supply-side economics, the formulation of a new industrial policy*, or *the forging of a new social contract among business, labor, and government*.

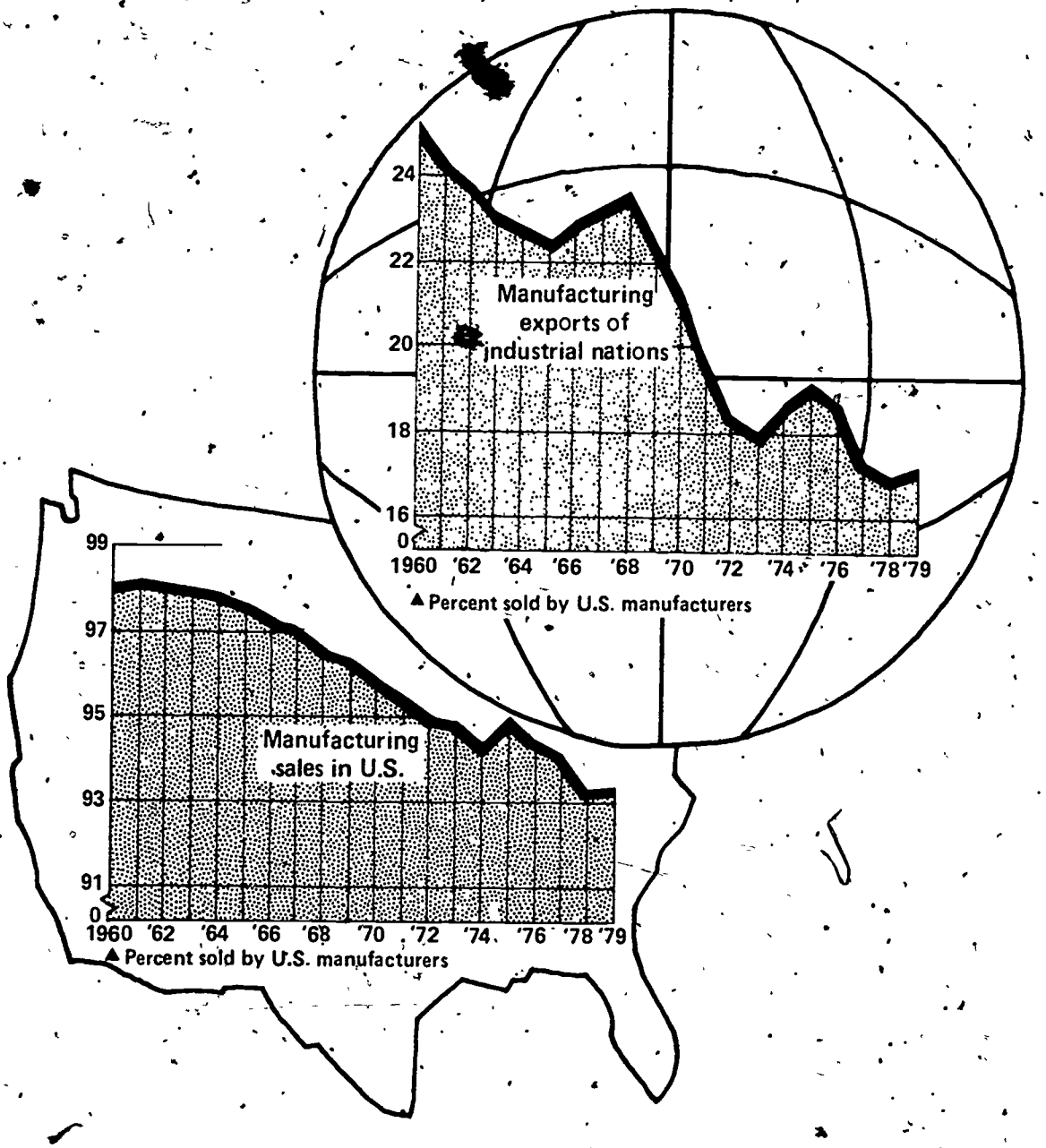
The concept of reindustrialization is fairly new, although its genesis can be traced to the middle of the 1970s. Beginning then, rapid growth in the United States economy subsided. Lack of capital investment, energy shortages, and inflationary constraints contributed to the abrupt turnabout (Mark 1979).

The term reindustrialization was first introduced by former Secretary of Transportation Brock Adams in 1979 during the Chrysler Corporation financial crisis. In January of 1980, Governor Brown of California used the term at a Washington press conference. He noted "The only choice . . . is to reduce consumption, to shift our capital to more investment—environmental, technical, and human—and use both the public and private sector, use changes in credit policies, changes in the tax laws, changes in the regulatory process, but push always in the direction of what I call reindustrializing the country to sustain our needs and our competitive position" (Martin 1980, pp. 2-3).

Etzioni (1979) identifies reindustrialization as being a most effective means of achieving restoration. He defines restoration as injecting old virtues, values, and taboos with new potency. Reindustrialization, according to Etzioni, necessitates a recommitment to the work-and-save ethos and a parallel rededication to technical efficiency, productivity, and economic progress. Hershman and Levenson (1980) suggest that a reindustrialization policy would deal with specific industries needing aid or encouragement, as opposed to economic planning that would set targets for the entire economy.

FIGURE 1

UNITED STATES SHARE OF DOMESTIC MANUFACTURING SALES AND MANUFACTURING EXPORTS OF INDUSTRIAL NATIONS



Much of the current debate over reindustrialization focuses on whether to back "winners" in high-growth sectors of the economy or "losers" in declining sectors. Daniels et al. (1981) state, however, that neither approach addresses the real cause of the nation's economic decline. Reindustrialization policy should encourage long-term planning, innovation, and risk taking in all sectors.

Strong criticism of the concept of reindustrialization has also been expressed (Phillips and Harrison 1980). Phillips and Harrison (1980) quote Gar Alperovitz, an economist, as defining reindustrialization as "just meaning more government intervention at the behest of big business," and suggesting "that the calls for a new social contract among business, labor, and government would result in more government bailouts, more tax breaks for big business, and less government regulation" (p. 2). They also refer to Stanley Aronowitz, professor of political science at Columbia University, as adding that "reindustrialization involves sacrifices in collective bargaining and pressure group politics" (p. 2).

Steven Max of the Midwest Academy claims that supporters of reindustrialization look to the better days of capitalism's infancy and are trying to turn back the hands of time simply by removing government regulations (Phillips and Harrison 1980). Others point out that reindustrialization has provided an excuse for conflicting pressure groups to invoke the phrase to press their own particular interests (Daniels et al. 1981).

There is nonetheless widespread agreement among business, labor, and government leaders that reindustrialization is necessary (Flint 1980). Levy (1980) reports on a survey of 250 heads of major corporations regarding their views on federal reindustrialization efforts. The major point of agreement was that federal help would be welcomed in the form of economic incentives to create new capital, to speed gains in productivity, and to develop new technology.

The corporate heads also agreed that the help should not be a handout targeted only to ailing industries or bankruptcy-bound businesses; nor should it be confined to economically depressed areas. The great danger, as stated in "The Reindustrialization of America" (1980), is that the political system in the United States will translate reindustrialization into some brand of "lemon socialism" whose main focus would be to save the lemons, that is, the obsolete jobs and companies that are too inefficient to compete in world markets.

The critical situations in the automobile, steel, and rubber industries are well known. However, they are only the most widely publicized problems. The industrial motor and apparel industries are experiencing difficulty now; many others are likely to come under increased pressure in the coming years. Even the semiconductor industry, in which the United States now holds 60 percent of the world market, is struggling to hold on to its lead. It is estimated that the United States's percentage of the world market will decrease to 50 percent by the end of the current decade (Hershman and Levenson 1980).

Although increasing foreign erosion of the United States's market share has occurred over the last several decades, Robert V. Lawrence, a Brookings Institute economist, attributes the severity of the present problem to an "era of slow growth" (Levy 1980). Manufacturing companies are producing very few jobs to absorb new entrants into the work force or workers displaced by plant closings and changing technology. The jobs being created are in the service sector. Displaced manufacturing workers are not skilled in the technology to obtain these jobs. The world is moving into an era of international specialization of production (roughly equivalent to the economic postulate of comparative advantage), with each nation making the products best suited to its mix of labor, raw materials, capital, and technological resources.

TABLE 1

KEY INDUSTRIES HARDEST HIT IN THE UNITED STATES AND WORLD MARKETS

United States Market:

Ranked by Total Sales of Industry

Percent of Market:

	1960	*1970*	*1979*
Autos	95.9%	82.8%	86.0%
Steel	95.8%	85.7%	86.0%
Apparel	98.2%	94.8%	90.0%
Electrical components	99.5%	94.4%	79.9%
Farm machinery	92.8%	92.2%	84.7%
Industrial inorganic chemicals	98.0%	91.5%	81.0%
Consumer electronics	94.4%	68.4%	49.4%
Footwear	97.7%	85.5%	62.7%
Metal-cutting machine tools	96.7%	89.4%	73.6%
Food processing machinery	97.0%	91.9%	81.3%
Metal-forming machine tools	96.8%	93.2%	75.4%
Textile machinery	93.4%	67.1%	54.4%
Calculating and adding machines	95.0%	63.8%	56.9%

World Market:

Ranked by Size of U.S. Exports

Percent of World Exports:

	1962	*1970*	*1979*
Motor vehicles	22.6%	17.5%	13.9%
Aircraft	70.9%	66.5%	58.0%
Organic chemicals	20.5%	25.7%	15.0%
Telecommunications apparatus	28.5%	15.2%	14.5%
Plastic materials	27.8%	17.3%	13.0%
Machinery and appliances (nonelectric)	27.9%	24.1%	19.6%
Medical and pharmaceutical products	27.6%	17.5%	16.9%
Metal-working machinery	32.5%	16.8%	21.7%
Agricultural machinery	40.2%	29.6%	23.2%
Hand or machine tools	20.5%	19.1%	14.0%
Textile and leather machinery	15.5%	9.9%	6.6%
Railway vehicles	34.8%	18.4%	8.1%
Housing fixtures	22.8%	12.0%	8.1%

According to many business, government, and labor leaders, reindustrialization of the American economy is needed for us to compete successfully in today's world market and to fuel economic growth and vitality. The reindustrialization process must be planned and implemented through a close working relationship of business, labor, and government. As Hershman and Levenson (1980) point out, however, coordinated and planned government action is not characteristic of United States economic policy. For the most part (except for the space and defense industries and during war years), the government allows the marketplace to determine which companies and industries succeed and which fail. Reindustrialization will require sweeping changes in federal economic policy and in the attitudes of and the roles played by business and labor.

Relationship to Other Economic Development Concepts

Reindustrialization should not be viewed in isolation from other economic development concepts. Economic development is defined by many economists as the process of expanding the productive capacity and improving the quality of life (e.g., decreasing unemployment) in an area or a region (Bruno and Wright 1980; Ledebur 1977; Winnie 1977). Reindustrialization is a part of, or a tool for, economic development. As such, the concept, even if viewed in a narrow sense as applying to manufacturing industries only, is directly linked to productivity and job creation.

Productivity

The issue of America's declining productivity rate is being raised with increasing frequency and intensity. The term, simply stated, refers to the relationship between outputs and resource inputs. Productivity depends on the quantity and quality of these inputs. Historically, the rate of productivity has been used as one of the economic indicators to measure the relative stability of the nation.

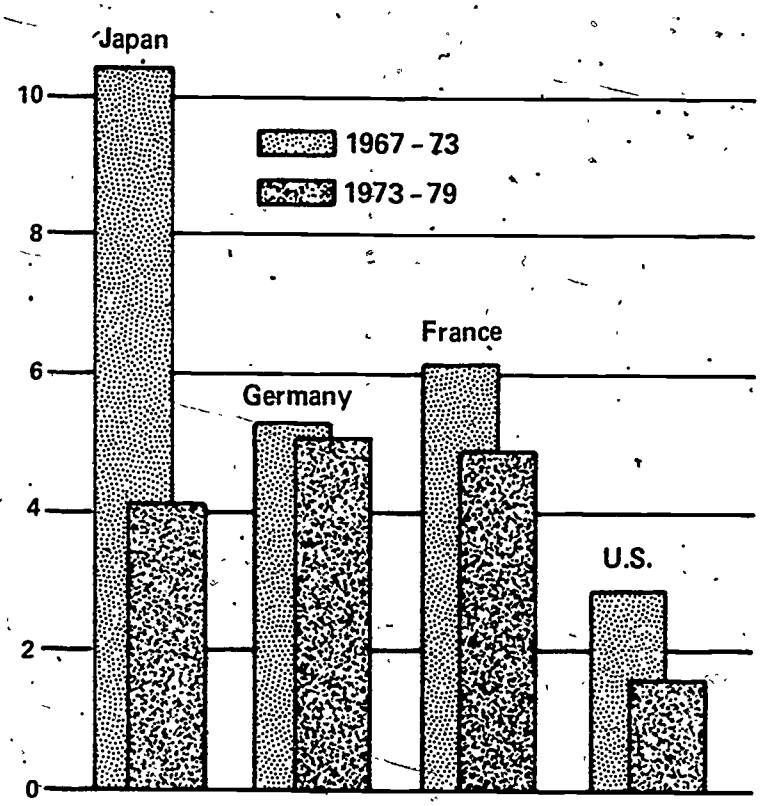
The American public recently has become enlightened about the lagging productivity of the nation's work force. Declining productivity has been spotlighted as a major cause of inflation. Morrisett (1979) states the relationship simply: "The most important basic fact about inflation and income is that if average income increases by more than average productivity, inflation must result" (p. 335). Virtually everyone is concerned with inflation. The nation's economic downturn, in particular the rate of inflation, also has made the productivity of the work force a professed concern of many disciplines outside of economics.

The notion that productivity affects the vitality of the industrial economy is not new. A number of years ago, Kendrick (1977) noted that productivity affects virtually all broad economic concerns, e.g., industrialization, automation, tax reform, cost-price squeeze, and competition in foreign markets. Growth in productivity is important to all Americans. It is a key factor in determining improvements in living standards, since it fuels economic expansion, provides for long-range growth in jobs, and helps to restrain inflation.

The slowdown in the productivity growth rate in the United States during the past fifteen years has caused serious concern to economists and others. According to Parrish (1980), the annual increase in productivity declined from about 3 percent in the 1950s, to about 2 percent during the last half of the 1960s and early 1970s, and to about 1 percent during the past five years. In 1980 there was a decline of four-hundredths of 1 percent.

FIGURE 2

HOW UNITED STATES PRODUCTIVITY LAGS IN MANUFACTURING



▲ Average compounded annual percent increase

Data: Bureau of Labor Statistics

While economic observers will agree that growth of productivity in the United States has declined, there are differing views about what caused the problem and how to combat it. The reasons for lagging productivity include the following points: reduced spending for research and development, lackluster investment, and an increase in employment in the service industries where productivity gains are harder to achieve ("The Reindustrialization" 1980). Changes in the composition of the labor force (e.g., increased numbers of youth and inexperienced females) have also been identified as reasons for a slowdown in productivity growth (Moore 1980; Kunze 1979; Mark 1979). Changes in attitudes and expectations of many workers may also contribute to the problem (Etzioni 1979; Yankelovich 1979).

Views regarding how to increase productivity also vary. Priority often is given to technological change. Business often promotes capital formation and government deregulation. Organized labor favors enhancing workers' skills and security (National Center for Productivity 1978). In reality, each of these factors affects productivity growth and all are interrelated.

While the United States still is the most productive nation in the world economy, the rest of the industrial world (especially Germany and Japan) is closing the gap rapidly. Unless there are radical changes in productivity trends, Germany probably will exceed the United States in output per employed person by the mid-1980s, and Japan will be close behind ("The Reindustrialization" 1980). Lagging productivity is contributing to the loss of competitiveness in the world market and, in many cases, the domestic market. This lack of competitiveness stunts economic growth and increases unemployment. Increasing productivity, therefore, is central to the reindustrialization process.

Job Creation

When new employment opportunities occur for the citizens of a locale or area in the process of economic development, it is called *job creation* (Paul 1980). If a new plant relocating in or near a community brings in employees from its old location, there will be no job creation from a national vantage point. In terms of additional jobs, industry relocation is a zero-sum game that, nonetheless, is being played rigorously by many states and communities. With stakes growing higher in a slowing economy, pressure mounts for competition among states for businesses and industries. This process often results in job creation, according to Rosenfeld (1980).

Two aspects of job creation hold special significance for reindustrialization. One is job development; the other is job preservation. The former refers to the process of upgrading or reorganizing existing jobs. Efforts to increase productivity and to use new and emerging technologies often necessitate job development. Efforts to persuade industries to remain in a community, rather than to relocate or close for economic reasons, may be termed *job preservation* (Paul 1980). Although job development and job preservation reduce unemployment, neither results in an increase in the total number of jobs in the nation.

Millions of new jobs are needed for unemployed youth and for the many women entering the labor force. New jobs also are needed for older adults who want to remain productive for longer periods of their lives. Since 80 percent of all jobs in the United States are created in the private sector, the nation looks to this arena for a solution to the problems of unemployment and economic stagnation. The government will need to create an environment in which this form of economic development is encouraged (Paul 1980).

Job creation is critical to the reindustrialization process. Although most new jobs are now created in the service sector of the economy and by small businesses, large manufacturing and

processing industries are important to job creation. Paul (1980) explains that, in addition to creating jobs per se, manufacturing industries also create a demand for services, which in turn increases economic activity within the region. This phenomenon, called the "multiplier effect," accompanies the development of all industries, but is greater for high-technology industries than for processing or service industries.

The concept of job creation is linked directly to the reindustrialization process. Job creation should be included as a primary component of the reindustrialization of America.

Critical Elements of the Reindustrialization Process

Several generally accepted elements are critical to the process of reindustrialization. While various reindustrialization models do not uniformly apply these elements, they are components of most reindustrialization models. Although discussed separately here, any one element cannot solve the problem of the shrinking market share in the United States. These critical elements should not be viewed in isolation. They should be viewed instead as puzzle pieces that may not be significant by themselves, but when considered together, present a picture of what is needed for reindustrialization. The elements of the reindustrialization process are the following:

- Collaborative policy development
- Increased investments in plants and equipment
- Technological innovation
- Special attention to small business
- Investment in human resources

Likewise, the responsibility for the current situation cannot be attributed to a single group. Government, business, and labor all have played a part in creating the problem. All must take an active role in the reindustrialization process. By most accounts, the climate is right for such collaboration.

Collaborative Policy Development

Clearly, the first step in reindustrialization is recognition of the critical nature of the problem. Carnevale (1980, 1981) notes, as do others, that our economic policy must undergo fundamental shifts in response to structural changes in the economy. He also asserts that neither the natural equilibrating mechanisms of the market or demand-centered economic policies have been successful. Recent efforts at "fine tuning" the economic system have been ineffective. New economic policies are needed.

In order for these policies to be effective, they must be collaboratively planned and implemented. American economic institutions must abandon their traditional adversarial posture. Reindustrialization will depend on consensus, rather than coercion (Carnevale 1980; Etzioni 1980; Hershman and Levenson 1980; "The Reindustrialization" 1980; Roesch 1981).

A government-business-labor partnership that develops and implements economic policy is central to most reindustrialization plans. There are, however, profound differences in the

philosophical orientations of economists toward appropriate economic policy. At one end of the continuum is a proposal calling for teams from government, business, and labor to analyze the problems of each economic sector. These teams would make decisions regarding the probable success or failure of certain industries. This concept has been called *national planning*. Etzioni (1980) describes the process as showering the "winners" with government-provided subsidies, loans, loan guarantees, tax incentives, a measure of protection, and research and development write-offs. The "losers" would be subjected to a "sunset" procedure, or allowed to fail.

At the other end of the spectrum is the plan that, although collaborative, reduces the scope and intensity of government economic policymaking. In this plan, often called *supply-side economics*, the government would reduce substantially its spending on entitlements and its regulation of private industry and would let the free market solve all of the problems. This approach would neither direct nor target resources in any particular way (Etzioni 1980).

In all approaches suggested for reindustrialization, there is general agreement that—through a coalition approach—government economic policies must be reviewed and revised. Policy revisions are suggested in the following major areas: government spending, trade, expansion and development of natural resources, antitrust, industrial promotion, tax laws, and credit. The notion that action of any type on policy development will work only if there is consensus among business, labor, and government leaders is at the heart of the reindustrialization process. (Etzioni 1980; Levy 1980; "The Reindustrialization" 1980; Roesch 1981).

Increased Investments in Plants and Equipment

By all accounts, reindustrialization will require increased investment in plants and equipment. The emphasis on spending rather than saving during the past ten to fifteen years has been labeled "over consumption." This has led to reduced availability of capital for modernizing plants and equipment. Lawrence R. Klein of the University of Pennsylvania notes that, "if reindustrialization is to occur, we must go from being a high-consumption economy to a high-saving economy" ("The Reindustrialization" 1980, p. 61). The reduction in saving, along with other factors such as negative rates of return caused by inflation and high taxes, has set a low limit on the capital available for investment.

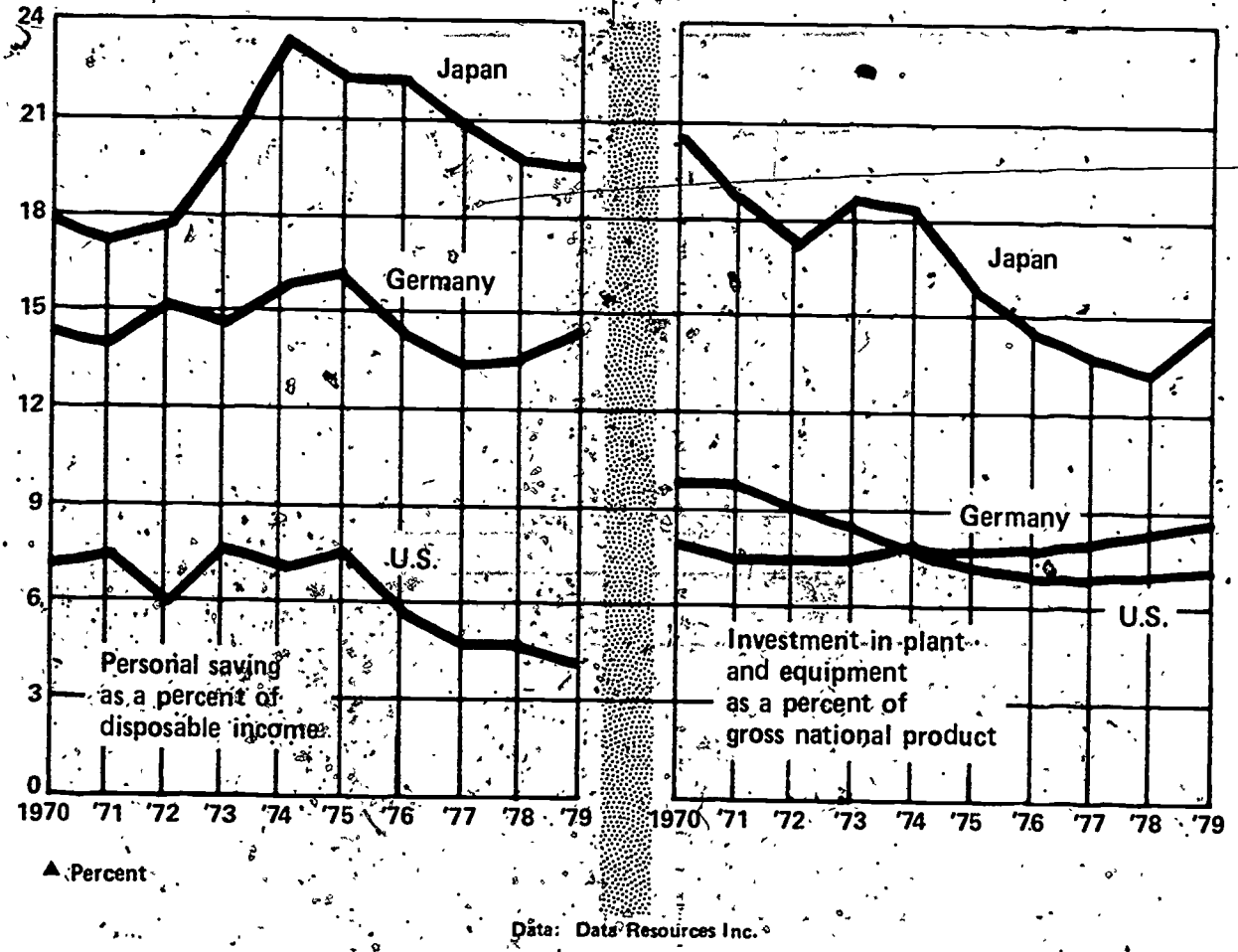
Policies that encourage investment to update plants and equipment are seen as vital by all who call for reindustrialization. The need to increase investment in plants and equipment is a central element, no matter from which end of the conservative-liberal continuum the approach originates (Carnevale 1980; Etzioni 1980; Hershman and Levenson 1980; "The Reindustrializaton" 1980; Roesch 1981).

Technological Innovation

Throughout the previous century, America has produced an array of technological innovations that have altered radically the lives of most of the world's population. The evidence suggests, however, that the ability of American industry to convert new ideas to commercial products and processes is slipping. For example, Allen H. Skaggs, director of the research center of the Aerospace Industries Association of America, notes that "It is abundantly evident that U.S. technological innovation and productivity are on the decline" ("The Reindustrialization" 1980, p. 60).

FIGURE 3

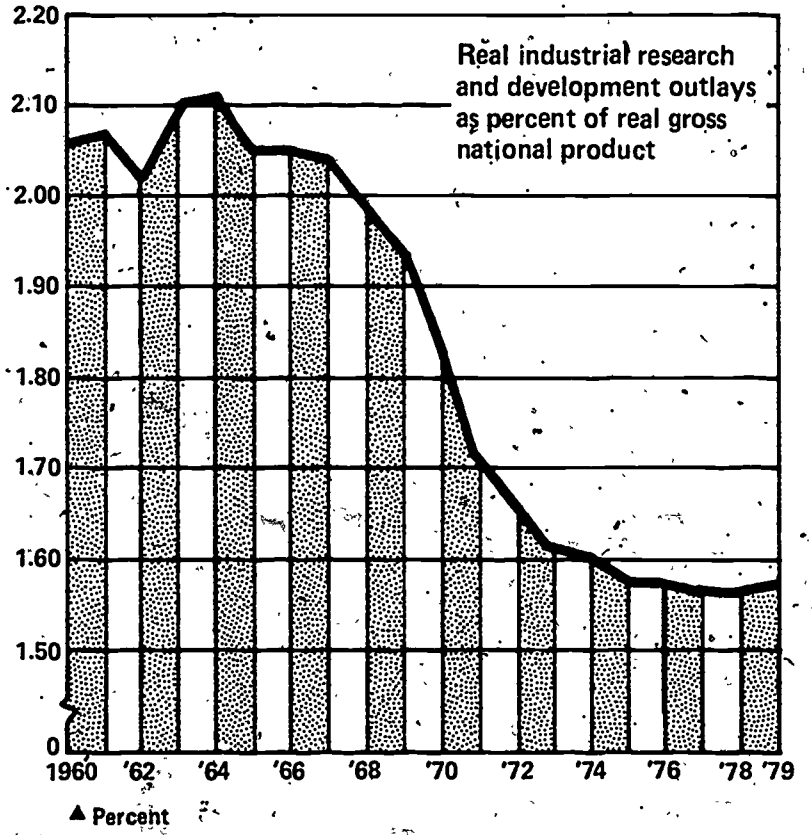
THE SHORTFALL IN UNITED STATES SAVING AND INVESTMENT



Data: Data Resources Inc.

FIGURE 4

REAL INDUSTRIAL RESEARCH AND DEVELOPMENT OUTLAYS AS A PERCENT OF REAL GROSS NATIONAL PRODUCT



Data: National Science Foundation, BW

One prominent reason for the decline in technological advances since the mid-1960s is reduced spending for research and development. This reduction has been especially profound in basic research budgets. Companies tend to put their research and development money into short-term applied research projects, rather than basic science ("The Reindustrialization" 1980).

The general consensus among the proponents of reindustrialization is that industry must invest more in research and development if it is to increase the nation's capacity to create and apply new technology (Carnevale 1980; Etzioni 1980; Levy 1980; "The Reindustrialization" 1980; Roesch 1981). Spending more for research and development is widely thought to result in increased technological advances, which in turn result in greater productivity, more products, and a better worldwide competitive stance.

Special Attention to Small Business

There is no question that "big" business dominates the American economy. Nor is there any doubt that, in general, the economy is highly dependent on the success of big business. However, small business represents a significant economic force. Since 85 percent of all United States businesses have fewer than twenty employees, small firms are of vital importance to the reindustrialization of the economy (Pierce and Steinbach 1981).

Small business in the United States accounts for approximately 40 percent of the Gross National Product (GNP) and for at least 95 percent of the business firms in the nation (Quimby 1980). About 60 percent of all jobs in the United States are generated by firms with twenty employees or less. Large firms (those with over five hundred employees) generate less than 15 percent of all new jobs (Birch 1979). The Small Business Administration, however, estimates that 80 percent of the 50,000 new businesses started each year eventually will fail (Van Voorhis 1980). Since small businesses have such a low survival rate, the number of jobs eliminated each year in the private small-business sector also is high.

Quimby (1980) has reported the testimony of the Chief Counsel for Advocacy, United States Small Business Administration, before the United States Senate Select Committee on Small Business, regarding problems of declining growth and productivity and the role of small business. He cites figures that indicate that the small-business share of economic output is falling. The Gross National Product (GNP) produced by small businesses, as measured by income generated, has been declining steadily from 43 percent in 1963, to 40 percent in 1972, and to 39 percent in 1976. (The data from the 1980 census are not yet available.) These figures show that the small-business sector, while more successful than big business in generating new jobs and in innovation, is suffering a decline in its contribution to the GNP.

A reindustrialization policy, according to Daniels et al. (1981), should encourage the development of new small businesses. Since small business is the source of the majority of new jobs and a main source of innovation, and since it survives through risk taking, one goal of reindustrialization should be to support the development of a strong, thriving small business sector.

Toffler (1981) forecasts a new dimension of the probable continued growth and economic importance of the private small business sector by describing the "electronic cottage." This term refers to homes—rather than offices and factories—where work is being done primarily through the use of computer terminals. Toffler predicts the emergence of an infrastructure of small companies and organizations for organizing and coordinating such home-based operations. Businesses operated at home form a "hidden" part of the economy. With the aid of increased

technology, it is likely that the number and effectiveness of home enterprises of all types will increase, thereby creating relevant, new jobs.

An all-time high of 6.6 million people are now self-employed. Pierce and Steinbach (1981) attribute the surge in small business ownership partly to a generation of independent-minded workers and to the nation's shift from a manufacturing economy to a service-oriented economy. There is little doubt, therefore, that any reindustrialization plan must pay close attention to the needs of small businesses and their roles in rebuilding the economy (Pierce and Steinbach 1981; "The Reindustrialization" 1980).

Investment in Human Resources

Striner (1981) notes that there are only a few factors that are of generic importance to a nation's economic performance. However, one such factor is labor. Building and maintaining an up-to-date labor force is essential for a technology-oriented nation. Striner maintains that the United States has been unwilling to understand the need to invest in major education and training efforts in order to service the skill needs of the nation. He suggests there is no awareness of the key relationship between inadequate investment in human resources and the problems of high inflation rates and lagging productivity.

According to Carnevale (1981), our human resources policies have been organized around distributional equity rather than economic efficiency considerations. As a result, human resources investment policies have encouraged the maintenance rather than the development of human resources. Other authors (Bere 1978; Jones 1980; Roesch 1981; Striner 1981), in addition to Carnevale, assert that intergovernmental and human resources policies need to be integrated into an expanded vision for economic development.

Any approach to reindustrialization must take into account investment in human resources (Carnevale 1981; Jones 1980; Roesch 1981; Striner 1981). Reindustrialization will require investment in human resources at all levels. Advancing technology requires training of displaced workers. Striner (1981) asks this question: "Why not retrain, while providing job security, rather than layoff or fire employees and then attempt to hire a new group of employees?" (p. 2). Implications for quality of work, productivity, and organizational loyalty are apparent. Investment in managerial training may also be necessary to encourage the long-range business planning needed for reindustrialization.

International Status of Reindustrialization

The United States is not alone in its effort to revitalize its economy in order to compete in the world market. Efforts to reindustrialize are occurring in other nations. The most notable precursors to reindustrialization are the long-established plans in Japan and in countries of Western Europe. There are differences, however, in the reindustrialization processes of these countries.

Japan, currently judged by many to be the most successful industrial society in the world, utilizes a national industrial plan coordinated by the Ministry of International Trade and Industry (MITI). The plan is designed to identify and promote industries with the best prospects for developing new technologies and exploiting world market opportunities while shifting workers out of declining industries.

West Germany, the world's most formidable exporter, relies primarily on market forces and on decisions by individual companies to channel resources into industries with high growth potential. This structure apparently is nearly the opposite of the national industrial plan utilized by Japan.

Britain, despite two decades of efforts to revitalize its economy through a network of government-business-labor councils and government grants and subsidies, has become one of the poorest nations in Europe. Britain's lack of success in the face of industrial planning and promotion indicates that additional efforts may be needed.

Japan's success demonstrates that well-conceived and coordinated national planning can improve a nation's economic performance. Germany has been successful without a national industrial strategy. Japan and Germany both have a broad national consensus among social groups on basic economic priorities. Perhaps that is what Britain lacks. A primary focus of the consensus in Germany and Japan is on productivity. In these nations, productivity is perceived to be the key to jobs, prosperity, and even national security ("The Reindustrialization" 1980).

Japan

Many of Japan's industries have been rebuilt repeatedly since the end of World War II and now incorporate the most modern technology available (Karsh 1980). Modern technology, however, may not be the only key to Japan's economic successes. Through the Ministry of International Trade and Industry (MITI), virtually all sectors of Japanese society are involved in a coordinated effort directed toward economic growth. Industries have been selected to be promoted and supported in the 1980s (i.e., financial assistance and incentives) by an advisory board called the Industrial Structure Council, composed of more than fifty representatives from government, business, and education.

According to "The Reindustrialization of America" (1980), the industrial policies presented to this council were a result of ten to fifteen industrial policy meetings and a number of other small sessions at which consumers, labor unions, and other groups were represented. The development of advanced products and new techniques that will be promoted by MITI during the 1980s is a continuation of the emphasis during the 1970s on "knowledge intensive" industries. This MITI policy is based on the consensus of Japanese industry ("The Reindustrialization" 1980).

In Japan, the basis of the job redesign movement—referred to as "quality control circles"—lies in "lifetime employment." Karsh (1980) describes the system as guaranteeing that regular workers will have employment in the same firm from the time of initial hire until retirement. About 30 percent of all workers in private industry in Japan are the beneficiaries of this secure status.

Funahashi (1974) relates that Japanese workers are paid on the basis of the number of jobs they can do, rather than on the complexity or skill required of any one job in relation to all others. Karsh (1980) explains that this is very different from the American system, which essentially assigns pay to jobs rather than to workers. The Japanese encourage versatility, whereas Americans tend to reward expertise and specialization and to hold workers accountable for the performance of small, measurable tasks.

The job redesign movement in Japan is actually a career enlargement program. The strategy to enhance worker security through career development has increased worker commitment.

Karsh (1980) points out that in the United States, where a large labor force exists, employers commonly accept the view that replacement of workers is easier and more economical than developing programs that increase worker commitment.

According to Cole (1979), Japanese worker participation in quality control circles and production decisions may not have contributed directly to increased productivity. Where worker productivity has increased, the "halo effect" may have been the cause; that is, production may have increased merely because someone was paying attention to the workers.

Karsh (1980) suggests that recent Japanese success in world markets may not be the result of their work ethic or culture. He indicates that it is largely due to acquisition of the most advanced foreign technology available through systematic efforts to obtain nonproprietary information and to arrange patent and licensing agreements. In addition, Karsh (1980) explains that "these purchases have been buttressed by vigorous government support of research and development efforts that concentrate on commercial applications and early economic payoff" (p. 18).

Germany

The reindustrialization process in Germany, unlike that in Japan, relies primarily on the free market to direct industrial development and growth. Corporations, rather than the government, decide where to invest. Germany, however, pursues an anti-inflation, macroeconomic policy to create a climate of investor confidence. In order to avoid inflationary wages, management and labor have achieved a consensus, much as in Japan. German labor unions, for example, since 1976 have agreed to pay increases only slightly above the inflation rate.

A key to Germany's high investment rate is a linkage of industrial companies and banks. German bankers typically are board members of companies to which they regularly lend. This relationship encourages business to invest in long-term growth. Close ties between business and labor are achieved through a system of "codetermination" that places union representatives on corporate supervisory boards. Managers are required to keep local unions constantly informed about company plans. In addition, German law makes it illegal for union representatives to work against the company's best interests ("The Reindustrialization" 1980).

France

The system of "indicative planning" initiated by the French government in 1947 relies on incentives and administrative stimulus to achieve economic objectives. The plans serve as guides for investment, wage bargaining, and other future activity in entire economic sectors. The French are now moving toward "strategic planning," in which the government will identify promising industrial areas and officially support investment proposals in these areas ("The Reindustrialization" 1980).

Britain

Industrial planning and promotion is being reduced in Britain; instead, macroeconomic policies are being pursued. These policies include less government spending, measures to reduce inflation, and changes in the tax structure designed to stimulate investment. There is a major reduction in emphasis on the National Economic Development Council, established in

1961, and the National Enterprise Board, set up in 1975. Both were designed to identify industrial "winners" and provide them with government support. Reductions in regional development grants for financing industries in depressed areas and bailouts of industries in deep financial trouble are occurring ("The Reindustrialization" 1980).

Lessons from Abroad

Valuable lessons can be learned from the experiences of others ("The Reindustrialization" 1980). From the information available about economic development in other countries, we may infer that certain elements are critical to revitalization of the United States economy. These components are as follows:

1. Resources must be channeled into industries with potential for adaptation and growth, instead of into attempts to shield declining sectors of the economy from inevitable change. A coordinated effort, with participation by all social groups, is needed to establish national priorities.

2. Research and development must be encouraged to ensure advancing technology.

3. A firm, noninflationary approach to management of the economy must be adopted in order to encourage business investment and ensure real wage gains.

4. A national consensus on the critical importance of productivity for economic vitality must be achieved.

The Status of Reindustrialization in the United States

Requests for federal aid for specific industries in the United States are not new. As far back as 1829, politicians urged the government to protect the nation's canal system from a new form of transportation—the railroads. The importance of canals as a first line of national defense and the unemployment caused by the supplanting of canal boats with rail cars were cited as reasons for federal support (Hershman and Levenson 1980).

The United States government nearly always has intervened in business and industry by imposing regulations and setting standards. On the other hand, it has come to the aid of some industries suffering from import competition (e.g., the textile and steel industries). Individual companies—such as Chrysler and Lockheed—who were facing bankruptcy have received government assistance. These actions, however, primarily have been responses to crises, rather than part of an overall policy. The prevailing attitude of government in this country always has been to let the market determine the destiny of industries (Hershman and Levenson 1980).

Striner (1981) indicates that little in the way of reindustrialization is likely to occur in the United States. He raises the following question: "Does anyone . . . really believe that a nation with the highest output per employee, a multitrillion dollar GNP, the largest volume of petrochemicals, computer products, aircraft, and communications equipment exports in the world is really in the process of completely rethinking and redoing its industrial base?" (p. 1). Striner concludes that, although the economy is in trouble, America is not one of the underprivileged and underdeveloped countries in the world.

Recent government actions, however, do relate to the reindustrialization process. The United States Commerce Department has established a think tank—the Bureau of Industrial Economics—to study the condition of American industry. The State Department and the Departments of Labor and Transportation, among others, are investigating the sources of the auto industry's problems, analyzing how other nations are dealing with similar problems, and trying to determine which industries are likely to have difficulties in the future (Hershman and Levenson 1980). In addition, delegations of Americans are visiting industries in Japan in order to study methods of increasing productivity.

Legislation relating to reindustrialization exists in the United States. The Trade Adjustment Assistance (TRA) Program, authorized in the Trade Expansion Act of 1962, provided for tax free income payments of up to 70 percent of a worker's former weekly wage for a period of one year for workers laid off as a result of lower tariffs. Eligibility requirements have since been modified so that workers do not have to prove that their unemployment resulted directly from tariff reductions. Under this program, approximately $1 billion was paid to about six-hundred thousand workers in 1980.

Under a variety of other programs administered through such federal agencies as the Farmer's Home Administration, the Department of Housing and Urban Development, and the Small Business Administration, ailing industries and economically depressed areas are receiving government aid. Many workers also are eligible for government-supported training programs to prepare them for new careers (Hershman and Levenson 1980).

Government efforts, however, have been unsuccessful in dealing with the growing problem of the erosion of the industrial base of the economy. The consensus is that action is needed; however, the forms that action will take still are being considered. Striner (1981) and Jones (1980), among others, suggest the use of a truly comprehensive approach, much like those in Western European countries and Japan. Etzioni (1980) calls for a semi-targeted approach to advance a stronger productive capacity. Most business leaders agree that government assistance should be across the board (Levy 1980).

Reindustrialization policy in the United States is in an embryonic stage. Regardless of the approaches taken to revitalize the productive capacity of the economy, however, profound implications for America's vocational education programs are ensured.

THE ROLE OF VOCATIONAL EDUCATION

A consensus seems to exist regarding the need for the involvement of vocational education in the reindustrialization process (Carnevale 1981; Etzioni 1981; Jones 1980; Striner 1981). Nevertheless, much less certainty exists about the specific role that vocational education should assume. Robert Worthington (1981), currently the assistant secretary for Vocational Education in the United States Department of Education, has stated that, "There is no question that vocational education does make an important contribution to the economic development of this country. . . . The role of vocational education in reindustrialization . . . will be addressed in the administration's vocational education reauthorization bill" (p. 5).

Rationale for Including Vocational Education in the Reindustrialization Process

Etzioni (1981) writes that vocational education should be included in the general agenda of reindustrialization because of the expressed concern with the size, composition, and quality of human capital. Hanssen (1980) also notes that the basic reason for the existence of technical education is to provide skilled employees in concert with the needs of industry. The skills required of industrial workers are changing and will continue to change. More specific job training and retraining will be required (Carnevale 1981). Renewal of the industrial sector as a key ingredient in the economy's growth necessitates vocational education programs that assign a substantially greater emphasis to training persons to operate, maintain, and repair the complex new technologies and products of the 1980s (Lecht 1981).

Carnevale (1981) indicates that it is shortsighted to reduce commitments to vocational education programs that can have a positive effect on the nation's growth possibilities. Furthermore, he suggests that the alternative to the development of improved employability among disadvantaged workers is greater public dependency and higher income maintenance costs. The alternative to retraining and relocating experienced members of America's work force is a vigorous protectionism and a wasting away of our experienced work force. The country's economic health is increasingly determined by "invisible" investments in human capital ("The Reindustrialization" 1980).

A well-trained work force is essential to the reindustrialization of the economy. Striner (1981) notes that Adam Smith's historic *Inquiry Into the Nature and Cause of the Wealth of Nations*, published in 1776, stressed the importance of a well-trained, specialized labor force as a key to the wealth of any nation. To substantiate that this still is the case, Striner cites the successful economic performance of Japan—an island with limited natural resources—stating that, "Its one great resource is a trained, motivated labor force managed with great skill and daring" (p. 2). In addition to Japan, Striner writes that "the West Germans, French, and most nations in Western Europe have embraced, not merely accepted, the philosophy of the necessity to invest in human resources. To build and maintain an up-to-date labor force is essential for a high technology-oriented nation" (p. 2).

Two major factors provide the rationale for vocational education and training as a critical part of the reindustrialization process. First, training is necessary to reduce the shortage of skilled workers in the United States. The shortage is predicted to worsen. Second, retraining will become even more important as new technology continues to contribute to the slow growth (or decline) in employment for semiskilled workers in manufacturing industries.

This shortage of skilled workers is not new. Carnevale (1981) reports that the Bureau of International Labor Affairs in the United States Department of Labor found the decline in the United States trade performance since the 1960s to be the result of differences in the growth of net real investment in equipment and in the acquisition of labor skills through education. The Bureau also reports that between 1963 and 1975 the United States's share of the world's skilled workers fell from 29 percent to 26 percent and that America dropped from second to seventh in the measured "skill endowments" of its workers.

Although there are skill shortages in almost all industrial sectors, the most serious ones appear to be in the machine-tool trades (Taylor 1981). According to the National Tooling and Machinery Association, America is currently short 60,000 skilled machinists. By 1985, the shortage is predicted to be 250,000 (Carnevale 1981). Increasing parallel commitments to defense and reindustrialization are likely to add to the shortage. Worthington (1981) states that, "Vocational education really is the best hope we have to provide that type of skilled labor" (p. 5).

TABLE 2

EMPLOYMENT FOR SELECTED MAJOR INDUSTRIAL SECTORS, 1977 AND PROJECTED 1990

Sector	*Employment (in millions)*		*Percent Change*
	1997	*Projected 1990*	*1977 to 1990*
Total Civilian Employment	93.7	118.6	26.6%
Manufacturing	19.8	23.9	23.0
Transportation and Public Utilities	4.8	5.7	16.9
Wholesale and Retail Trade	20.9	27.4	30.9
Finance, Insurance, and Real Estate	4.9	6.7	37.0
Services*	17.7	26.7	51.3

* excluding private household workers

SOURCE: *Employment and Training Report of the President*, 1979; p. 362.

Career opportunities in technical and service fields and in new growth industries will increase during the 1980s, while opportunities for semiskilled factory operatives will decrease (Lecht 1981). According to Lecht (1981), investment in complex technology during the 1980s is intended to bring about a renewal of the industrial economy without a comparable increase or, in many cases, a decrease in requirements for semiskilled and unskilled workers. Retraining of displaced industrial workers will be necessary to fill positions in designing, producing, operating, maintaining, and repairing new equipment. Retraining will be especially important since, from about 1985 to 1995 or later, the number of young people of working age in the United States will decrease about three to four million per year (Evans 1977).

Between 1973 and 1979, 13 million new nonagricultural jobs were added to the American economy. According to Carnevale (1981), however, this growth was concentrated in low wage and low productivity jobs. Lecht (1981) points out that employment projections indicate a continuation in the shift to a postindustrial society during the 1980s. Vocational education of various types will be needed to train persons for the new jobs that will grow out of the reindustrialization process.

TABLE 3

PROJECTED POPULATION GROWTH, SIXTEEN to TWENTY-FOUR YEAR OLDS AND PERSONS SIXTY-FIVE AND OVER, 1980 TO 1990

Age Group	Estimated Population (in millions)		Percent Change 1980 to 1990
	in 1980	in 1990	
16 to 19	16.7	13.5	−19.0
20 to 24	20.9	18.0	−14.0
65 and over	24.9	29.8	−19.5

SOURCE: *Employment and Training Report of the President*, 1979; p. 353; the projections represent Census Bureau intermediate fertility estimates.

Reindustrialization will require training that fits the person rather than bureaucratic convenience or tradition. Drucker (1980) points out that it makes little sense to subject all employees to training programs designed for yesterday's typical entrant into the labor force, namely, youth without any experience. Those individuals reentering the paid work force after an extended absence and older workers, possibly retired, preparing for new work challenges will not require the same type of training as youth entering the work force for the first time.

Use of Different Types of Vocational Education

The most apparent and certainly most direct way vocational education can impact on the reindustrialization process is through delivery of effective education and training programs. Increasing awareness of the crucial roles education and training play in economic development is apparent in a report by the Joint Economic Committee of Congress (1979):

> In our view it is possible to enhance dramatically our potential GNP growth prospects in the coming decade with a carefully designed program aimed at promoting capital spending and upgrading worker *skills*. Not only would such an approach raise productivity growth, and therefore our GNP potential, but it would also bring about further improvement in the areas of inflation, employment and our *balance of payments* (emphasis supplied) (p. 64).

Vocational education is not limited to a single type of curriculum for one type of student. An understanding of the different types of vocational education and their different purposes is needed by policymakers and program planners at all levels. If vocational education is to play an effective role in the reindustrialization of the economy, its leaders must be more aware of what its various forms can do. The distinction between vocational education and vocational training, although somewhat artificial when the amount of overlap is considered, may be important when determining potential effects on reindustrialization.

Evans and Herr (1978) define vocational education in the broadest sense as "that part of education which makes an individual more employable in one group of occupations than in another" (p. 3). They also present three basic objectives of any public school vocational education curriculum, namely, to meet society's needs for trained workers, to increase options available to each student, and to serve as a motivation force to enhance all types of learning. The immediate need for reindustrialization is linked to the first objective. However, to the extent that the second and third objectives are met, vocational education may have its greatest impact on the quality of the work force over the long term.

Secondary school vocational education programs may impact most on the work force of the future by raising academic achievement of certain students and helping to introduce realities of the work world to youth. Those who do well in school generally do well in employment. For the most part, the same skills and attitudes lead to success in both. Vocational education that imparts work values and habits and an understanding of employer-employee relationships (along with a basic preparation for occupational clusters) may aid in developing a work force prepared for the required periodic retraining necessary to meet the ever-changing skill needs of industry.

Lessinger (1980) defines training as the process of deliberately passing on to others the knowledge and occupational skills that have been mastered so that they can be demonstrated in a required setting. Vocational training that is designed to do this, whether for job entry or upgrading, can have an immediate impact on reindustrialization. However, because its focus is usually somewhat narrow and skills are increasingly short lived, the impact of vocational training

may be short term. Vocational training that provides immediate, although short-term, impact is not only desirable, but also is necessary for reindustrialization and continued economic development.

Training is addressed most systematically and intensively in times of crises. World Wars I and II, for example, served as the impetus for massive training efforts designed to spur the production of essential products. Current crises in the American economy and the ensuing efforts at economic development and reindustrialization may call for more systematic vocational training. Vocational education and training, by whatever definition or however differentiated, must be identified as having a significant role in increasing both the short-term and long-term effectiveness of the work force.

Two basic types of vocational education and training can impact on the reindustrialization process. Vocational education that provides general work skill development is related indirectly to reindustrialization; occupational skill development is related directly.

General Work Skill Development

Whereas much of the employee-education effort conducted by private industry is undoubtedly job or organization specific, according to Craig (1980), a significant share of the education and training content probably is sufficiently generic that it could or should be done by the traditional educational system. Employers invest heavily in development of employee skills such as decision making, interpersonal relations, and communications skills. Craig also points out that "there appears to be a large market potential for the educational community in developing generic skills of the work force and being responsive to employers' educational needs" (p. 17).

When attempting to define basic skills, we need to go beyond reading, writing, and arithmetic and include the acquisition of skills that center on the human aspects of work. These include skills in interpersonal relations, problem solving, decision making, effective communications, recognizing and understanding authority and responsibility, coping with conflict, adapting to change, and planning for the future. Leach (1980) concludes:

> It seems apparent to me that teaching "technical" occupational skills, although an important and necessary component of vocational education programs, should not represent the basics in vocational education curricula. Students, I think, need to learn skills that have been valued in the workplace in the past, are valued now, and will probably continue to be valued in the future. This type of basic vocational education will be applicable to the changing requirements of the work world. Learning skills that relate to the "human aspects" of work will, I believe, allow people not only to enter the workplace but also to maintain themselves as productive, satisfied workers throughout a changing occupational life. Workers who possess skills such as those described above do not become automatons, but rather find their options in the work world increased. (p. 15)

Relationships between reindustrialization and vocational education for general occupational skill development may be seen most directly in terms of cost and time devoted to retraining. Dunham (1981) indicates that many employers are willing to provide skill training but do not want students with narrow skills. They prefer students who have a strong basic education.

Dunham also states that, given a broad vocational education, "a person whose job ends or who encounters technology change ought to be able to move into a related field and perform well. Retraining is expensive. Upgrading is less expensive and takes less time." Nelson (1979) suggests that young workers may spend much time early in their careers learning about the "human" skills necessary for success through trial and error. He feels that this is a waste of time and that it may lead to inefficiency on the part of individual employees.

A distinction has been made between education *for* work and education *about* work. While education *for* work tends to concentrate on specific occupational skill development, one form of education *about* work concentrates on developing skills and knowledge needed in all occupations. "We are just beginning to recognize the importance of this type of education and have not yet developed satisfactory ways of planning and teaching it" (Evans and Leach 1979, p. 60).

It is estimated that 30 percent or more of the students in vocational education programs enroll with a basic skill level inadequate to enable them to complete a vocational education program and enter employment (Bottoms 1981). The criteria upon which this estimate is based define skill levels narrowly. If the previously discussed general occupational skills were to be included, the estimate undoubtedly would be higher.

Emphasizing vocational education for general occupational skill development may be instrumental in raising the productive capacity of a large number of vocational education students and in providing a more adaptable work force in the future. There are skills that have wide applicability. Tyler (1980) concludes that we still do not know the amount of general knowledge and skills that needs to be developed in order to enhance specific skills needed for rapid change. Providing vocational education only for general work skill development will not contribute greatly to reindustrialization; job-specific training will be necessary.

Occupational Skill Development

The traditional role of vocational education as occupational training is defined in the 1976 Education Amendments, Part II, as "vocational training or retraining which is of high quality (and) which is realistic in the light of actual or anticipated opportunities for gainful employment." In other words, vocational education should prepare students for gainful employment in jobs that exist or are likely to exist when training is completed.

Evans (1981) describes three types of vocational education for occupational skill development, namely, job-specific training, occupationally specific vocational education, and occupational area preparation. Job-specific training is designed to prepare people for a particular job with a particular employer. While most vocational training of this type is conducted by individual firms in the private sector, public school job-specific training has become more popular in many states as a counterpart to economic development programs designed to attract new industries and, in some cases, retain existing ones.

For the most part, job-specific vocational training may be best suited for upgrading workers' skills as a component of reindustrialization or of state or local economic development programs. Job-specific vocational training clearly can be useful to reindustrialization by retraining adults and preparing secondary school-age youth with skills needed for entry-level positions.

Occupationally specific vocational education prepares people for employment in a certain occupational area but not necessarily for a particular employer. Examples include programs to

prepare welders, bookkeepers, cosmetologists, and wildlife conservationists (Evans 1981). If jobs are available and if the training is sufficiently relevant to employers' specific needs, the effect on the reindustrialization process should be much the same as the effect of job-specific training.

Craig (1980) indicates that the private sector training industry has developed because many education and training needs have not been met by the traditional educational system. Even when students have been prepared for entry into specific occupations, orientation and retraining or additional training must be provided to accommodate differences among various industries.

To the extent that local advisory groups are utilized to advise vocational educators about content of specific occupational programs, and to the extent that this advice is utilized, much of the need for additional training or retraining can be avoided. For the specific purpose of promoting the reindustrialization process, it might seem advisable to revise all occupationally specific vocational education programs so that they become job-specific training programs. However, factors such as individual student preferences, increased geographic mobility, and the need for youth to obtain general occupational skills make this notion less desirable.

Occupational area preparation is designed to prepare people for clusters of occupations that require similar knowledge, skills, tools, methods, and materials. Examples of vocational education for occupational area preparation include programs to prepare workers for office occupations, medical careers, horticulture, building trades, and homemaking (Evans 1981).

The effects of vocational education for occupational area preparation on reindustrialization may be even less immediate than either occupationally specific vocational education or job-specific vocational training. In most instances, the more generic scope of occupational area preparation necessitates more orientation and additional training and/or retraining for specific jobs.

On the other hand, it is precisely the more generic scope of occupational area preparation that offers greater long-term and future impact on increasing the effectiveness of the work force. To the extent that people are prepared adequately for a cluster of occupations, shorter and less intensive periods of job-specific training may be necessary for upgrading workers' skills in order to meet future labor requirements and skill needs.

Thus, decisions regarding which type of occupational skill development to provide involve understanding the trade-off between the short-term (but more immediate) impact fostered by job-specific vocational training, the less immediate (but more long-term) impact of occupational specific vocational education, and the even less immediate (but even more long-term) impact of occupational area preparation.

Fortunately, decisions about which kind of occupational skill development programs to provide do not have to be unilateral. Vocational education for occupational skill development can be provided to meet the needs and desires of various interested parties. The immediate needs of employers for skilled and productive workers can be satisfied through job-specific vocational training for adults who require upgrading or retraining. Vocational education for both occupationally specific and, to a greater extent, occupational area preparation (primarily for secondary youth) can help to ensure a productive, flexible, and effective future work force.

Increased Coordination Efforts

Roesch (1981) emphasizes a need for an end to the adversarial relationships among government, business, and labor that have dominated the recent past; he suggests that in their place relationships based on mutual cooperation should be developed. According to Carnevale (1980), reindustrialization will encourage cooperation and discourage adversarial relations in economic decision making.

Vocational education can adopt training for reindustrialization as an important goal. Nevertheless, for vocational education to have an effective role in reindustrialization (and in economic development in general) the perception of education as a separate, self-sufficient, and isolated entity must be changed. A stronger linkage between vocational education and private industry is necessary.

It is estimated that American business and industry annually spend up to $100 billion for employee retraining. Futurists forecast that current methods of technical retraining must extend not only into the work force, but also into the home (Dudley 1980). However, both Lessinger (1980) and Luderman (1980) stress the need for more training—as opposed to education—in schools, returning the training function to the educator.

A coordinated effort between industry and vocational education is essential if training for reindustrialization is to be provided through the vocational education system. Industry must effectively communicate the requirements of the work force in terms of short- and long-range employment needs and opportunities. In turn, vocational education must respond by providing appropriate training.

Working with private industry to establish guidelines about what should be taught in school and what can best be learned at work is one way to begin cooperative efforts to train productive and skilled workers. While these guidelines may be established at the national and state levels and may differ from one industry to another, they must be flexible enough to accommodate local needs.

Establishing strong, active, and effective advisory councils is a must for achieving these guidelines. Such councils exist in most states and local communities; however, they have not been given this task and are seldom used to their fullest extent. Collaboration and communication among vocational advisory councils, state and local economic development councils, employment and training councils, and private industry councils are needed to increase the effectiveness—and relevance—of vocational training for reindustrialization.

Coordinated effort between vocational education and industry is especially critical, since the costs of establishing and maintaining many training programs in schools are extremely high. Phillips (1981) reports that these costs probably contribute to the fact that new high-technology advances such as robotics, fiber optics, and computer-assisted manufacturing have not yet been incorporated to any great extent into the vocational education curriculum.

Delivering Vocational Education and Training for Reindustrialization

Strategies for reindustrialization that involve more effective use of human resources must take into account the effects of job training. Determining where vocational education fits into the job training strategy may be crucial for reindustrialization.

As noted previously, the effects on the work force of vocational education for general occupational skill development and occupational area preparation will be important and long-term. However, for vocational education to aid in the initial reindustrialization process, training must have a more immediate impact. The vocational education system must deliver to youth entering the paid work force the most up-to-date skill training possible and must use the most current equipment and methods.

Even more important for reindustrialization is providing for upgrading and retraining of adults reentering the paid work force, particularly those who have been displaced by technological advances or declining industries, or whose skills are becoming obsolete. In order to accomplish this task successfully, alternative approaches for delivering vocational education and training will need to be utilized.

Carnevale (1981) points out that the demography of labor markets will demand changes in the delivery of vocational education. Vocational education students will become older, will include a larger percentage of females, and will require more directed job training and retraining. It is likely that future training will be delivered in environments apart from the traditional classroom and closer to the work world.

A position statement of the National Association of State Directors of Vocational Education (1980) indicates an awareness of these changes and a willingness to react accordingly. The association has gone on record to indicate that it is the particular responsibility of vocational education "to ensure that the necessary connections exist between education and training and the work place, and to make instruction accessible at the time and places it is most needed."

Increased Emphasis on Cooperative Education

For in-school youth, cooperative education apparently is one of the most effective methods for delivering up-to-date vocational training. As new entrants in the labor market, youth generally are less productive because they lack experience (Freeman 1979; Mark 1979). In addition, in many instances the equipment around which in-school vocational education is centered is out of date. Based on (a) the assumption that youth become more productive workers as they gain experience and (b) the need to ease the transition from school to work, expansion of cooperative programs is both necessary and apparent.

Almost 40 percent of high school students aged sixteen to nineteen indicate that they are either working or looking for work (Parnes 1971; Wirtz 1975). These data represent an existing broad base for the further development of work-study and cooperative education programs. Wirtz concludes that "young people are telling us, by what they are already doing, that we are making a serious mistake in keeping two separate sets of books and virtually ignoring this now substantial area of dual activity simply because the two parts of it come under different institutional jurisdictions" (p. 27).

Tyler (1980) estimates that "something like 35 percent of our young people believe that there is no reality to work. They do not expect to get a job" (p. 54). He suggests that "this is why it is so important to have widespread cooperative education, not just for a favored few" (p. 54). Tyler further notes that less than 20 percent of high school seniors are enrolled in work-related school programs. The expansion of cooperative education clearly offers a means for increasing the number of youth who become productive skilled workers at an early age through gaining work experience while they are in high school.

Short-Term Training

Vocational education traditionally has provided full-time training programs to prepare people for initial employment. These programs have been operated at both the secondary and postsecondary levels. Programs for upgrading or retraining presently employed adults have resulted in fewer full-time than part-time enrollments.

In order for vocational education to impact substantially on the reindustrialization process, an increase in the number of short-term, specific skill training programs may be necessary. These programs, unlike many long-term training programs, must be like those provided by industry. In short, they must be intensive in nature and must operate under the assumption that students already possess a broad base of general occupational skills.

In the future, concentrated, specific training for shorter periods of time will be the norm rather than the exception for workers pursuing skill upgrading. According to Kowle (1981), such programs may be designed to meet the needs of a particular industry, to attract new industry, or to provide training to help workers keep pace with changing technology.

Employer-Specific Training

To the extent that reindustrialization emphasizes the development of particular industries or firms, vocational education provided for the employment needs of individual firms may increase. The vocational education system can provide training for employees of individual firms who require specific upgrading or retraining. Vocational education programs in some states and communities already have made efforts to provide employer-specific training. In most cases, these efforts are part of an overall state or local economic development program. Carnevale (1981) suggests that vocational education is an important part of many subnational economic development programs and that it should assume its proper responsibility in local and area development.

Coordinated planning and delivery of employer-specific vocational education programs can be useful to the reindustrialization process. Jones (1980) suggests that these programs provide "custom-made" employees and are successful primarily because students are trained in specific skill areas for specific jobs.

These vocational education programs are specially designed to meet the needs of individual employers or groups of employers in designated geographic areas. Program design is based on individual requests for services. Employer-specific vocational training may be delivered in school classrooms, laboratories, or the work place. In addition to providing training programs, vocational educators may be asked to design curricula to allow an industry to do its own in-house training.

In-House Training

Corresponding with increased employer-specific, short-term training programs, vocational education can be more involved in in-house training programs. Duplication of up-to-date equipment necessary to conduct upgrading and retraining is avoided when instruction occurs at the work place. In addition, there is greater access to and likelihood of participation by employees when training is convenient and does not disrupt personal schedules.

Personnel Development

Participation in the reindustrialization process has several implications for personnel development in vocational education.

- Vocational education program directors must become more knowledgeable about training that is provided by industry and by other public agencies.
- Vocational educators must understand the importance of and be willing to develop the organizational skills necessary to promote cooperative approaches to meeting the training needs of industry.
- Creative and flexible methods must be designed so as to permit the incorporation in classroom instruction of instructional strategies being used in business and industry. Information about such strategies should be obtained from advisory councils.
- Preservice and inservice development for administrators of vocational education programs must be focused on management and organizational skills needed to develop and deliver the flexible, short-term, up-to-date training programs required by industry.
- Vocational educators must update their own skills. It is important that instructors be well qualified to provide up-to-date training on the latest equipment, using the most appropriate instructional methods.

Many vocational educators may need to become more proficient in what Lessinger (1980) calls the "training basics" (p. 41). These are derived from the process of show, tell, do, and check. Principles of the training basics include the use of detailed task analysis, performance-based objectives, individualized instruction, student feedback, and quality control.

Curriculum Development/Adaptation

In general, curriculum should be developed and/or adapted to facilitate the teaching of new skills required by the application of new technology in the reindustrialization process. In-school vocational education programs at all levels need to incorporate the concept of increased productivity in terms of both quantity and quality of goods and services produced.

Where industry does not provide curriculum materials needed to conduct specific vocational training or where curriculum materials do not exist, vocational educators may be asked to develop them. If so, curriculum development for adult retraining or skill upgrading should incorporate the basic training principles previously discussed. More likely, industry will look to vocational educators as consultants to adapt or refine existing training materials in order to achieve maximum effectiveness.

SUMMARY

This paper began by indicating that the concept of reindustrialization in some ways is not new. The United States has a history of marshalling and managing resources, including human resources, to meet its challenges. Through these efforts, the nation has become an industrial leader. Education, including vocational education, has played an important role in preparing individuals for participation in the work force.

The concept of reindustrialization, however, now appears to be different in at least four ways. The first is the growing awareness that the United States no longer can take for granted its economic and industrial leadership position. It must do a better job of competing for world and domestic markets. Second, in reaction to diminished competitive strength, there is widespread agreement that major economic policy changes are needed for revitalization. There also is growing acceptance of the belief that the economy can no longer be "fine tuned." Third, the concept of reindustrialization appears to have broad-based support among business, labor, and government leaders, even though there is little agreement on the methods to employ or models to follow. Fourth, there is growing awareness and consensus that, although reindustrialization is essential to "rebuild" the economy in the short run, a long-term plan and/or policy is needed for investing in human resources.

Faced with accelerating technological advances and keen worldwide competition, America must develop a coordinated and cooperative education and training policy in the decades ahead. Such a policy is necessary in order for vocational education to provide the skilled, productive work force required to maintain a viable domestic economy and competitiveness in world markets.

There is little doubt that the United States is entering a new cycle of economic development. One major question is what will be the characteristics of this cycle. One view suggests that the development will be characterized by economic policies that have been dominant in the past, i.e., emphasis on the development and growth of large industrial businesses. Another view characterizes the future cycle of reindustrialization as being guided by new economic policies that emphasize development and growth of businesses in new and emerging fields.

In the former view, reindustrialization takes on a meaning of doing what we have been doing for several decades—but doing it better. Probable outcomes may seem more certain since most of the conditions and constraints are known. In the latter view, reindustrialization is a "whole new ball game." Economic policies that have worked in the past may not work well in the future because of changing economic conditions. Probable outcomes seem less certain since the conditions and constraints are not known.

Implications

The concept of reindustrialization, viewed in both the short and long run, has two major implications for vocational education. First, there are immediate needs for retraining and

upgrading of adult workers. This training can be accomplished, in part, by the vocational education system. In order to provide effective retraining and upgrading programs, however, vocational education must ensure that its instructional personnel have competence in current technical skills and instructional methods and that they have access to the most current equipment and facilities for conducting such training.

To a large extent, this point leads to the second major implication of reindustrialization for vocational education. A well-planned, cooperative, and coordinated effort must be conducted by industry and vocational education. Industry will need to provide information on training needs, skill requirements, and—in many cases—needed equipment. Vocational education must be willing to deliver appropriate and flexible training programs that meet the needs of industry. The vocational education system will be asked to provide—and, may indeed, become more accountable for providing—youth with a solid base of general work skills upon which periodic retraining and upgrading can be based.

At this stage, there are more unanswered questions about reindustrialization than there is available information. Determining the direction and fate of reindustrialization and being more certain about the implications and recommendations for vocational education will require further investigation and study.

Figure 5 summarizes some proposed implications of reindustrialization for vocational education.

Recommendations

Moving from a system characterized primarily by the elements listed in the left column of figure 5 to one characterized primarily by the elements listed in the right column raises several important questions. These questions are listed below as recommendations for further research. The answers to these questions will help to identify ways that vocational education can be involved in reindustrialization and can ensure that the vocational education system remains an important component of economic development strategies in the United States.

1. What would be the effects on reindustrialization if vocational education programs became more flexible? What short-term training programs are needed? How does the structure of current programs restrict enrollment? How can current programs become more flexible?

2. What would be the effects on reindustrialization if vocational education programs primarily provided skills needed for occupations in a service- and information-based economy? How would productivity be affected? To what extent are production skills still needed in the economy? What are the skills needed for occupations in a service- and information-based economy?

3. What would be the effects on reindustrialization if the technical content of vocational education programs remained current? What are the potential methods for ensuring up-to-date content?

4. What would be the effects on reindustrialization if vocational education provided training in basic transferable skills? What are the basic occupational skills that should be taught in vocational education programs and that are transferable to a number of specific occupations? How effectively would these skills serve as a base for specific retraining? At which educational level should these skills be taught? What are the best methods for teaching these transferable skills?

FIGURE 5

MOVING TOWARD A MODERN VOCATIONAL EDUCATION SYSTEM

Current Elements		Emerging Elements
Standardized training programs	→→→→→→→	Flexible training programs
Many production-based skills taught	→→→→→→→	Primarily service- and information-based skills taught
Most technical skill content obsolete	→→→→→→→	Technical skill content revised continuously to remain current
Training aimed primarily at preparing employees for big business	→→→→→→→	More training aimed specifically at preparing for small businesses
Primarily employee-centered training	→→→→→→→	More emphasis on entrepreneurial skills
Amost entirely school-based instruction	→→→→→→→	More industry-based instruction (especially for adults)
Outdated equipment utilized for technical skill training	→→→→→→→	Up-to-date equipment utilized for technical skill training
Lack of specialized instructional equipment for teaching basic technical skills transferable to many specific technical occupations	→→→→→→→	Development and use of specialized instructional equipment
Emphasis on training for initial employment of youth	→→→→→→→	Emphasis of training for youth on skills needed for initial employment and on retraining for adults
Many instructors whose training is technically obsolete	→→→→→→→	System to continuously update technical skills of instructors
Most federal dollars spent on program maintenance	→→→→→→→	Most federal dollars spent on program improvement
Little coordination between vocational education and CETA	→→→→→→→	More coordination between vocational education and CETA

5. What would be the effects on reindustrialization if vocational education programs emphasized training to meet the specific training needs of small businesses? Would the number of new jobs created increase? Would there be fewer business failures? Would technological innovations increase? What would be the reactions of big business?

6. What would be the effects on reindustrialization if vocational education emphasized training for entrepreneurship? How would productivity be affected? What are the most effective ways to teach for entrepreneurship?

7. What would be the effects on reindustrialization if vocational education became more employer based? How can vocational education utilize employers more effectively? Do businesses really want to become more involved with vocational education? In what specific ways can business be more involved with vocational education?

8. What would be the effects on reindustrialization if vocational education utilized up-to-date equipment for technical skill training? Would employers continue to provide training? Can the nation afford to equip vocational education programs with up-to-date equipment?

9. What would be the effects on reindustrialization if vocational education emphasized retraining for adults rather than training of youth for initial employment? Can vocational education provide increased training for adults and still continue current youth programs? What adjustments would be necessary?

10. What would be the effects on reindustrialization if vocational education instructors maintained current technical skills? In what ways can vocational instructors be encouraged to update their technical skill levels? Is it necessary for all vocational instructors to maintain current technical skills?

11. What would be the effects on reindustrialization if most of the federal dollars spent on vocational education were used for program improvement rather than for program maintenance? What are the most needed program improvements? Would state and local governments maintain vocational education programs?

12. What would be the effects on reindustrialization if vocational education programs and CETA programs were better coordinated? How could unnecessary duplication be avoided? What are the barriers to coordination? How can examples of good coordination that can be used as models be identified?

The major vocational education research and development thrusts needed to accompany the reindustrialization process correspond with the major implications noted in this list. The vocational education system at all levels must conduct assessments of its overall operation to identify the types of training it can and cannot provide, given the current and likely future constraints. Based on these assessments, on the need to provide youth with long-term basic occupational skills, and on the short-term retraining and upgrading needs of industry, vocational education must make the adjustments necessary to develop, promote, and deliver multi-faceted, flexible education and training programs.

Willingness alone will not be enough. Policies must be developed at the national, state, and local levels to provide the mechanisms and funding support to allow vocational education to participate successfully in the education and training component of reindustrialization. If the concept of reindustrialization is more than a passing whim—and it appears to be—the

reauthorized Vocational Education Act should focus, at least in part, (1) on keeping vocational education programs up to date with technical skill requirements, especially those needed in high technology industries, and (2) on addressing the critical shortage of skilled workers in many fields.

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