National Institute of Standards and Technology
Technology Administration, United States Department of Commerce

NIST Special Publication 943

How Are Companies and Workers Preparing for the Workforce of the Future?

Co-Sponsored by the
National Policy Association and the
Baldrige National Quality Program

March 15-16, 1999
National Institute of Standards and Technology
Gaithersburg, MD

NIST Special Publication 943

How Are Companies and Workers Preparing for the Workforce of the Future?

Author and Transcript Editor:

Ralph A. Richter
Technology Services
National Institute of Standards and Technology

Managing Editor:

Deborah W. Smyth
Baldrige National Quality Program
National Institute of Standards and Technology

February 2000

U.S. DEPARTMENT OF COMMERCE
William M. Daley, Secretary

Technology Administration
Dr. Cheryl L. Shavers, Under Secretary of Commerce for Technology

National Institute of Standards and Technology
Raymond G. Kammer, Director

National Institute of Standards and Technology Special Publication 943
Natl. Inst. Stand. Technol. Spec. Publ. 943, 111 pages (February 2000)
CODEN: NSPUE2

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON: 2000

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, DC 20402-9325

Table of Contents

Baldrige National Quality Program

Although the Baldrige National Quality Program is best known as the home of the Malcolm Baldrige National Quality Award, it is helping not only Award applicants, but also many other American businesses and organizations to improve performance. Thousands of organizations use the Criteria for Performance Excellence as an assessment vehicle or emulate the practices of the Award recipients without applying for the Award. In addition, almost all of the states and many foreign countries have quality award programs modeled after the Baldrige National Quality Program.

The Program is based on eleven core values and concepts. These values and concepts are the foundation for integrating key business and organizational requirements within a results-oriented framework. The core values and concepts are:

- Customer-driven quality
- Leadership
- Continuous improvement and learning
- Valuing employees
- Fast response
- Design quality and prevention
- Long-range view of the future
- Management by fact
- Partnership development
- Public responsibility and citizenship
- Results focus

These values are translated into the Criteria for Performance Excellence, an assessment tool published annually by the Baldrige National Quality Program.

The Program and the Award are managed by the National Institute of Standards and Technology, an agency of the U.S. Department of Commerce.

National Policy Association

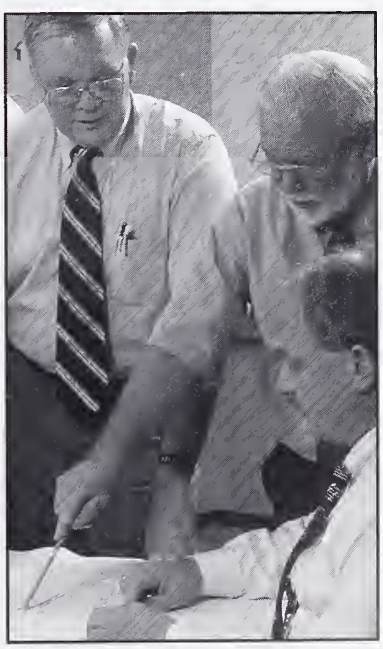
The National Policy Association is a nonpartisan, nonprofit research institution founded in 1934 on the conviction that the private sector should actively participate in the making of public policy.

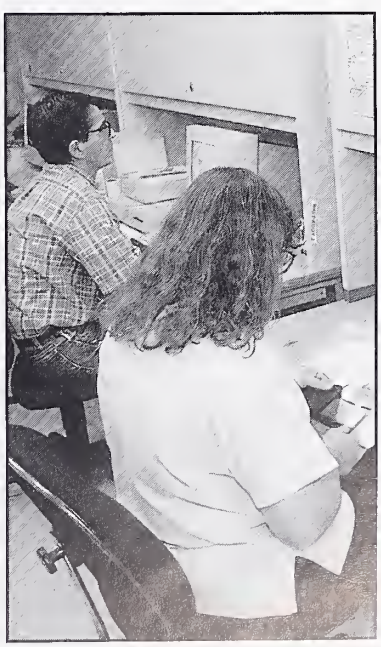
Since its inception, NPA has encouraged private sector involvement in all aspects of public life. Today, the broad-based structure of NPA's committees and its independent research program continue to provide an avenue for private sector leaders to become better informed about issues affecting their organizations and society.

NPA brings together influential leaders from business, labor, agriculture, and academia in four policy committees: Committee on New American Realities, Food and Agriculture Committee, Global Economic Council, and North American Committee. These policy groups provide a valuable arena where members can hear differing viewpoints, gain new insights, and recommend strategies for addressing issues of mutual concern and national importance. NPA works to find common ground to promote measures that will ensure and improve the general welfare.

NPA-sponsored research focuses on major economic and social issues facing the United States and other nations and addresses fundamental questions related to strengthening U.S. global competitiveness while remaining sensitive to human values. Through an active publications program and topical seminars and conferences, NPA reaches out to policymakers and the public at large.

For 65 years, the National Policy Association has been the principal organization seeking consensus among diverse private sector leaders on solutions to America's challenges.





Introduction

"How Are Companies and Worker Preparing for the Workforce of the Future?" was a unique working conference cosponsored by the National Policy Association and the Baldrige National Quality Program. The conference was held in conjunction with the start of the second decade of the Baldrige National Quality Program and took place at the National Institute of Standards and Technology in Gaithersburg, MD, starting the evening of March 15 and continuing through March 16, 1999.

During the past ten years, America has regained its competitive advantage and undergone a quality revolution in the process. This revolution has extended beyond product and service quality to focus on customers and employees, cycle time reduction, just-in-time agreements with suppliers, and many new partnering relationships.

In the process, many American organizations have introduced significant new technology into the workplace. Information technologies are challenging enterprises to develop a more empowered, higher-performing workforce. Growing productivity demands in a global marketplace are changing where and how work is being done.

This conference focused on how technological innovation and productivity demands will affect the American workforce in the 21st century.

Some questions addressed included:

How is technology affecting the workplace?

What skills will tomorrow's workers need and how will they gain these skills?

How will the technology and the workforce meet ever-growing productivity demands?

How will company innovation processes involve and affect the workforce?

How will global companies with a global workforce impact the American workplace and workforce?

This conference was designed for maximum interaction and involvement of the approximately fifty leaders from business, labor, and academia who attended.

Executive Summary

A conference entitled, "How Are Companies and Workers Preparing for the Workforce of the Future?" brought together a diverse group of participants from business, labor, government, and academia to discuss several key workplace issues. New technologies, competitive global markets, shortages of skilled workers, and corporate productivity expectations are placing significant and ever-increasing demands on the U.S. workforce. Conference participants discussed these demands, the response of companies and workers to these demands, and the business and government policy implications of these demands.

Several general themes emerged from the conference:

- High performance workplaces where decision making is decentralized and employees' skills, knowledge, and abilities are systematically updated and leveraged for the benefit of the firm, and the employees are becoming more prevalent and more important.
- A firm's employees are its most important asset.
- The skill sets that workers are required to possess are quickly changing because of the rapid implementation of new technologies, competitive markets, and expectations for continuing increases in worker productivity.
- There is an increasing need for effective and timely training of incumbent workers.
- Effective worker training programs and improvements in the K-12 education system are often the result of successful partnerships and collaborations among business, labor, government, and academia.
- Public policy can be used to support workforce development and encourage lifelong learning.

Dr. Richard McGahey, Assistant Secretary for Pension and Welfare Benefits, U.S. Department of Labor, set the stage for the conference by discussing workforce demographics such as the current tight labor market, the impact of women and minorities, statistics on employer-provided training, and information on high-demand occupations. He also discussed new regulations under consideration by the Department of Labor aimed at increasing the autonomy and accountability of states and cities for implementing federal job training policy. Concluding his address, Dr. McGahey stressed that improvements in workforce productivity are a critical component of future U.S. economic growth.

Mr. Leo Reddy, President, National Coalition for Advanced Manufacturing, and Chair of Session One, observed that the accelerated adoption of information-based technologies is largely responsible for our country's recent economic growth, especially in the manufacturing sector. According to Mr. Reddy, the manufacturing sector has experienced many changes such as the implementation of advanced processes and management systems, downsizing, cost-cutting, and the deployment of systems like lean manufacturing. These changes have increased the movement of decision making to the shop floor, often spurring the creation of cross-functional teams. Mr. Reddy introduced the concept of the high performance workplace and listed the core skills and knowledge found to be important in enabling workers to adapt to this new and changing workplace such as communications, team work, methematics, problem solving, and computer use. He also discussed the failure of U.S. education and training systems to keep pace with this workplace transformation. Finally, he addressed the need for companies, unions, schools, and government to be actively involved in preparing workers for the workplace, keeping their skills and knowledge up-to-date to maximize their contributions.

As respondent to Mr. Reddy's comments, Ms. Pamela Kurstedt, Assistant Dean, Virginia Tech, discussed the need for four-year educational institutions and community colleges to increase their collaborations to produce the workers needed at all manufacturing levels, from technicians to supervisors. She pointed out that in order to be accredited, engineering school curricula must now address 11 key attributes, basically the same core people and technical skills described by Mr. Reddy as important to production workers.

The second respondent, Ms. Nancy Mills, Director of the Center for Workplace Democracy, AFL-CIO, expressed her belief that the vast majority of establishments have remained essentially "command and control" environments, rather than the high performance workplaces described by Mr. Reddy. Her view was that advances in technology are often used to de-skill workers rather than to enable them to build their analytical skills. Ms. Mills noted two prerequisites to the establishment of a high performance workplace. The first is commitment from employees to learn and to use that learning for the good of the firm; the second is commitment from employers to invest in and empower their workers, offer secure employment, and share the rewards of success.

The Chair of Session Two, Mr. Roberts Jones, President and CEO, National Alliance of Business, concurred with earlier speakers that technology, competitive markets, and increased productivity expectations have changed and will continue to change the required skill sets of workers. He outlined three categories of skill sets necessary for successful performance in the workforce - soft skills, core skills, and skill specific competencies. He also articulated several worker training trends, such as the reality of lifelong learning and the fact that workers want to work for firms that are willing to invest in their education and training. Mr. Jones re-emphasized the need for partnering between corporations, communities, and educational organizations and closed with public policy issues relating to worker training.

Respondent Mr. Joel Marvil, Chairman and CEO, Ames Rubber Corporation, gave a first hand account of the need for improved literacy and basic skills. Mr. Lynn Williams, former President, United Steelworkers of America, also responding to Mr. Jones' comments, stressed the need for loyalty between workers and their employers, especially the need for power sharing. He also discussed efforts of the Institute of Career Development in the areas of training and workforce improvement.

Ms. Kelly Carnes, Assistant Secretary for Technology Policy, Designate, U.S. Department of Commerce, covered several points related to the high demand for IT workers and the efforts of the Department of Commerce and others to encourage development of a world-class IT workforce. Ms. Carnes discussed the necessity of improving the K-12 education system, emphasizing the importance of mathematics and science and the need to attract and retain qualified teachers in those areas. Also discussed was the need for government to create incentives for private firms to participate in consortia with other firms and educational organizations to solve workforce problems.

Session Three Co-Chair, Mr. Ralph Craviso, Vice President, Workforce Effectiveness, Lucent Technologies, shared observations concerning the changing nature of the workforce citing growing diversity and generational differences between the "Baby Boomers" and "Generations X and Y." He also addressed the dramatic changes occurring in the workplace due to technology, globalization, and mega-mergers. Mr. Craviso concluded by emphasizing the need for employers and unions to develop cooperative approaches for problem resolution. Co-Chair, Mr. Ronald Blackwell, Director, Corporate Affairs, AFL-CIO, expressed his belief that companies are not spending enough resources on training, and that companies must harness the commitment, creativity, and knowledge of their workers to succeed.

Respondent, Mr. Rob Atkinson, Director, Technology, Innovation and New Economy Project, Progressive Policy Institute, asserted that public policy should work to accomplish several objectives in the area of training: improving the K-12 education system, encouraging companies to invest in more training, and encouraging training of workers in cases where it is not provided by the company. He offered several suggestions such as tax benefits to companies that provide training to their entire workforce or that offer remedial and literacy training. Mr. Atkinson also suggested and financial aid or tax exempt training accounts whereby workers could contribute and obtain matching company funds. He closed by challenging conference participants to think about how U.S. workers could be encouraged to engage in lifelong learning.

The conference concluded with participants agreeing that thought-provoking presentations and lively discussion had combined to successfully achieve the objectives of the conference. By working together and encouraging a broad dialogue on workforce and workplace issues, improvement strategies can be implemented and problems can be resolved - increasing the competitiveness of American companies in the global economy.

HOW ARE COMPANIES AND WORKERS PREPARING FOR THE WORKFORCE OF THE FUTURE?

Dinner Session

Introduction: Mr. Anthony Quainton, President and CEO, National Policy Association (NPA)

Mr. Quainton welcomed the conference participants and expressed his hope that the conference would be a positive step forward in looking at how the workplace could be changed and improved in response to the significant changes our society faces. Mr. Quainton noted the need to be concerned with those who are in the workplace on a day-to-day basis, making the things and carrying out the services that are the dynamo of the American economy. Mr. Quainton then introduced the keynote speaker, Dr. Richard McGahey.

Keynote Speaker: Dr. Richard McGahey, Assistant Secretary for Pension and Benefits, U.S. Department of Labor

Dr. McGahey, who served previously as Assistant Secretary for Policy at the U.S. Department of Labor, informed the conference participants that he had worked on the problems of the workplace in a very direct way for several years. He first highlighted the current "wonderful" state of the U.S. economy. He specifically noted: 1) the 18.1 million new jobs that have been added since President Clinton took office, many of which are in the private sector; 2) the unemployment rate that has been below five percent for 20 months in a row, the lowest sustained unemployment rate during peacetime in 41 years; 3) the growth in real wages of almost 2.5 percent in the past 12 months, the fastest real wage growth in the last two decades; and 4) the historically low unemployment rate not only for the population as a whole, but also for African-Americans, Hispanics, and other groups that traditionally have not done as well in the labor market, all at a time when inflation remains remarkably tame, with the 1998 gross domestic product measure of inflation rising at an annual rate of one percent, the lowest level since the 1950s.

Dr. McGahey then discussed labor market trends and the workforce of the future, showing a series of viewgraphs, some of which appear in the Appendix.

Dr. McGahey's main points on workforce demographics are summarized below.

Tight Labor Market - A large surplus or extra population in the labor force does not exist. This is a key point for employers. The employment-population ratio, the number of people working divided by the working age population, is at an historic high. One major reason for this is the entry of women into the workforce. This is the new structural condition of the labor market. For the next several decades, with the wild card of immigration, the demography will give us tight labor market conditions.

Aging Workforce - The workforce is aging. The median-age worker was 35.3 years old in 1976, 38.2 years old in 1996, and will be over 40 years old in the year 2006.

Impact of Women on the Workforce - Labor force participation by women continues to increase. In 1976, women made up 40 percent of the workforce; in the year 2006, that percentage is predicted to be 47.4. Women's labor force participation patterns by age are more and more resembling men's labor force behavior. This is one of the most striking facts about labor market change in the last 20 years. In addition, labor force participation has increased dramatically among mothers. In 1975, one-third of the mothers with children under three were in the labor force. That percentage was almost 60 percent in 1996 and continues to increase. This has enormous implications for the ways we raise our children, issues of child care in the workplace, and many other issues, as well.

Increasing Diversity - Ethnicity in the workforce is another big issue. The majority of the workforce will still be white in 2006, and the African-American component will remain fairly stable as a percentage. The growing sector is the Hispanic population in the workforce.

Dr. McGahey also commented on the relationship of education level to pay. In general, higher levels of education result in higher levels of pay. The percentage of college graduates continues to grow. Those industrial sectors that have higher educational requirements associated with them are expected to experience higher levels of employment growth than other sectors.

According to Dr. McGahey, the Bureau of Labor Statistics forecasts the ten fastest growing occupations for the period 1996 to 2006 to be: computer support specialists; computer engineers; system analysts; personal and home health-care aides; physical therapy aides; home health aides; desktop publishing specialists; and physical therapists. The growth in computer-related jobs is being driven by the enormous technological changes that are sweeping the nation, while demand for health-care related and personal care jobs is increasingly due to our aging population.

Dr. McGahey then presented the findings of a 1995 survey on the beneficiaries of employer-provided training. Managerial, professional, paraprofessional, and technical employees receive the most employer-provided training, with those in higher-level, higher-income, and higher-skilled occupations reaping the primary benefits. Not only do higher-level employees receive more training, they also receive more formalized, longer, and more meaningful training. Dr. McGahey stated that he anticipates an enormous gap between the need for future training and available funds.

Turning to the tight labor market, Dr. McGahey stated that in the period from 1986 to 1996, employment grew much faster than the civilian population, with women responsible for absorbing many of those jobs. Employment is forecast to grow slightly faster than the population through 2000 - that means increasing tightness in the labor market as the number of workers lags the number of jobs available. With a tight labor market, employers will need to rely more on the quality and skill of their existing workforce. This is a structural issue for employers, not simply a cyclical phenomenon that they can ride out.

Dr. McGahey asserted that because the population is not going to grow very much in the next ten years, the nation's economic growth must come from productivity increases. The country will see a continued and increasing premium on skilled human capital throughout the organization, not just at the top end where training and education are currently focused. Our productivity is not just a matter of skilled workers - it also involves the way work is organized, how workers are utilized, and the way technology is adapted and used.

According to Dr. McGahey, the combination of these labor force demographics and labor force participation rates makes the issue of training incumbent workers very important. Most of the workers who will constitute the workforce in the next 10-15 years are already employed. While a great deal of effort has been expended looking at education in the K-12 system and in community colleges and four-year colleges, comparatively little attention has been paid to training incumbent workers. Dr. McGahey stated that the Department of Labor needs to spend more time on this issue.

The Labor Department's new initiative, "Workplace Workforce of the Future," will take a broad look at major trends in the labor market such as demography, globalization of the economy, and technological change and determine what these trends mean for the future workforce. This initiative will be used to help set long-term policy. The Labor Department will be holding a series of conferences with several partners as part of this initiative.

Dr. McGahey then discussed efforts by the Department of Labor relating to worker training. He explained that for the last 18 years, federal job training policy has been governed by the Job Training Partnership Act. The Department of Labor is currently writing regulations for this Act's replacement, the Workforce Investment Act. The new Act gives more autonomy to states and cities for implementing federal job training policy and requires more accountability from training providers and from the state and local agencies. As sweeping as these new regulations will be, Dr. McGahey expressed his belief that the policies really will not do enough to serve incumbent workers. The focus remains on those disassociated from the labor market, i.e., disadvantaged youth, economically distressed populations, and workers dislocated from jobs for a variety of reasons.

The unfortunate assumption in Federal policy, stated Dr. McGahey, seems to be that once workers are in the labor market, they do not need any more assistance. This leaves a big gap in the middle of training policy, and it is this gap that most affects employers because it is their own existing workers whom they believe most need the training. Dr. McGahey asserted that the Workforce Investment Act allows for the first time a small amount of the funding to be used for incumbent worker training. However, some fear that if these limited training dollars for incumbent worker training are increased, the distressed populations that also need help will not be served at all.

Dr. McGahey described one of the Labor Department's biggest challenges as making its systems work better for employers, labor unions, and community groups. Many new players are needed to make the important changes occur. A role for employers is to communicate what training and skill sets their employees need.

Finishing his keynote speech, Dr. McGahey re-emphasized the point that economic growth will be a function of productivity growth in the next decade. He believes it is essential that we address the productivity and training issues of the entire workforce to avoid a period of slower economic growth that would undercut many of the things the nation wants to accomplish.

Discussion:

Immigration

The immigration issue continues to see a significant amount of debate. There was political pressure last year to open up more visas, particularly for workers with information technology skills. However, a high demand for workers with certain skills sends important social and economic signals. The likely result is a significant increase in computer science enrollments at U.S. universities. Dr. McGahey expressed his belief that if this market pressure is relieved with immigrant labor, the wrong signal is sent.

Funding for Incumbent Worker Training

Mr. Brian Turner asked a question about how the level of training investment per worker could be increased and how the training could be more evenly distributed among workers.

Dr. McGahey responded by pointing out that one idea that has never really gotten off the ground is some type of "training tax." Dr. McGahey described the training tax concept as a mechanism that would require companies to put a certain percentage of their payroll into training that would be well distributed across the workforce, or alternatively, the companies would have to pay a tax. Money collected from the tax would be placed into a public fund which would be used for training. Implementing this idea would probably have enormous administrative problems, according to Dr. McGahey.

It was noted that funding for training will most likely stay attached to the individual worker. The big investments in human capital development currently go toward financing higher education in college, not for incumbent worker training. Companies and industries will need to get more involved in helping to organize and finance some of the incumbent worker training. Some existing coalitions of industry, unions, and others exist, providing good funding examples for this type of training.

The point was made that four-year universities do not really want to get involved in worker retraining; they do not believe it is part of their mission.

More Labor Issues

A number of enterprises in the U.S., particularly in the service sector, were built on the expectation of high turnover. The fast food industry is an example. They thought there would always be a fresh supply of teenage workers coming in, allowing for continual turnover. If the demographics hold, that is not a very good strategy for moving forward as a company or as an industry. Firms should not rely on a high-turnover, low-skilled, low-retention labor force, although many are still trying. For example, firms in the suburbs where demographic growth is low are having trouble finding people willing to work in those kinds of businesses.

It was asserted that employment relationships are developing in two contradictory directions. While some firms are clearly investing in their workforces, other businesses seem to have a desire to reduce their attachment to their workers. This is true in both the tenure and the benefits areas. There has been a dramatic rise in contingent workers, independent contractors, and leased employees. There is an increasing trend where employment relationships are now with some intermediary organization, rather than with the direct employer.

Most of the U.S. labor laws are based on the existence of a steady relationship with an identifiable employer. Because the whole concept of relationships is changing, important issues are raised in the areas of labor law enforcement, workplace rights and responsibilities, and investment in the workforce.

K-12 Education

The final point of the evening addressed the K-12 education system. It was stated that the U.S. does not have national, enforceable standards on education. Adult literacy is an enormous problem for employers, and much of the existing workforce has a significant problem operating at even the lowest levels of basic literacy and mathematics skills. Education rates for the entering labor force are low. Half of the high school graduates in the U.S. do not have the necessary mathematics skills to perform an entry level job in a "Big-3" auto plant. This is partly a reflection on the education system, as well as a reflection on how the nature of work is changing and moving to a higher level. As an example, error rates in manufacturing can be reduced by implementing statistical process control, and manufacturing workers with some skills in algebra can make this happen. What at first seems to be a technology issue is really a human capital issue for many employers.

Session One: What Demands Are New Technology and Productivity Increases Placing on the U.S. Workforce?

Introduction: Dr. Harry Hertz, Director, Baldrige National Quality Program, National Institute of Standards and Technology

Dr. Hertz, on behalf of NIST and the Baldrige National Quality Program, welcomed the conference participants and thanked the National Policy Association for co-sponsoring the event.

Dr. Hertz stated that preparing companies and the workforce for the future is really central to the Baldrige Criteria and Baldrige philosophy. Human resource planning is an important aspect of Category 2 of the Baldrige Criteria which deals with overall organizational strategic planning. Also, Category 5 of the Criteria focuses on human resources as internal customers of an organization, i.e., the well-being and satisfaction of those internal customers being vital to the ongoing relationship between the organization and its most vital asset, its people. Category 5 looks at work systems - how work and jobs are accomplished in the organization; how the workforce is motivated; and how the workforce is hired and prepared to deal with workplace challenges. Human resource education, training, and development are critical to this preparation.

Dr. Hertz reminded the conference that while companies and the nation capitalize on technology, people are still going to remain our most important asset. The challenge Dr. Hertz presented to the conference participants was to try to understand what the demands on the workforce of the future will be and what opportunities and development we will have to provide to ensure that, as a nation, we are prepared for that future.

Chair: Mr. Leo Reddy, President, National Coalition for Advanced Manufacturing (NACFAM)

Mr. Reddy began by stating that the accelerated adoption of information-based technologies is largely responsible for much of our country's recent economic growth. Most workplaces are relying increasingly on computer and telecommunications technologies, especially in the manufacturing sector's high-export, high-value-added industries such as computers, pharmaceuticals, aerospace, and precision instruments. Over 90 percent of manufacturing firms are now using computer-aided design, and over 75 percent are using computer-numerical controls, computer-aided manufacturing, statistical process control, just-in-time inventory systems, total quality management systems, and other new technologies.

In addition to information-based technologies, companies are adopting advanced processes and management systems, often in response to global competitive pressures. After an extensive process of downsizing and cost cutting, and the deployment of systems like lean manufacturing, companies have increasingly moved decision-making power to the factory floor, creating cross-functional teams that operate much like small business units.

These technological and organizational changes are having a significant impact on the workplace and on the workers. Workers must become and are becoming more skilled. Since 1950, the percentage of the manufacturing workforce that was considered unskilled has dropped from 60 percent to 30 percent and is projected to reach about 15 percent by the year 2005.

Core Skills are Needed

With distributive manufacturing enterprises, e-commerce, integrated supply chains, and huge service and IT sectors, the very definition of work in manufacturing is changing, according to Mr. Reddy. The process of continuous change in today's workplace requires American workers to develop the skills that will enable them to adapt continually. There is a growing premium on workers who have core skills and knowledge sets that are important in all jobs and all industries. Workers who have developed competencies in these basic areas are more adaptable to change, more easily cross-trained, and more capable of moving from job to job within a company.

What Manufacturing Workers Need to Know and Be Able to Do, NACFAM's 1997 report prepared for the U.S. Department of Education, sets forth the following core skills and knowledge as important in a production environment:

· communications and teamwork
· math and measurement
· problem solving
· learning skills
· quality assurance
· business planning and operations
· computer use
· process control and improvement
· manufacturing fundamentals

These core skills include basic skills and knowledge, technical skills, and organizational skills. Ms. Pamela Kurstedt, an Assistant Dean at Virginia Tech's School of Engineering, endorsed the importance of these core skills in a production environment. The technical and people skills are similar to the skills that engineering schools are required to teach to be accredited by ABET, the Accreditation Board for Engineering and Technology.

A High Performance Workplace

With specialized skills and company-specific skills added to a firm foundation in the core skills, our workforce will be able to function efficiently and successfully in today's "high-performance workplace," described by the Manufacturing Skills Standards Council as follows:

> A high performance manufacturing workplace is quality driven and customer focused in order to ensure an economically viable future for the company and its employees. In such workplaces, a streamlined, decentralized decision-making structure that maximizes communication and flexibility is utilized. Such workplaces clearly and consistently share their strategic goals, priorities, and operating information to empower and enable all employees to share in the decision-making process.
>
> In a high performance workplace, the diverse skills, knowledge, and abilities of employees are leveraged to improve the manufacturing process. By systematically investing in workforce development, the skills and knowledge of all members of the workforce are continuously updated and aligned with those needed to accomplish the work of the organization. Employees are provided with positive rewards and incentives in recognition of their value to the company's long-term success.
>
> This definition of a high performance workplace was referenced throughout the conference. Work performed in the past by managers or production engineers is increasingly performed by an empowered workforce. Workers are involved more frequently on cross-functional teams, in multiple aspects of the company's operations, and in higher-level activities such as process control, equipment design and reliability improvements, health and safety issues, and quality systems. Thus, the high performance workplace employs a different generation of worker than was employed 30 or 40 years ago.

Mr. Reddy stated that the nation's education and training systems have failed to keep up with this transformation in the workplace. The gap has grown between what the modern workplace requires -- at least in advanced manufacturing -- and what the education and training systems in the country provide. According to a 1997 survey entitled, The Skills Gap, 88 percent of responding manufacturers reported difficulties in finding qualified candidates in at least one job function. More than half reported that their workforce lacked basic employability, math, reading, and writing skills. A third or more of the respondents indicated that skill deficiencies among workers made it very difficult to adopt new technologies and improve productivity. Companies are too often spending tight training dollars on basic, remedial education.

More than half of the companies responding to a U.S. Census Bureau survey cited the need for education and training and the lack of a skilled workforce as their company's most significant barriers to technology adoption.

Workers, too, are experiencing severe challenges as change envelopes the world of work. Businesses are downsizing, relocating, and operating in competitive global markets.

Unfortunately, in many cases, businesses are not modernizing, adopting new technologies, training, or making appropriate use of worker skills and knowledge.

Mr. Reddy stated that businesses and workers must have the tools to keep pace with technology, but many of those tools are currently insufficient. This is a profound structural problem that permeates our economy. Companies, unions, schools, government, and many other organizations must all be actively involved in solving this problem. Especially important is that companies invest in workforce training. Companies will almost certainly realize returns on this investment in terms of profitability and productivity. Mr. James McKenney, from the American Association of Community Colleges, stated his belief that community colleges are collaborating very well with unionized companies, especially the bigger companies, to train the workforce.

A recent study conducted by Price Waterhouse Coopers for *Industry Week* states that "world-class" plants, the world's most productive and successful plants, are three times more likely to provide more than 40 hours of annual training for their workers than are companies that are not world-class. Employees in these companies are also two times more likely to be working in self-directed teams. A direct correlation seems to exist between investment in workforce education and training and profitability and productivity.

NACFAM has been working with the Working for America Institute of the AFL-CIO to develop a voluntary partnership of industry, labor, and educators to build a nationwide system of skill standards in manufacturing. Over 250 national organizations and companies are represented, and the system operates under the name of the Manufacturing Skill Standards Council. The idea is to develop a common set of assessment tools, standards, and certificates to increase the flexibility of the workers, make their skills more portable, and enable them to deal more effectively with technological change.

Respondent 1: Ms. Pamela Kurstedt, Assistant Dean,
College of Engineering, Virginia Tech

On the subject of cross-functional teams, Ms. Pamela Kurstedt stated that very few engineering schools, either here or in Europe, have structured activities for bachelor degree students to participate on a team that involves someone of a different educational level, such as technicians or certificate production workers. She indicated her belief that this may be a place for collaboration among four-year universities, community colleges, and industry. Currently, engineering schools are not doing enough to prepare their future engineers to be the first-line supervisors of high-performance production workers.

Respondent 2: Ms. Nancy Mills, Director,
Center for Workplace Democracy, AFL-CIO

Shining Factory on a Mountaintop

Ms. Mills observed that the high performance workplace, described by Leo Reddy, sounded a bit like a shining factory on a mountaintop. The labor movement would like to have a world in which workers feel free and justified in contributing all their skills, knowledge, and abilities to the success of that firm; where technology relieves the drudgery, tedium, and danger of work; and where productivity increases are such that those gains can be shared to improve the quality of life for everyone. She stated that this is a world that unions have committed themselves to fighting for.

Unfortunately, these types of workplaces are rarely seen. While some instances of the high-performance workplace exist, Ms. Mills believed that most U.S. workplaces are still essentially "command and control" operations, with very little independent authority for workers to make decisions about how they conduct their work.

Mr. Joel Yudken expressed concern that the country's moves toward the virtual workplace, the virtual enterprise, and increased use of information technology could cause tremendous personnel reductions in many sectors rather than a move toward a high performance workplace. Manufacturing is an example in which significant personnel reductions have occurred as productivity and output have increased.

Many workplaces are using computers more as fancy word processors than as tools to actively change the way work is performed, according to Ms. Mills. In some cases, computers are being used to de-skill workers, such as huge pools of insurance company employees who do data entry all day long. In other insurance companies, however, computers are being used to allow up-skilling, e.g., employees perform higher-level work such as pricing policies. There are broad differences in our existing world of work, both in how technology is being utilized and what its benefits are for American workers.

Employer and Employee Commitment Needed

Ms. Mills pointed out that making the high performance workplace a reality will require commitment from both employers and employees. Workers must make a commitment to learn what they can to improve their contribution to the workplace, to proactively use that knowledge for the good of the firm, and to be loyal to the firm.

In return for worker commitment, Ms. Mills explained, employers must make a fundamental choice to compete on the high road, i.e., compete in the marketplace while investing in and empowering their workforce. Workers will not commit to a company that competes on the low road by decreasing its labor costs by reducing the workers' standard of living, in lieu of using smart automation or technology. Too many employers, according to Ms. Mills, are operating on the low road - 40 million American workers are not covered by health insurance, and pension/retirement plans are becoming scarce. Statistics indicate that the total dollars that employers spend on education and training as a percentage of payroll are going down in America. When training dollars are being spent, the trend is that those dollars are being used on supervisors, managers, and engineers. The lesser-educated and lower-skilled workers are much less likely to receive education and training.

Currently, workers are too often expected to obtain additional skills and education themselves. They then take their self-investment to a higher bidder to the surprise of their employer, who denounces the workers' lack of loyalty. The recent *Vice Presidential Summit on 21st Century Skills for 21st Century Jobs* stated that the main reason employers are not investing in education and training for their workforce is their fear that their workers would be "stolen" by another employer. Mr. James Dean suggested that one possible solution would be for employers to pick up the cost of expensive training (such as schooling for an MBA or medical school) if the individual worker agrees to stay with that organization over some period of time.

Employers need to share the burdens and the costs of preparing workers for the skills they need for the world of work. Ms. Mills reported that several new "high-road" regional partnerships are springing up around the country. Groups of employers and unions are coming together to share the costs of equipping their workforce with skills needed by every employer such as problem solving, computer usage, and teamwork. Ms. Mills encouraged the conference to think about how the government could better support these high-road regional partnerships.

Finally, Ms. Mills expressed her theory that to obtain commitment and loyalty from the workforce, employers must make a commitment to employment security, to share the rewards of success, and to give workers the authority to make the decisions. She recognized profit/gain-sharing plans and collective bargaining as two ways to share the rewards. Ms. Mills stated that unionized workplaces spend more money on technology and training and that unionized workers avail themselves of training more than nonunion workers do. She concluded by pointing out that unionized workplaces make the transition to a high performance workplace easier and more successful.

Session Two: How Are Companies Responding to and Preparing for These Demands?

Introduction: Mr. Howard Samuel, Senior Fellow, National Policy Association (NPA)

Mr. Samuel, moderator of Session Two, introduced the session chair, Mr. Roberts Jones.

Chair: Mr. Roberts Jones, President, National Alliance of Business (NAB)

Mr. Jones, former Assistant Secretary of Labor for Employment and Training and current President of NAB, discussed current trends in training and education and the impact of those trends on industry. All training and education of workers is good if it prepares them for the future. He observed that markets no longer reward workers for experience and longevity. Rather companies and institutions reward workers who have the set of competencies that the market is demanding today and in the future.

Technology, competitive markets, and increased productivity expectations have all combined to change rapidly the required skill sets workers need. These changes are continuous. Therefore, workers and the educational systems that service them need to focus on remaining current with the demands of a continuously changing workplace.

Mr. Jones asserted that required worker skill sets fall into three separate categories: 1) "soft skills" - such as analytical thinking, judgment, and communications, skills that are increasingly important as workers assume more responsibility, make more decisions, and operate in a team environment; 2) core skills - basic competencies in math, science, reading, and writing; and 3) competencies to do a certain job. He also noted fundamental worker traits like reliability, punctuality, and a basic work ethic as important.

Some Training Trends
Mr. Jones noted that:

- Lifelong learning has become a reality. The vast majority of our working population is going to be continually engaged in some form of education.
- Training is and will continue to be employee-centered and employee-driven; workers seem to understand that a personal training investment is important to their future security and employability.
- Workers want to work for companies that are willing to invest in their education and training.
- Competencies are driving the training market. There has been enormous growth in certificate programs offering short, flexible, and user-friendly training sessions. Also, certificate program training providers seem to be much more attuned to actual workplace issues and demands than traditional providers.
- Traditional higher education enrollments and curricula in our top universities are not changing very much.
- Job definitions and career definitions no longer reflect the jobs that people actually have and the way they work. New sets of definitions are needed.
- The distinction between education and training is blurred. These two terms have been kept apart for several reasons in the past, but when looking at them from a company investment perspective, there is no distinction.
- Companies decide which business functions need to be increased or improved, and training/education investments are then focused in those areas.

Mr. Jones articulated the belief that, for the workers, loyalty to the company is becoming less important, while portability of skills and benefits continues to become more important.

Partnering with the Educational Community

Mr. Jones provided a successful example of corporate partnering with the educational community. Two years prior to the opening of a new plant, the company began discussions with competitors in the region, deciding which skill sets and education demands their industry would need for the next 10 years. Then, they negotiated with the educational feeder systems in the community -- community colleges, high schools, and others -- to build the needed curriculum into their systems. A joint investment in public advertising spread the word in the community that students enrolled in these programs would have career paths available in certain industries and with certain employers.

Mr. Jones stated that this example demonstrated how success can be achieved where companies communicate clearly their skill and knowledge needs to educational institutions, and students, families, and community leaders are made aware of and become involved in the process.

Regional Coalitions

Similar to the industrial group in the example above, there are now approximately 250 regional coalitions in the U.S., both union and non-union, that are dedicated to workplace issues. These coalitions are discussing sets of skill standards and are attempting to communicate the need for those skill sets to a wide variety of educational institutions. There are over 450 regional business groups that are involved in education reform at the state and local level. Improving education has become a key issue, and relationships promoting education reform cross traditional lines, such as unions and companies, political groups, and schools.

Technology continues to expand dramatically the ability of employees to access training and education in a user-friendly manner. Companies can provide substantially increased educational offerings at lower cost through effective use of new technologies. The first Internet bachelor's and master's degree programs have now been accredited.

Companies in the U.S. rarely respond to the training needs of their employees on their own -- partnerships are the key. Corporate universities are basically a series of partnerships, usually with outside providers of various types. Partnerships are especially important to small and medium-sized companies that are working with regional or other associations to accomplish their training objectives.

Public Policy Issues

Mr. Jones closed his remarks by discussing public policy issues related to worker training. First, there needs to be equity in the training system, and all workers need to have access. Second, everyone must possess basic skill sets; they are a critical investment in our nation's future. Companies are increasingly viewing training and education expenditures as an investment rather than a cost. This is a very important concept and must continue, especially the investment by training companies in training that will dramatically improve the competencies of people coming out of the system. Finally, investments in training and education need to increase significantly during periods of economic downturn or high unemployment. This way the workforce will be prepared to avail itself of future opportunities when they do become available.

Respondent 1: Mr. Joel Marvil, President and CEO, Ames Rubber Company

Mr. Marvil expressed his agreement with those who had emphasized the importance of workforce training and discussed his experiences with training at his company. Many of his employees required literacy and basic skill improvements before important competency-building training could begin. Mr. Marvil believes that investments in his workforce, his scarcest and most valuable resource, are

increasing productivity and improving worker loyalty. Having seen the extent of the problem firsthand in his company, he stated that it is critical that the U.S. education system produce workers that can read, write, communicate, and perform basic mathematics. He supports measurements and minimum standards for graduation from high school. Until we have those, he believes that industry will have to be committed to remediation.

Respondent 2: Mr. Lynn Williams, President (retired), United Steelworkers of America

The session's second respondent, Mr. Williams, stated that his experience has been that workers are anxious to be loyal to their employers, and they want their employers to succeed. The companies have to return that loyalty; it has to go both ways, which was referred to as "loyalty up and loyalty down." Critical to implementing a high performance workplace and gaining worker loyalty is "power sharing." Although empowered workers drive a great deal of innovation and success, management is frequently unwilling to share power in a significant way.

Mr. Williams described the significant benefits provided by his union through the Institute for Career Development. Started in 1989, the Institute is a training consortia that addresses not only the general need for training and workforce improvement, but also the large number of employees retiring early because of their fear of new technologies and new workplace demands. The Institute's goals and objectives are set centrally, but all training is arranged and conducted locally with the focus on local needs and basic skills such as math, literacy, and computer literacy. The effort has been very successful, and the workers are very enthusiastic and seek out training on their own time.

Discussion

Both Mr. Jones and Mr. Williams discussed the importance of involving the education system itself, i.e., teachers and the school administrators, in all efforts to reform the schools. Most of the time, school improvement issues are handled as political debates that fail to involve the institute, itself, and the richest resource for improvement -- our highly-educated, highly-creative teachers. The Malcolm Baldrige National Quality Award has just been extended to education. It is hoped that this will help provide a framework for accountability measures and will be a catalyst for improving educational systems and encouraging educational partnerships.

Ms. Miller stated that part of becoming a high performance workplace has to involve changing the culture within the company. Opportunities must be created for women and minorities to rise within the corporate structure and to earn equal wages. The total needs of workers must also be addressed. This means not only education and training needs, but also issues like child care, family leave, and career planning.

Ms. McCain added to the discussion that it is very expensive for companies and unions to create and maintain a high performance workplace. While most believe the expense is more than justified by the return, it is important that goals and desired outcomes be firmly established before massive training efforts are initiated.

Mr. McKenny challenged the conference participants to consider the onslaught of retirements that the country will soon face. Bell South says that 40 percent of its workforce is going to retire in the next five years. Ford is concerned about its retirement situation because almost all of its plants hired their workers at the same time. The education system will be hit especially hard by imminent retirements. Mr. McKenny believes that several of the issues discussed at the conference will be multiplied, because there will simply not be enough bodies in the workforce.

The session ended with both Mr. Marvil and Mr. Lorentz discussing the value of applying the Baldrige Criteria for Performance Excellence to improve the workplace so that customers and outcomes become the focus, and team-oriented solutions to problems are found. Technology can often serve as an enabler of change if it is correctly applied.

**Introduction: Mr. Raymond G. Kammer, Director,
National Institute of Standards and Technology**

Mr. Kammer introduced the luncheon keynote speaker, Ms. Kelly Carnes, Acting Assistant Secretary for Technology Policy, Technology Administration, Department of Commerce. Her organization, the Office of Technology Policy, develops policies that promote and advance technology innovation in the U.S. economy. Ms. Carnes is a leading advocate for developing the Nation's information technology (IT) workforce.

**Speaker: Ms. Kelly Carnes, Acting Assistant Secretary for Technology Policy,
U.S. Department of Commerce**

High Demand for IT Workers

Ms. Carnes began her remarks by noting that in almost all of the nation's industrial sectors - from electric power to manufacturing to financial services -- there is a problem of almost crisis proportions in finding, hiring, and retaining IT workers. Different surveys have estimated the number of private sector job vacancies in the IT arena range from 200,000 to 500,000, and these numbers continue to rise. Anecdotal evidence suggests that companies and state governments, alike, are changing their practices to recruit and retain sufficient numbers of IT workers. The State of Michigan, for example, initiated a special campaign designed to attract IT workers from states like New Jersey - rather than California, its traditional source of IT workers - so that the Michigan climate would not be a competitive disadvantage.

Ms. Carnes reported that there are several reasons that IT workers are in such high demand. The nation is experiencing phenomenal economic growth coupled with very low unemployment rates. IT is an enabling technology across every single sector of the economy, and investments in IT represent over 45 percent of all business equipment investment currently. The most important factor driving the demand for IT workers, however, is probably the extraordinary growth of electronic commerce and use of the Internet. Some estimate that there will be over $300 billion worth of annual business conducted on the Internet by 2002.

From 1987 to 1997, employment doubled in the core IT occupations such as computer programmers, systems analysts, computer scientists, and engineers. Unemployment rates among those professionals is 1.3 percent, less than a third of the rate for other workers, even with the current low overall rates. A Department of Commerce report, "America's New Deficit," uses conservative data from the Bureau of Labor Statistics and projects that the nation needs 1.3 million new computer programmers, systems analysts, and computer scientists and engineers between 1996 and 2006.

Encouraging World Class IT Workforce Development

Ms. Carnes reported that in January 1998, the Department of Commerce and partners -- the Departments of Labor and Education, the Information Technology Administration, and the University of California at Berkeley -- initiated a nationwide dialogue on possible approaches to encouraging world class IT workforce development in the United States. The dialogue brought together many of the stakeholders that have a role to play, including academia, the K-12 education system, community colleges, universities, many of the different industrial sectors, and employee organizations. A future report will highlight the best ideas, innovative practices and recommendations that were collected during these dialogues.

One key issue that needs to be addressed, according to Ms. Carnes, is the K-12 education system. Attracting and keeping qualified math and science teacher is a serious problem. Some highly qualified teachers are being lured away by industry or being taken into university-level and community college

level teaching. The problem is compounded by the fact that many existing teachers will be retiring over the next 10 years. Some people estimate that the nation will need to recruit as many as two million new teachers. This is a big problem given the current unemployment rates and the typically low levels of compensation and low stature that teachers tend to have.

Ms. Carnes discussed some ideas aimed at making the teaching of math and science in K-12 more attractive. A few parts of the country have piloted programs where teachers are hired jointly by a school board and a local company. The teachers are guaranteed a salary commensurate with an industrial salary; they spend part of their time teaching in the local schools and part of their time working in the company. Communities that have tried this approach have found it beneficial for the students, the teachers, and the companies. Another approach is to recruit K-12 teachers trained in science and math by giving them a "GI-bill-like" scholarship in exchange for a teaching commitment of certain duration. This program could be run either by individual states or by the federal government.

Ms. Carnes discussed the recent results of the Third International Math and Science Studies (TIMSS) sponsored by the Education Department. The results of these studies showed that fourth graders in the U.S. performed as well or better than their counterparts around the world. By the time U.S. students reached eighth grade, there was a gap in math and science performance, and American high school seniors performed very poorly relative to their international counterparts. Most recently, the U.S. ranked 17th in the world. These studies show rather dramatically that significant problems exist with basic competencies and skill set development for U.S. students moving through our elementary and secondary schools.

In Ms. Carnes' opinion, students, parents, and guidance counselors do not realize the important connection between science and math education and future job opportunities. If parents were somewhat intimidated by science and math themselves, they often communicate those attitudes to their children. If the teachers are not trained in science and math, as is frequently the case in many parts of the country, the teachers may also be intimidated by these subjects. Although there are many U.S. students who know how to use computers and enjoy their science and math courses, the system is not working for a huge percentage of students. We must deliver the message that if students want a job when they graduate from high school or if they are continuing their education, they must learn science and math and know how to read, write, and analyze.

The image of scientists and technologists in American society, according to Ms. Carnes, is another major problem that the country faces as it tries to encourage our youngsters to become scientists and engineers. Teens are very image conscious, and for the most part, they do not perceive the technology workplace to be interesting or appealing. Unfortunately, popular culture tends to reinforce negative images and stereotypes about IT workers.

Training the Incumbent Workforce

Ms. Carnes stated her belief that incentives must be created for companies to train their employees on a larger scale than currently exists. Particularly in the IT arena, companies also need to move beyond their immediate labor pool and engage in activities that help increase the labor pool in their region and the Nation. Ms. Carnes discussed several such initiatives.

Ms. Carnes described Microsoft's efforts to build a pool of IT workers. In a pilot effort, the company offers the 250,000 people exiting the military annually the opportunity for training in one of the Microsoft disciplines. Microsoft administers an aptitude test, provides the training, and then provides placement assistance within the Microsoft network. In this way, Microsoft is tapping into a workforce -- former military employees -- that already has many of the basic work skills, communication skills, and core analytical problem-solving skills that are needed by IT workers. Potential IT workers may also include graduates with a bachelor's degree in liberal arts that have been given, on an expedited basis, sufficient education and training to qualify for entry level IT jobs.

Another pool of potential IT workers -- people who are already trained in a science and technology discipline -- might be the most challenging in terms of retraining since companies often prefer to hire students just out of school rather than retraining more experienced workers. An example would be aerospace engineers whose jobs have been eliminated due to downsizing in defense-related industries. Appropriate curricula and training programs could be developed to allow these workers to be redeployed in some of the IT industries if companies are willing to make the effort.

The Consortia Approach

Ms. Carnes noted that forming consortia is an effective approach for solving mutual and regional business problems. Ms. Carnes stated that all levels of government need to do a better job of creating incentives for companies to become engaged in these kinds of consortia activities.

There is a great need for the business and education communities to work more closely together. Somehow, fast-moving requirements and changes in the business world need to be translated quickly into curriculum changes in education. Businesses frequently complain that in their attempts to work with major universities, it takes at least three years to effect curricular changes. Community colleges seem to be able to move much faster, but their change cycle could still be a year.

In response, Ms. Pamela Kurstedt, from Virginia Tech, discussed the challenges facing universities if they are to graduate 1.5 million computer scientists and computer engineers by 2006. A recent survey of 20 major engineering schools in the U.S. showed that 50 percent of their freshman applications are for computer engineering and computer science, while only 15 percent of the faculty are computer scientists or computer engineers.

Ms. Kurstedt stated that changing a curriculum in three years is very fast for a university. It is difficult to gear up quickly in one area and, at the same time, gear down in other areas. The problem is compounded by the fact that a Ph.D. in computer engineering can make significantly more money working in industry than in a university. Thus, attracting quality faculty to meet the burgeoning demand for computer courses is especially difficult for universities.

Session Three: What Are the Policy Implications That Result From the Changing Nature of the U.S. Workplace and Workforce?

Introduction: Mr. James Auerbach, Senior Vice President, National Policy Association

Mr. Auerbach summarized the discussion held earlier in the day and stated that the policy implications of those discussions should be the focus of Session Three. Mr. Auerbach then introduced Mr. Ralph Craviso, one of the two chairs of Session Three.

Co-Chair: Mr. Ralph Craviso, Vice President for Workforce Effectiveness, Lucent Technologies

The Changing Workforce

Mr. Craviso began by discussing the changing nature of the U.S. workforce. The "Baby Boom" generation, those who are now 34 to 54 years of age, comprise over 50 percent of the current workforce. Mr. Craviso stated that many of this generation have not adapted well to the acceleration of technological change and the challenges presented by global competition.This large pool of older workers is quickly reaching retirement age, which is causing significant turnover problems for the U.S. business community. Marked by irony, this generation's paramount goal seems to have been to earn enough money, yet they often face financial squeezes and usually fail to achieve their career goal aspirations. This is especially applicable to women "Baby Boomers."

The "Baby Bust Generation," or "Generation X," was described by Mr. Craviso as a more diverse group, characterized by more individualistic and entrepreneurial spirit. It is the first generation of latch-key children influenced by dual-career families, high divorce rates, and single-parent families. This generation, according to Mr. Craviso, expects its workplace managers to behave more like a coach and mentor than as a supervisor. A new generation of workers, "Generation Y" is just beginning to enter the workforce.

Ethnic minority groups are growing at a faster rate than the traditional white majority within the U.S. population. By the middle of the 21st century, non-Hispanic whites will represent only 53 percent of the total population. The steady influx of immigrants will change the values and attitudes of the workforce. Mr. Craviso stated that one result will be higher value placed on diversity and tolerance for differences within the workforce.

The Work is also Changing

After discussing the changing nature of the workforce, Mr. Craviso spoke to the changing nature of work in the U.S. and throughout the world. The entire world is in the middle of a revolution driven by technology, and, although the current revolution is happening much more rapidly, there are many strong parallels to the industrial revolution of the late 19th century. As an example of the transition from the industrial age to the information age, corporations have invested more capital in computers and communication equipment since 1991 than the combined amount spent on all mining, farm, construction, and industrial equipment.

The boundaries between organizations and world markets are blurring; multinational corporations are emerging, and global communications will continue to become faster and less expensive. Mr. Craviso expressed his belief that our existing national education system and our corporate training organizations will not be adequate to support the learning requirements of the existing and future workforce.

Mr. Craviso observed that the social order is being redefined by issues such as privacy, information access, and equality of information technology. Human capital is more critical than ever to the world's economy, and work issues of social importance such as labor standards, wages, hours of work, and working conditions are being addressed in global terms.

Mega-mergers and dramatic restructuring have changed the face of U.S. corporations, often resulting in downsizing and employee layoffs. Worker insecurity about continued employment has eroded employee loyalty. Mr. Craviso stated that both companies and workers must accept the fact that these changes will continue and accelerate. Workers with the most marketable skills tend to be younger, have little loyalty to the corporation, and place the greatest value on job mobility. Corporations must adapt their policies accordingly, innovative recruiting strategies and compensation and benefit plans are emerging. Hiring bonuses, stock options, flexible benefits and hours of work, portable retirement benefits, and more emphasis on pay for performance are all being used by companies to acquire and retain talented workers.

Corporate Learning Centers

In the learning and development arena, Mr. Craviso stated his belief that corporations must move from traditional training organizations to "learning centers." Learning centers will help change the role of the supervisor into one of coach and mentor and improve the ability of the organization to be an incubator for thought leadership. In his opinion, a higher level of motivation among workers and break-through productivity will be realized when organizations are redesigned to incorporate high performance work teams with empowered employees. These "learning organizations" are critically needed to rise to the challenges created by ever-changing and more complex technologies.

Mr. Craviso concluded with a discussion of labor-management relations. He stated that traditional adversarial approaches must be set aside because this behavior is counter-productive to the U.S. economy. Both corporations and unions must learn to understand and respect the other's position and use cooperative approaches to problem resolution. Corporations that partner with their unions achieve greater success in the marketplace and have higher employee morale.

Co-Chair: Mr. Ronald Blackwell, Director of Corporate Affairs, AFL-CIO

More Worker Training Needed

Mr. Blackwell opened his discussion with a question: Why, if everyone agrees that training is good and education is better, are companies spending such a small amount of resources on meaningful education and training? The main reason, according to him, is that corporations are often not competing on the high road and are not attributing enough value to their workers.

Mr. Blackwell expressed concern over the changing nature of employment and labor-management relationships. Loyalty and dedication to the relationship are slipping quickly. Just as shareholders invest in a company, workers who bring their firm-specific skills to the workplace are contributing a valuable asset to the success of the firm. If the firm fails, they lose their investment.

For companies to succeed today, they must have continuously escalating levels of competencies; they must become learning organizations that can innovate on a continuous basis. Companies must learn to thrill their customers with the quality of their products and services. These things are only achievable when the commitment, the creativity, and the knowledge base of the company's workers are harnessed and expanded. Mr. Blackwell stated that only after questions involving labor-management relationships are resolved will concepts such as teamwork be useful to the learning and innovative processes which must take place.

Mr. Blackwell also stated the urgency of giving human rights, minimum wages, and acceptable working conditions the same level of importance in international trade rules as intellectual property rights. Currently, some U.S. companies that have established overseas operations are employing some of the most impoverished and oppressed workers in the world.

Respondent: Mr. Rob Atkinson, Director,
Technology, Innovation & New Economy Project, Progressive Policy Institute

Mr. Atkinson reported that the amount American companies are spending on training as a share of the gross domestic product has gone down from 0.8 percent to 0.7 percent during the last ten years. He offered two main factors that help explain this occurrence. In today's competitive environment, companies are tending to reduce their investments in the types of things that they believe might not produce a full return, e.g., employee training and basic research. Secondly, a large number of jobs in many sectors of the economy, especially the service sectors, simply do not require much training.

Mr. Atkinson recommended that public policy work to accomplish several objectives in the area of training: fix K-12; encourage companies to invest in more training; and figure out ways to give workers their own tools to get the training they need if their companies will not provide it. Then, Mr. Atkinson offered suggestions that would work to help accomplish these objectives:

- The tax code should be adjusted so that companies that are training their entire workforce should be able to obtain tax relief in the same way they deduct for healthcare or pension costs. There should also be special tax credits for remedial and literacy training.

- The federal and state governments should be leading by example in the development of innovative training programs, particularly for "lower-end" workers.

- The granting of corporate tax incentives for economic development and job creation should be restructured to focus on high-road high-performance jobs.

- There are several examples around the country where alliances of firms or alliances of firms and unions have collaborated to train workers. This concept of a "regional skills alliances" should be encouraged and expanded.

- The Manufacturing Extension Partnership network based at NIST needs to make worker skills more of a priority.

- Mechanisms should be in place that will help individual workers obtain the skills they need, particularly if their companies are not providing the correct learning opportunities. Financial aid or student loans should be available for older workers interested in part-time learning. "Individual learning accounts" - tax-exempt accounts like IRA accounts - should be established whereby workers could contribute a small share each year, voluntarily matched by companies.

Mr. Atkinson concluded his response by encouraging conference participants to think creatively to answer the question of how U.S. workers can be helped and encouraged to engage in lifelong learning.

Discussion
Mr. Howard Samuel stated that the Department of Defense (DoD) spends approximately $15 billion annually on formal classroom training. Many private sector organizations involved in training could probably learn a great deal from the DoD about using distance learning and technology to achieve training objectives.

In responding to a question, Mr. Craviso stated his belief that successful business enterprises should provide the workers with a fair share of corporate returns. He asserted that a higher level of worker loyalty and motivation is obtained through "ownership" in the company, including pay for performance and stock option plans.

Large American corporations are increasingly setting up operations overseas, and Mr. Craviso was asked a question about corporate responsibility when operating overseas. Mr. Craviso stated that, in his opinion, there is a high awareness of human rights and worker rights. He made the point that his company, Lucent Technologies, would often prefer to produce products in the U.S. for quality and reliability reasons, but the foreign countries' tariffs and government policies often require that products sold in their countries be manufactured there to foster local economic development.

Mr. Hecht made the point that the training needs and requirements of the future will be significantly different from training of the past. Training workers, like those workers at Yahoo! and Microsoft, in the latest information technology provides an example of the need to rethink the way training has been conducted traditionally.

During the discussion, Mr. Blackwell stated his belief that minor changes in the corporate tax incentives would not, by themselves, bring about the significant changes that are necessary to have companies accomplish their mission of training workers to become the highest-skilled workforce in the world. All levels of public policy and corporate strategy must address this integrated challenge.

Mr. Blackwell reemphasized the notion that in order to have workers use their knowledge and abilities to improve the performance of their companies, they must: (1) be assured of some job security; (2) be compensated for what they contribute with increased wages, which they often prefer, or with stock option plans; and (3) be given the authority to help identify the problems and then contribute to the solutions.

Appendices

Conference Agenda

Edited Transcripts

Selected Figures

Participants List

HOW ARE COMPANIES AND WORKERS PREPARING FOR THE WORKFORCE OF THE FUTURE?

Co-Sponsored By:
Baldrige National Quality Program and National Policy Association

MONDAY, MARCH 15, 1999	**Gaithersburg Marriott - 9751 Washingtonian Boulevard**
6:00- 9:30 p.m.	**Opening Reception/Dinner**
Welcome:	Anthony Quainton, President and CEO, National Policy Association
Keynote Speaker:	Richard M. McGahey, Assistant Secretary of Labor for Pension and Welfare Benefits Administration
TUESDAY, MARCH 16, 1999	National Institute of Standards and Technology NIST Administration Building - Gaithersburg
Session One	
9:00-10:30 a.m.	**What Demands Are New Technology and Productivity Increases Placing on the U.S. Workforce?**
Chair:	Leo Reddy, President, National Coalition for Advanced Manufacturing
Respondents:	Pamela Kurstedt, Assistant Dean, College of Engineering, Virginia Tech Nancy Mills, Director, Center for Workplace Democracy, AFL-CIO
Moderator:	Harry Hertz, Director, National Quality Program, NIST
Session Two	
10:45-12:15 p.m.	**How Are Companies Responding to and Preparing for These Demands?**
Chair:	Roberts Jones, President & CEO, National Alliance of Business
Respondents:	Joel Marvil, Chairman and CEO, Ames Rubber Company Lynn Williams, President (Retired), United Steelworkers of America
Moderator:	Howard Samuel, Senior Fellow, National Policy Association

12:30-2:00 p.m.	**Lunch**
Introduction:	Ray Kammer, Director, National Institute of Standards and Technology
Keynote Speaker:	Kelly H. Carnes, Assistant Secretary of Commerce for Technology Policy (Designate)

Session Three

2:00-3:30 p.m.	**What Are the Policy Implications That Result From the Changing Nature of the U.S. Workplace and Workforce?**
Co-Chairs:	Ronald Blackwell, Director, Corporate Affairs, AFL-CIO Ralph Craviso, Vice President, Workforce Effectiveness, Lucent Technologies, Inc.
Respondent:	Rob Atkinson, Director, Technology, Innovation and New Economy Project, Progressive Policy Institute
Moderator:	James Auerbach, Senior Vice President, National Policy Association

MR. ANTHONY QUAINTON
President and CEO, National Policy Association

Opening Remarks

It's a very great pleasure for me, as the new president of the National Policy Association, to welcome you all to this conference on how companies and workers are preparing for the workplace of the future.

As many of you know, workplace issues have been at the heart of NPA's mission for 65 years. Created at the height of the Great Depression in 1934, NPA brought together business and labor to think about the problems in American society arising from workplace concerns and the dilemmas which we faced in a society undergoing dramatic negative transformation.

Here we are, several generations later, partnering with NIST and with the Baldrige National Quality Program for a seminar on how the workplace can be improved to take into account the changes that are going on in our society today. In recent years, NPA has produced a number of publications on this subject that some of you have read: *Through a Glass Darkly, Building a New Workplace for the Twenty-First Century, The Culture of Labor-Management Innovation in the United States, Change At Work Trends That are Transforming the Business of Business.*

So, it's not surprising that NPA has joined hands with all of you for this next day and a half to sit down and ask where we are going and how, together, we can advance into an America which both recognizes the values of the workplace and provides the justice and equity in the workplace that is so essential for America to grow and prosper.

The Baldrige National Quality Program, now in its eleventh year, has won itself wide recognition for its awards in stimulating quality performance in the workplace. What has made American enterprise so successful is its ability to be concerned about those who are in the workplace on a day-to-day basis, making the things and carrying out the services that are the dynamo on which the American economy rests.

We are enormously privileged this evening to have as our keynote speaker Dr. Richard McGahey. He is currently Assistant Secretary for Pension and Welfare Benefits at the U.S. Department of Labor. Until a very few weeks ago, he was Assistant Secretary for Policy and has been in the department now for several years, thinking about the problems of the workplace in a very direct way.

Dr. McGahey is an economist with a wide range of policy experience at the local, state, and federal levels. In the United States Congress, he served as chief economist on the Senate Committee on Labor and Human Resources. He was Economic Policy Advisor to Senator Edward Kennedy and served as Executive Director of the Joint Economic Committee of the Congress. And, before coming to Washington, he worked on policy and research for the economic development agencies in New York State, where he wrote the state's first strategic plan for economic development and directed Governor Cuomo's commission on the future of financial services.

Richard McGahey has a Ph.D. in economics from the New School for Social Research. He has served on the faculty of NYU's Urban Research Center. And, he was appointed to the Advisory Council on Employment and Welfare Benefits, which advised the administration and Congress on the policy related to ERISA.

He has written and spoken widely, and we look forward to hearing him tonight as the keynote to our seminar and our conference on how companies and workers are preparing for the workplace of the future.

Speaker: Dr. Richard McGahey
Assistant Secretary for Pension & Welfare Benefits, U.S. Department of Labor

DR. MCGAHEY: Thank you.

AUDIENCE: (Applause.)

DR. MCGAHEY: Thank you, Tony. And thanks to NIST and the National Policy Association for inviting me here. It always is a little dangerous to come after dinner and dessert.

AUDIENCE: (Laughter.)

DR. MCGAHEY: But seriously, I want to thank the folks here. The National Quality Program is a great, great program, one that's been enormously influential not only in its own sphere of activity, but also for trying to help businesses think about how to do things better and improve.

One special thanks to Harold Samuel, who first gave me the invitation to be here.

I want to do a couple things tonight. There are several people in the audience who know more about aspects of these problems than I do. So, I want to be a little modest and to set up some issues, and then hopefully we can have a little bit of discussion or conversation afterwards. Possibly we can set things up for tomorrow.

I want to talk about a couple of things, starting with the current state of economy, which is, of course, wonderful. And, if you're an administration appointee, you always have to do a little bragging right at the beginning about the economic situation.

I want to go from there to tell you about some work that we're doing for the Labor Department on a project that we call, perhaps rather grandly, the Workplace Workforce of the Future. I want to then go through some overheads and some facts that most of you will know. I'll try and line them up in ways that I think will stimulate discussion and then come back and summarize a couple of themes that I think characterize things.

I'm not going to talk a lot about technology tonight. I'm going to concentrate much more on the labor market/labor force side of the equation. An important set of factors, I think, play in.

Tony referred to the economy as a dynamo. I think that's right. A lot of you know these numbers. This is the bragging part if you work in the administration.

Last month alone we kept our unemployment rate down to 4.4 percent, with a quarter of a million new jobs in the last month. There have been 18.1 million new jobs since President Clinton took office. The unemployment rate has been below five percent for 20 months in a row now. That's the lowest sustained unemployment rate during peacetime in 41 years. A lot of these jobs are private-sector employment.

The real Achilles heel, I think, in this recovery has always been the wage and income side. We are finally starting to see some real wage growth. Although, if you compare it to other business cycles, it's still coming much more slowly than it has in the past. But, over the past year average hourly earnings rose 3.6 percent, which is twice the rate of inflation. Adjusting for inflation, wages have increased almost 2.5 percent in the past 12 months -- that's the fastest real wage growth in the last two decades.

Now, I would hasten to add that these increases have not caught us up for a very long period of wage stagnation, including the first several years of this recovery, when real wages for the majority of the workforce were still stagnant or even declining in some cases. But, we are finally seeing some growth in real wages. And we hope that continues.

Unemployment remains historically low, not only for the population as a whole, but also for African-Americans, Hispanics, and other groups that haven't done as well in the labor market. Again, those numbers are still too high. There's still a very large differential between those workers and other workers -- particularly more highly

educated groups. But, the African-American unemployment rate has fallen -- it fell to 8.3 percent in February 1999, again still far too high, but one of the lowest levels that we have on record since we started keeping data on these figures in 1972.

All of this is coming at a time when inflation remains remarkably tame.

I almost wrote my dissertation in economics on whether or not economics is a science. If you would have asked economists a few years ago, "Could you sustain unemployment at these levels and not see inflation go through the roof?" they might have told you, "Absolutely not. And we know that scientifically." So it's a good thing economists are not engineers or physicists or others where you have to count on these things.

In 1998, the GDP measure of inflation rose a mere one percent at an annual rate, the lowest level since the 1950s. So we have these really very strong economic conditions going forward, some of them of cyclical factors.

Let me turn to some of these overheads and put some of the numbers into context. I'm going to run through these fairly quickly.

This is the unemployment rate for all workers, seasonally adjusted, 1948 to 1998. So that's a long run. We're at one of the lowest rates we've had in the post-war period.

This is the employment-population ratio for the same period, that is, the number of people working divided by the working age population. That's an historic high. The last time we had these low levels of unemployment, we had a much lower employment population ratio than we have now.

Of course, the big piece of that story is women's entry into the workforce; other groups as well.

That already tells you that we are in somewhat of a different situation now. This is a key point I make when I do these kinds of talks for employers and others -- if you think demography is going to get you out of the unemployment problems you face now, you're wrong. There is not a large surplus or extra population in the labor force, with the wild card of immigration, that's going to come in and really relieve these conditions.

Much of the discussion about the current unemployment rates has been about its cyclical nature, that is, where are we in the business cycle? How does it relate? What I want to emphasize here is the structural condition of the labor market.

For the next several decades, as far as we can see, the demography will give us tight labor market conditions. That doesn't guarantee that we'll keep these unemployment rates the way they are, but there are both outward constraints and opportunities that this picture presents.

Of course everyone knows this: the workforce is aging. This is the median-age worker: in 1976, 35.3 years old; but 1996, 38.2; in the year 2006, the median-age worker will be over 40 years old.

We talked about this before, the employment population. This next overhead shows the changing mix of labor force gender. It may not seem like a big increase, but in 1976, you see that the female workforce had already begun to tick up there, 40 percent; by the year 2006, up to 47.4 percent.

This next overhead is another way of looking at the labor force participation rate for adult women. The top line is adult men. This is a shorter period, 1971 through 1997. For adult men, labor force participation rates are declining slightly. For adult women, they've jumped up. They're still not converging, but they're getting closer to each other.

This next set of curves is showing an age pattern, aged across the bottom gradient, 16 to 19 years old, all the way up to 65 and over. The top line is the men's labor force participation patterns by age. You

can see how the women's participation patterns have changed from 1970 to 1980 to 1996; they're getting more like the men's labor force behavior.

This is the biggest story in the labor force in the last 20 years. We sort of take it for granted now in some ways, because women are more and more at work. We still have the severe pay gap issues that we have to address. But looking at even a modest kind of time span, it is the most striking fact about labor market change.

This next overhead really underscores, I think, labor force participation by showing how participation has increased dramatically among mothers. It shows participation by mothers with children under 18 years of age, 6 to 17, and even under 3 years old, in 1975 and in 1996. In 1975, we had a third of the mothers with children under three in the labor force. That's up to almost 60 percent in 1996 and continuing to move up. Enormous implications are there for the way that we raise children, the issues of child care in the workplace, and many other issues.

Ethnicity in the workforce is a big issue, although a majority of the workforce will still be white even by 2006. The African-American component will remain fairly stable as a percentage, around 11.5 per cent. The growing sector really is the Hispanic part of the workforce.

Labor force participation over the years -- this is a very complicated chart -- this shows participation both by male, female, and by different race ethnicity groups. Again, the real message is the convergence of labor force participation patterns. People are out working. They're more in the labor force, and it's on a pretty consistent basis.

The next overhead shows numbers that are important to look at -- civilian population growth rates and civilian employment growth rates, again forecast. Forecasts aren't always perfect. Will Rogers allegedly once said, "An economist is someone who can forecast the future with absolute certainty, and his guess is likely to be as good as anybody's."

AUDIENCE: (Laughter.)

DR. MCGAHEY: So these can be wrong, although in population demography we do pretty well.

Now you see that in the 1986 to 1996 period, employment grew much faster than the civilian population. We have the change in labor force participation, and women accounted for a lot of that. Moving toward 2000, you still see that employment is forecast to grow slightly faster than population.

Again, that means that this tightness in the labor market, that is, number of workers for number of jobs available, is a condition that I think arguably is with us at least through the next decade or going out well into the future. That is going to mean for employers and for everyone else that the quality of that workforce -- their ability, their skill, and their ability to do work -- really remains a crucial variable.

We deal a lot in the Labor Department with people looking for different ways to solve their labor force problems. We had a rather notable debate that some of you probably followed last year about giving more visas to high-tech workers, principally computer scientists and people in the high-tech industries. But it's not confined to just that. We see this time that the issues are affecting everyone.

A year or so ago, a long-haul truck drive association came to us and said that they were having a shortage of people to drive long-haul trucks. What they wanted to do was to have immigrants come in from the United Kingdom to be the truck drivers.

Now, aside from the fact that a long-haul trip in England is about 50 miles --

AUDIENCE: (Laughter.)

DR. MCGAHEY: -- and you drive on the wrong side of the road. . .

AUDIENCE: (Laughter.)

DR. MCGAHEY: The point is that they didn't think, "Aren't there maybe some Americans we can train for that?" We ended up working with their association to try and develop a new training grant. Unfortunately, their first impulse was not to think about what parts of the American workforce could be retrained for this, but to immediately assume some other fix from abroad.

I'm going to come back to that at the end because I think we still have a ways to go, particularly with some of our business associations and others. We need to encourage thinking about more creative solutions for some of these labor market issues.

The other big piece of the labor force story over this period is the educational attainment in human capital. This overhead shows educational attainment, 1970 through 1996.

You can see many things on this chart, but most importantly, the percentage of college graduates continues to grow.

Education pays off for people. There is some controversy in the economics literature about exactly how much it pays off and why it pays off, but I think it's pretty unambiguous that, in general, higher levels of education give you higher levels of pay.

The next chart shows the forecast from the Bureau of Labor Statistics for the ten fastest growing occupations, 1996 to 2006. Now this is not in total numbers; this is in percentage. What's going to grow fast? You see computer support specialists, computer engineers, systems analysts, but also personal and home health-care aides, physical therapy aides, home health aides, desktop publishing specialists, and physical therapists. Computer-related jobs are being driven, of course, by the enormous technological changes that keep sweeping through. Health-care related and personal care jobs are being driven by the demographic numbers we looked at before, the fact that we've got an aging population.

This chart shows employment growth, in different countries, by higher and lower educational attainment. Again, all the forecasts for employment growth are in the sectors that have higher educational requirements associated with them.

This is another way of looking at the numbers, just for the United States. All education and training categories are expected to grow. It's out to 2005. But again the higher educations -- this chart goes up to master's degree -- are expected to grow faster than the other categories.

Now, where do people get training and education? Of course, they get it through formal institutions. But, employers still tend to be the primary source of skill-improvement training. This is a BLS survey from 1991. It's been updated somewhat since then. The BLS survey has some problems, because it allows fairly low levels of training or engagement to be counted as training. It's basically a difference between none-at-all and some. It's not a very good measure of how much training or the quality of the training. We're hoping to go back and do some more work in that regard. But you see that informal, on-the-job training and formal company training in the top two bars are really the primary source of skill-improvement training for people, at least based on the BLS numbers.

This is a slightly more updated version of those numbers. It's a 1995 survey of employer-provided training, who got training of various sorts. You can see it's pretty widespread, although it is managerial, professional, paraprofessional, and technical employees who received the most training. One of the major issues in training policy is who gets the training. It seems to be distributed much more to higher-level occupations, higher-income occupations, and higher-skilled occupations.

Now, to some extent that's a good thing. If you're flying -- I have to fly to Chicago tomorrow -- you want the pilot to have received training recently. And if you have to go to an emergency room, you want the doctors to have their skills kept up. So it's not necessarily a bad thing that higher-income and higher-skilled occupations, higher educational ones, get continuous training.

The problem in the economy is in the sectors that require less than a college degree. We are not doing a good job in training for those parts of the population.

You can see in this next chart who, separated by their level of educational attainment, got training. For all employees, we have 70 percent again. Not surprisingly, the lowest percentage would be for those with a high school education or less.

Remember again, the quality of the training these different groups receive is varying pretty substantially. It's more likely that the higher education people are getting more formalized, longer, and more meaningful training. This is again sort of a zero or one, any training at all measure.

We'll leave the overheads with this one. This is from Steve Rose's organization, The Educational and Testing Service. This is just an estimate, a projection, of formal company training, both occurrences and the costs in 1983, in 1991, and in 2005.

If we're going to keep the general trend of training level or increase it substantially, there's an enormous gap in the funding of where that training money is going to come from. We can come back to that before we finish.

So there are a couple messages here that I think are important. One is that the labor market tightness that we see now, although certainly fueled by the current cyclical success that we have, also has a very strong structural component to it. By that I mean that we've got very high employment in the population ratios now. Labor is a scarce commodity. Unemployment could go up a percent, a percent and a half. We hope it won't. That would help you get a looser labor market, but it doesn't loosen it entirely.

So the issue of workforce quality and skill, then, becomes very, very important for employers. As a structural thing, it is going to stay with them. It is not simply some cyclical thing that they can ride out. I think that message has gotten through more and more to some employers. But, I don't think it's fully widespread or understood yet.

If you're an economist, there's an enormous issue here concerning economic growth. If you're an economist in a stylized way, from a macro-economic standpoint, growth takes place in two ways. It takes place because you increase productivity or you increase population.

Again, with the wild card of immigration set aside, our population growth relative to the economy is not going to grow very much. That means economic growth will come out of productivity increases for our economy in the next ten years. That's a better way to get growth for a lot of other reasons. If we're going to continue on the path of economic growth, the issue of productivity is the central issue to the economy going forward.

That means a continued and increasing premium on skilled and human capital throughout the organization, not just at the top end, where we now see training and education distributed much more strongly.

That productivity is, of course, not just a matter of skilled components in the workers themselves. It has critically to do with the way work is organized, the way that workers play roles, and the way technology is adapted and used. These can have enormous impacts.

Figuring out how to get that message across on an enterprise-by-enterprise basis is a tough challenge. And, thinking how government programs can work effectively with business, with unions, and others to do that is something that we continue to work on and struggle with.

Finally, let's discuss the last piece of the story. As we look back at the labor force demography and labor force participation rates, the issue of training incumbent workers becomes enormously central to us.

Most of the workers that are going to be in the workforce in the next ten years or fifteen years are already there. We've spent an enormous amount of time in policy terms looking at K-12 education, through community college education, and through four-year colleges, and those remain central. Those are very important. But we have

done very, very little on the incumbent worker training side. This is where the majority of the workforce is and where probably more training needs to take place. It's something that we at the Labor Department have not done very much with.

I'm going to talk a little bit about what we have been doing and where we hope to be going with this.

Let me frame some of the initiatives first by saying that we are in the middle of a project that we call the Workplace Workforce of the Future project. This is something that my boss, Secretary of Labor Alexis Herman, set us on last year -- to try and take a broad look at major trends in the labor market and to think about what those trends mean for these workforce issues going into the future -- less to set an immediate policy template and more to think broadly. We are stylizing it very broadly.

We saw three main drivers that are shaping these issues. The first was demography, which we've talked about. The second, the frequently talked about globalization of the economy, which we see as continuing, but I think things are going to slow down. The third driver really is technological change, which seems to sweep through the economies ever more rapidly. Again, it shows no prospect of slowing, but rather is spreading into the lines of enterprise where it wasn't before.

To look at the impact of all those factors on the changing employment relationship, we're going to be holding a series of conferences this spring with some partners. We're going to do a conference at MIT's School of Industrial Relations in the spring.

Another conference will be held in an area that we call work, family, and community. Issues will include family supports and what the changing workplace is doing, not only in workplace itself, but in social relations and family relations outside the workplace. The conference will be done with a consortium of scholars from Cornell University's Economic Policy Institute and elsewhere, all of whom have been working with the Sloan Foundation.

The third conference will be looking particularly at the problems of inequality for low-skilled and low-wage workers. Even in this growth economy and even with the real wage gains we have, there are still enormous wage gaps that have stayed with us since the 1970s for low-wage workers. The Urban Institute will be helping us organize that effort.

It's not just a matter of wages, as important as that is. My new hat is pension and welfare benefits. Low-wage jobs also tend not to have pension benefits, and they tend not to have health care. The workers in those jobs are exposed to a much higher rate of accident and injury.

Economists used to have a theory that some of the benefits and wages were traded off. In the real world, they tend to view things clustered together. High-wage jobs have benefits and better working conditions. The other set of jobs that are low productivity jobs very often that pay low wages, have low benefits, and also expose the workers to a number of other harms. So, we want to take a special look at how these broad trends are affecting that part of the workforce.

The Clinton-Gore administration, of course, has tried to do a lot in these areas. I'll give you an overall list of things that we have tried to do. The one that's most important to us is the Workforce Investment Act. This passed without a lot of people paying attention.

For the last 18 years or so, federal job training policy has been run under something called the Job Training Partnership Act, or JTPA. It replaced the old SETA program.

A year or so ago, with hardly anybody noticing, a bipartisan bill passed that replaced the Job Training Partnership Act and put the Workforce Investment Act into place. We are currently in the process of writing regulations and training for the Act now. This will change federal job training policy for the next two decades, as it gives more autonomy to states and to cities. It also tries to empower workers more individually, trying to put some of the funding out in the form of skill grants to them that will allow them

to shop more for training programs, rather than having to use a narrow list of training providers. It will demand more accountability. The tradeoff in the legislation is to try and demand more accountability from these providers and from the state and local agencies.

As sweeping as it is, I think it probably doesn't go far enough toward solving a key problem. One of the challenges I think we still face in the workforce, at least from the federal perspective, is that we tend to build workforce policy in the United States not as a policy that serves incumbent workers or the primary views of the workforce, but really just focuses on dealing with groups that are disassociated from the labor market.

Early in the modern era, we had the first major piece of job training legislation, the Manpower Demonstration and Training Act. In 1962, MDTA was formed to help workers who were faced with the problem of automation, which is what people called computerization back then.

It very rapidly became the basis, when the War on Poverty was launched, of a whole slew of other programs for working with economically distressed populations. We've since added to that with trade-related workforce concerns. Dislocated workers are still our fundamental categories, even under the Workforce Investment Act. The focus is on disadvantaged youth, people in poverty, workers who were dislocated from jobs for a variety of reasons, principally for trade reasons, but other reasons as well.

The latent assumption in all of this was that these were groups who had fallen out of the labor market. The assumption, if you look at our policies, seems to say that we didn't have to do anything anymore; somehow the market or other factors would take care of incumbent worker training once people were attached back into the labor market. That won't always be the case, particularly for many parts of the population that we care about. In fact, it's made it even harder for us to plug in these parts of the population that we now want to serve. Because, by building a system like that, by building sort of a doughnut with this big hole in the center, we did not engage employers in the places that they cared the most about. How do they train their incumbent workforce? How do they get workers for those enterprises? And, how do they keep their own labor force? The employers often did not look to the public system, the post-college system, the post formal education system, as a place where they went to meet their labor market needs.

So, it became even harder to meet the needs of those populations that we are attempting to get reattached to that part of the labor market.

The Workforce Investment Act provides some modest possibilities of changing that. It will be possible for one of the first times in quite some time to use some of the funding for incumbent worker training. It's still pretty constrained. There's some fear of opening up this training -- these limited training dollars -- for incumbent worker training. The fear is, of course, that the money will be used on the incumbent workers and that the distressed populations you also want to help won't get served at all.

I think one of the biggest policy challenges that we face over the next decade is thinking about how to make our systems work better with employers and with other groups as well, especially labor unions and community groups. We want to get some new players into this workforce system. My hope for the Workforce Investment Act is not so much about reducing the layers of government, although I do believe in that. For many labor markets, having it at the local/regional level is the right level, and by shaking it up, we can get some new players involved in the workforce system, some nongovernmental players, to be honest, who can have a sustained influence in making the system work better for the workers in their communities and for the employers in their communities.

I think the opportunity is here. From the demographic side, this is as good a time as any to be trying this. Over the next decade, that structural tightness should still be there as well.

What that means, of course, is that a lot of these jobs and training will need the input of people on the technology side. What are the skills that are necessary to implement the assumptions in the Workforce Investment Act? The employers must both know and be able to communicate what training needs to be provided. What is the skill set that they need? What should people be getting trained for? How did that information find its way into the system?

I think that is the kind of work that you all will be doing at the conference tomorrow. Not only questions like what employers are doing, but how technological changes are really affecting the workplace? What kind of skill sets are people going to need in the future? Who are the best providers of those skills? What are the different ways to combine what we do in formal, public training with the ever increasing things that employers do on the job -- which, in fact, we have a very imperfect picture of and are hard to measure. We don't always know what's happening out there.

Going back to the idea that economic growth really is going to be a function of productivity growth in the next decade or so, it's essential that we answer these questions. If we don't find a way to really address the productivity issues for the workforce as a whole, we're going to suffer through slower economic growth -- undercutting a lot of the other things that we want to accomplish.

Let me stop there. Again, I want to thank you for having me. I have not gone directly to the questions on technology or workplace, instead I thought I'd try and give you a flavor of some of the things that the Department of Labor is thinking about. These are, I think, enormously important issues even in a time of prosperity.

What's going on in the workplace? How is technology meshing with the existing workforce skills and the skills we need in the future? These are two of the most essential issues for the continuing prosperity of the American economy. I hope we find a way to solve all of our workforce issues so that the next president, Democrat or Republican, I hope a Democrat, will be able to continue to brag several years from now about the continuing high and strong economic statistics that we talked about at the beginning of my talk.

Thanks a lot.

AUDIENCE: (Applause.)

DR. MCGAHEY: I don't know if there are any questions, comments, discussion.

MR. QUAINTON: Talk for a second about the immigration wild card. It seems to me that we are bombarded with information about immigration and the likely impact on the workforce of accelerating immigration, particularly of the Hispanic population, but not only of that. How will this immigration impact on the kinds of things you were talking about?

DR. MCGAHEY: I think the impact of immigration varies by what sector you're talking about. We haven't looked at it closely enough. It's a hard problem to untangle -- how immigration in the lower skilled sectors may have created some competition for employment in those sectors.

It is on the higher-skilled side where most of the political attention came to us last year in the form of opening up more visas, particularly for workers with information technology skills. We pushed back against that relatively strongly on an argument that we were going to adjust the number of visas only if we could generate some funds and training for American workers.

In a funny way, as an economist, it's easier to talk about the higher-skilled issue. You don't want to immediately relieve the pressure through an affirmative immigration program if what you care about is the training of your own workforce. We continue to see that the enrollments in computer science courses in colleges have gone up rather substantially. There are market signals that are sent by that. If we relieve all that pressure with immigrants, it sends a signal for our own population. That is our argument, at least, on that issue.

There are very contentious discussions on the immigration issue. Whether, in effect, there's real competition there -- whether that's been a factor that's had something to do with some wage stagnation in those populations. I don't think it has a lot to do on the wage side, but I think it has to do with many other factors. It's a real live debate and one that continues today. Politically, most of the pressure comes to us not in those sectors.

MR. TURNER: Brian Turner with the AFL-CIO Workers of America Institute. Rick, you mentioned the importance of improving skills and productivity for raising living standards in the future. I wonder if you could share with us some of your ideas about how we can increase the level of investment per worker and improve the distribution across the different kinds of workers. The data that I'm more familiar with differs from the somewhat rosy projections of increasing numbers of dollars shown on your chart. A survey from the ASTD found that the per worker investment in incumbent worker formal training will actually decline during the next 15 years.

DR. MCGAHEY: I mischaracterized the chart. The chart showed what would be necessary to keep those levels going. It said nothing about how that gap would be financed.

MR. TURNER: Could you summarize for us how you would cut this.

DR. MCGAHEY: It's tough. You remember, of course, the infamous training tax -- I came to Washington and went to work for Senator Kennedy to write a bill that had a training tax in it. But, there were an enormous number of barriers in doing it. It's easy to talk about the barriers, which you know real well. We don't treat investment in people the same way we treat investment in equipment. And our accounting rules, even at the basic level, are not designed to do that.

So, we have been pushing training solely through the individual side, particularly by financing higher education in college. That's where the big dollars in human capital development have gone during the last few years, not for incumbent worker training, except insofar as it's attached to that. I think instruments like Hope Scholarships began to get at that, although they weren't consciously meant to be that.

What those efforts really accomplished was the ability to finance community college in a couple of places. I think most of the funding still is going to be attached to individuals. It's hard to attach it to firms. I'd like to think about ways to do that.

But the training tax experience was interesting to think about. The idea was that companies either had to put a certain percentage of their payroll into training, and the training would be well distributed across the workforce, or they essentially would have to pay a tax. That tax would be placed into a public fund, and the fund would then be used for training.

It turned out to have enormous administrative problems, the most obvious of which is you either have to have companies self-certify -- to which the companies all say, "Oh, yes; self-certify; yes, we're doing training"-- or you have to send an army of IRS-type inspectors to the company to ensure that the training is taking place, which is politically unfeasible, particularly if you're going to pay for on-the-job training, to use formal education providers.

The community colleges and other people seem to be a little more comfortable with some of these tax type notions or tax forgiveness notions, if it's tied to some sort of certified institution. That has its own potential difficulties, but it's probably about the only way that the box has been worked out.

The funding is probably going to remain somewhat attached to workers. Companies and industries will need to get more involved in helping to organize and finance some of the training. Training providers will need to become more flexible. There are some places around the country you can see where these things have happened in some way.

I believe that it's going to take coalitions really -- of industry, of unions, and other entities -- that raise a voice for worker needs and generally find some way to finance it.

We seem to be doing everything through the tax code these days. There are many inefficiencies, and that may not be the best way to do it, but that seems to be where the politicians are pushing it.

I think that more pressure may soon come out of the business community on how it can finance their training and human capital needs. If I'm right about the structural situation, then that pressure is going to stay there and probably grow in intensity. So, I would think that some potential alliances are there, which hasn't always been the case. I don't have a blueprint for that. You guys might work on that tomorrow.

MR. HECHT: I'm Larry Hecht. I used to run the Iacocca Institute, and I do consulting now.

I was in the university atmosphere for a number of years. One of things that bothered me is that the "educational bureaucracy" really ignores, to a large extent, what you're talking about, which is retraining. The universities really don't want to get involved. The junior colleges want to get involved to a certain extent, but they don't relate to companies very well.

So, as a result, literally there is no research and there is no development mechanism for retraining. The universities don't have the mechanisms. Is there some possibility of some government support for R&D or retraining -- not just the training itself, but a better understanding of how you do it? How do you keep people up to date -- because this is something we all know we have to do.

DR. MCGAHEY: Yes. And I think that's interesting. In addition to the public providers of education and training in the United States, there's a whole raft of private providers as well. And it's actually a fascinating, rapidly growing piece of the market, the private provision of education and training.

I gave a talk last summer at the Milliken Institute, which is something Michael Milliken set up. Leaving aside what one thinks about junk bonds or high-yield financing, Milliken is now going around buying up education and training providers. He's got something called "Knowledge Universe," and it buying up every software provider and education and training provider. He's putting down bets that this is the next big thing.

I'm a little more optimistic, about the community colleges than you are. I think it varies quite a bit from state to state. I share your skepticism about four-year universities, I have to say. Having done economic development in New York State, I know that the four-year universities believe that it's not in their mission to do this kind of training. They're not particularly flexible outside of their mission, particularly on this. I think that community colleges partly by default have become the strong provider institutions in worker retraining, but more flexibility is needed.

Nothing is automatic when it comes to worker training. I think we've got to experiment a little bit and look for places where there seem to be positive examples. Then, we've got to figure out ways to nurture and expand those.

MR. SPANT: Roland Spant, Swedish Embassy. I was wondering if you could touch on the tradeoff between training and retraining, considering the issues of tenure and the turnover of the labor market. Most statistics I have seen from all countries in the world show that you get more training for people with longer tenure, meaning the company has lower turnover rates. Unionized workers normally have longer tenure and lower turnover for training.

DR. MCGAHEY: Yes.

MR. SPANT: But, of course, if you invest in your labor force and they leave, you have a turnover problem.

DR. MCGAHEY: Right. It's a bit of a chicken and an egg problem. I think a number of enterprises in the United States, particularly in the service sector, were built on the expectation of high turnover. Think of the fast food industry -- the way it used to operate and, to some extent, still does.

At McDonald's, they expected very high labor turnover. They used the population of teenage workers and thought there would always be a fresh supply of them coming in, allowing for continual turnover.

If the demographic numbers hold, that strategy is not a very good strategy for moving forward as a company or as an industry. You should not premise yourself on a high-turnover, low-skilled, low-retention labor force, although lots are still trying. That's a pretty broad stroke. In the suburbs, for example, there is very low demographic growth. They have trouble now finding people to go into those kinds of businesses.

This whole employment relationship situation has gotten to the point where businesses seem to be running in two contradictory directions. In the next decade, we'll be able to see how it plays out. And I wonder, is there a desire by business to reduce its attachment to the labor force? That's true not just in tenure. We also see it in the benefits area. We see the rise of so-called contingent workers and leased employees. There is a rising trend where employment relationships are now with some intermediary organization, rather than with the direct employer.

That's another large set of issues that we're trying to look at in this project. All of our laws -- our benefit laws under ERISA, our labor enforcement laws, and our labor standards -- are premised on a pretty steady relationship with an identifiable employer. The laws have to be enforceable. To the extent that the whole set of relationships is changing, it raises real issues for us in terms of how training takes place, who's responsible, and about rights and responsibilities in the workplace.

I think that there are many cases where employers do make a significant investment in their workforce in training. Unfortunately, most of them don't.

I was reading about the SAS Institute. It's a computer organization in North Carolina, which pays lower wages, but has a terrific range of benefits -- not just training, but, child care, medical care, and other dependent care sorts of benefits. The organization claims to be able to hold its programmer base in a pretty competitive industry at lower nominal wage rates than others.

There's going to be lots of experimenting by business with different strategies for doing this. Hopefully, we'll find that those companies that invested in workers, invested in the workforce and training, and developed a more cooperative relationship with the workers would find some ways to succeed. I think that's less something government policy can dictate anymore, so then one wants to try and enforce the boundaries of what's allowable.

It's sort of a high-world/low-world argument. If you let standards slip too much, then you create other sorts of operating advantages for firms. The key is finding a balance that includes flexibility and letting the companies look forward.

The argument to me is: if you want to stay in the U.S. and stay competitive at a certain productivity level, you're going to have to do some investing in the workforce. There are a lot of barriers for a company to take that on all by itself.

If you look at small firms, small or medium-sized enterprises, this is not something that comes to them naturally. There are not many financial incentives for them to do it. A worker is different than a piece of machinery. You can train a worker. They can leave. The investment will always be viewed differently.

Finding some way to make the financing for training work better, so at least companies will want to try it -- I think that's the real challenge on the policy side.

DR. HERTZ: Harry Hertz with the Baldrige program. I guess one of the real challenges that we hear from businesses today is remedial education. There is a need to make up for what isn't happening in the K-12 education system. Then, looking at your crystal ball to see our future needs, where do you think education in the K-12 system will be a decade from now? And then, what burden will be on businesses to provide ongoing remedial education?

DR. MCGAHEY: I agree with your statements on remedial education. I think that K-12 improvements are critical, and, of course, the President's had some ideas about how we might improve the general quality of K-12 education. In the United States, our education system is much more dispersed; we don't have a national system. We don't have national, enforceable standards on education.

Adult literacy is an enormous problem for employers to deal with. A good deal of the existing workforce has quite a severe problem operating at the lowest levels of basic literacy and mathematics skills. The President has proposed some new programs to deal with the literacy issue, but I think the problem is going to remain and may be spreading out.

If you think about the demography of the entering labor force, they have generally lower education rates and higher gestation rates. That's going to be a challenge that we're going to have to find some way to deal with.

The thing is moving so fast. One of my favorite stylized facts (which I borrowed from the Levey and Murnane book of a few years ago) is that half of the high school graduates in the United States now don't have the mathematics skills to get an entry level job in a "Big 3" auto plant.

Now, that's partly a statement on what's happening in schooling, but it's really a statement about how the job is changing. The quality issues in the higher levels of manufacturing have really revolutionized the laws of work. Talking to the Baldrige folks, of course, this is the stuff you live and breathe.

When I was in New York doing economic development, I remember we had some auto industry suppliers who came in. The auto industry was squeezing down the number of suppliers they had. To survive as a supplier, you had to get your error rates down, way down. And, to get your error rates down, you had to use something called statistical process control. To do that, it meant your workers had to know some algebra. Very rapidly you ran into what seemed like a technology issue, but it turned out to be a human capital issue among a lot of our employers.

You have people who are illiterate, and the curve keeps moving out away from them. I don't know whether it takes place in the workplace or in conjunction with it. I started on the problem of severe literacy problems, but I think it does go on much more broadly than that.

MR. LINOWES: Richard Linowes from American University. I'm curious, what figures are you most eager to learn from the next census, and how do you expect that to most likely impact your policies? And number two, our aging workforce -- should we be open to the idea of retirements at an age other than 65?

DR. MCGAHEY: Well, retirement is not at 65 now. That's when we award Social Security and Medicare. But, the average retirement age is below that and is moving down. That statistic varies substantially by income.

One of the real challenges in this debate is that people have longer working lives, but people would like to stop working. If you ever taught an introductory economics class, it's one of the few things that makes intuitive sense to people. There's a lot of stuff in economics that doesn't. But when you say, "Work is this utility, and that's what I'm paid for," everybody goes, "Yeah, okay."

I think opening up that higher age level and allowing people to work if they want is a good thing, and it can be done in some situations. I believe most people would like to retire when possible, but it's a real mixed bag when people work beyond normal retirement age.

It's a different question, whether we should be changing federal policy in such a way that makes it harder for people to retire at those ages. That's a different question and one that gets a lot more into social values. Right now the President's initial Social Security proposals do not propose advancing the retirement age beyond the existing age. I think that's a pretty popular view.

I certainly wouldn't think that whatever marginal benefits we might get from encouraging people to continue to work would be worth the tradeoff. Those issues are driven by a whole set of other circumstances in any case.

MR. LINOWES: What figures are you most eager to learn from the census?

DR. MCGAHEY: We will be curious to learn more about contingent work arrangements. There's not enough reliable information on these changing employment relationships.

When we were setting up this Workplace Workforce of the Future project, everyone I talked to, business, labor, folks in academia - said that changing employment relations was the issue we really need to know about. It's the thing that's changing the fastest, and we don't have a handle on it.

The tremendous rise of independent contractors, contingent workers, and varied sets of relationships is changing firms, and we don't know nearly enough about it. Everybody's sense is that it's sweeping widely through many different industries.

But, if you look at the numbers that we try and use to measure it, the numbers are not telling us what we believe to be true. It's always possible that it's not happening to the extent everyone thinks it is. That does seem hard to believe with the number of people from different perspectives that all argue the trend is huge. We don't know if it is possible, but this information is something that we would really like to get out of the census.

MR. DEAN: Jim Dean, Kenan-Flagler Business School, UNC Chapel Hill. It seems, given the structural elements of the economy that you talked about, one would expect that workers would be more likely to invest in their own training.

Given the returns that education provides, according to your slides, and also with the tightness in the labor market -- you would think that workers would be willing to invest in training to increase their own market value.

DR. MCGAHEY: Yes.

MR. DEAN: But apparently that's not solving the problem.

DR. MCGAHEY: Well, they are investing in college, right. The biggest way that college is financed is not through government grants; it's financed by taking on debt. So, families are investing rather heavily when instruments are made available to them for higher education. There is not a parallel set of instruments available for non-college education, for several reasons. I'm not sure that I'd be comfortable with the idea of lower wage workers taking on enormous debt burdens in that way. For at least some types of training, people are investing pretty heavily. I'm not sure you can translate that investment into the problem we're talking about. It probably is a piece of the puzzle though.

Everyone now believes that their kids have got to go to college. In fact, we've done sort of an overly good job of convincing people that the four-year college is the only way to succeed.

When we were setting up some of the earlier versions of the Workforce Investment Act, we were trying to put an emphasis on two-year trades and similar things. Some of our biggest criticism came from minority group representatives, and others, who were worried that we were tracking people, which wasn't at all what we wanted to do.

Bob Reich, who was the Secretary of Labor, talked a lot about technical occupations -- two-year occupations that could give you a very good living with training, but didn't require a four-year college education. These jobs exist in a variety of fields.

That caused - maybe not a storm -- but there was at least a rumble of concern among people who had bought the idea that (which most Americans have) that a four-year college is the only route to success. They believed that if you tried to encourage people to move into these two-year occupations, you would be, in effect, tracking them away from the most successful route.

I'm not sure how to crack that nut, because then the idea of them taking on more debt to do those sort of things has its own problems.

I agree that finding some way to share the investment burden is important.

MR. DEAN: Just a quick follow-up question. Has research been done on the economic return to the individual when training is completed outside the four-year college environment? Do we have reason to believe that it does increase an individual's competitiveness in the job market to have participated in training outside that environment?

DR. MCGAHEY: Yes. Obviously, we don't have as much data as we do on the economic returns of four-year college. The measure we tend to have is not the training but the credential. We assume the credential reflects some end human capital increase. It's probably one of the effects of the credentialing process.

The on-the-job training that people do and the learning that people do in an occupation, the informal stuff, is where we know a lot of people learn and improve their productivity. This is extremely hard to study and measure, much less to figure out investment components. It would, however, be a great type of research to have.

We know that there's kind of a step gradient thing, with each formal level of education. Even with each measure of the year, we see a higher return on earnings. It's still pretty crude for the kind of questions we want to have answered.

MR. QUAINTON: One last question.

MR. FOOKS: Marvin Fooks from Montgomery College. I'd like to ask the same question as my colleague except from the perspective of industry in the private sector. It seems to me the incentive to invest in training is at least as valuable to business as it is to individual workers. And, in fact, the computer industry is notable for signing bonuses and all those other things.

DR. MCGAHEY: Yes.

MR. FOOKS: Why is it that it seems to be so sporadic?

DR. MCGAHEY: Well, in some industries I think there's a higher concentration of training where it matters. The computer industry is a good example. It's often hard for small firms, depending on their cash flow, to set dollars aside. Small companies generally don't have a human resources department; they don't have an organized training system. They typically aren't unionized. There have been some interesting attempts to work with small employers on the training issue. Traditionally, it just hasn't been in the small business mindset to think about training as a solution to their problems.

I think that we have relatively weak trade associations in the United States. That's a big generalization, we have some that are pretty good, but the Europeans and others put a lot more concentration into the trade association and training types of issues.

One of the biggest institutional challenges we have is how to work effectively with small businesses and small employers on this kind of training issue. Everything needs to be arranged: from financing needs, to where would they get the training, to could it be delivered on site.

In some of the bigger enterprises, you see that there is a good deal of training taking place. This is happening in many industries not just the high tech ones.

There are many interesting labor issues we're starting to see. Sometimes we're seeing training components written into contract negotiations, especially in larger firms.

In many situations, however, there's not an organized voice for the workforce. The employers tend to be small and somewhat fractured. There may not be a financing resource for training. To me, the most pressing problem we've got is how we can work effectively with the small firms.

MR. QUAINTON: Thank you very much.

AUDIENCE: (Applause.)

Session One: What Demands Are New Technology and Productivity Increases Placing on the U.S. Workforce?

Moderator: Dr. Harry Hertz, Director, Baldrige National Quality Program

Good morning. On behalf of the National Institute of Standards and Technology and the Baldrige National Quality Program, I'd like to welcome all of you to our conference.

I'd like to start by thanking our co-sponsor, the National Policy Association, for co-sponsoring this event with us. They worked with us to set the tone and were really responsible for proposing this conference from the start.

Particularly, let me acknowledge Howard Samuel who's been a close and longtime friend of NIST and the Baldrige Program. Howard was the original proposer for the idea of today's conference.

How companies and workers are preparing for the workforce needs of the future is really central to the whole Baldrige Criteria and to the Baldrige philosophy.

Category 2 of the Baldrige Criteria deals with strategic planning, and obviously how companies are preparing for the future is what strategic planning is all about. Central to strategic planning, from the perspective of the Baldrige Criteria, is the related and very important aspect of human resource and workforce planning. Obviously, the two have to go hand in glove if companies and organizations are going to be prepared to face the future.

Category 5 of the Baldrige Criteria deals with human resources. We call that Category "Human Resource Focus," because we focus on the human resources of an organization as internal customers of the organization, just like we have "Customer Focus" as one of the other Categories of the Baldrige Criteria.

The Human Resource Focus Category looks at work systems: how work and jobs are accomplished in the organization, how we motivate the workforce, and how we hire and prepare the workforce to deal with the challenges of the workplace. The Category also deals with human resource education, training, and development -- obviously, that will be central to some of the discussions that we will have today. And finally, it deals with the well-being and satisfaction of the workforce. Clearly, in viewing the human resources of an organization and in viewing the workforce as internal customers, the well-being and satisfaction of those internal customers are vital to the ongoing relationship between the organization and its most vital assets.

The main purpose of today's session is to promote discussion, so that we can all get a better appreciation of some of the issues facing us and maybe some of the possible answers as we look at our future needs in terms of both organizations that employ people, as well as the people who work for those organizations.

We got a good introduction last night into issues associated with demographics and the training and development of the workforce. I think that we have the opportunity to further that discussion as we proceed through the day today.

It's been said that one machine can do the work of 50 ordinary people, but no machine can do the work of one extraordinary person. I think what we are faced with in the future is more and more the need for extraordinary people. So, while we will capitalize on technology, people are still going to remain our most important asset.

I believe our challenge today is to try to understand what the demands on the workforce of the future will be, what opportunities we will have to provide, and what actions we will have to take, in order to make sure that we are prepared for that future.

Our first session this morning deals with the technology and productivity demands on the U.S. workforce. This session, as with the other two sessions that will follow later in the day, will begin with a challenge statement, followed by a brief response or responses, depending on the session, and then we'll open up the floor to

general discussion. The sessions were designed to bring together the thoughts from the diverse communities that are represented by our attendees today. I think we really have a wonderful mix of people here, and I appreciate all of you coming so that we can foster that discussion.

Leo Reddy will set the stage for the first session on technology and productivity. Leo is President of the National Coalition for Advanced Manufacturing. He has been in that position since 1989 as founder of NACFAM. His complete biographical sketch is in your packet, so I think we'll dispense with lengthy introductions, since you can read the biographies of our distinguished speakers. I will just turn the floor over to Leo and invite him to set the challenge for the first session.

Chair, Session One: Leo Reddy, President,
National Coalition for Advanced Manufacturing (NACFAM)

Thank you very much. Good morning, ladies and gentlemen.

It's always a pleasure to make the pilgrimage from downtown Washington to Gaithersburg, to meet with distinguished friends and colleagues from NIST. I'm happy to see Ray Kammer joining us here this morning, which I think indicates the high level of interest that NIST has in this subject. And it's always a pleasure to attend a conference organized by the very venerable National Policy Association and the Malcolm Baldrige National Quality Award, which hasn't quite reached the status of venerable, but Harry and his colleagues are working hard at it and making rapid progress. It is, however, certainly a fine program.

I welcome the opportunity to share some thoughts with you on the subject of how technology and the demands for increased productivity are affecting the workforce.

I'll be sharing with you this morning some rather recent research results in this area which you may find of interest.

Let me begin by recalling something you all know -- that manufacturing is indeed back. I'm not sure it ever went away. But if there were any doubts, manufacturing is certainly back on the map. We have seen a significant recovery in the market position in a number of our sector's high-export, high-value-added industries, certainly in computers, pharmaceuticals, aerospace, and many others.

And I think that the judgment is in, from all the research that I've seen on this subject, that the main driver behind this resurgence, in the manufacturing sector at least, has been the accelerated adoption of information-based technologies.

According to the Office of Science and Technology Policy, most manufacturing workplaces today rely heavily on computer and telecommunications technologies. Over 90 percent of manufacturing firms today are using computer-aided design. And over 75 percent are using computer numerical controls, computer-aided manufacturing, just-in-time inventory systems, total quality management systems, and many other new technologies.

In addition to technology, companies are also adopting advanced processes and management systems. There's been an extensive process of downsizing, cost cutting, and other steps of that kind, including the development of lean production systems, in response to global competitive pressures. And more germane to our subject this morning, companies have increasingly moved decision-making powers to the factory floor, creating cross-functional teams that operate much like small business units. I think most of us are familiar with these phenomena.

But these changes, these technological and process changes, have made manufacturing a model for the economy in terms of productivity growth. In the fourth quarter of 1998, it was very good news that business as a whole had a productivity increase rate of about 3.9 percent. But during the same period manufacturing productivity and durable goods increased at 8.4 percent. Throughout last year, manufacturing

productivity growth grew at about 6.3 percent, while business as a whole grew at a rate of about 2.4 or 2.5 percent. So manufacturing indeed is increasing its productivity.

Now, these technological and organizational changes are obviously having a significant impact on the workplace, most obviously on workers. Certainly in manufacturing (and I'm going to keep referring to manufacturing because it's the only sector I know reasonably well), workers must become and are becoming more skilled.

In 1950, for example, about 60 percent of our manufacturing workforce was unskilled. Today that number is 30 percent, and it's projected to decline to about 15 percent by the year 2005.

More importantly, I think the relentless infusion of new technologies and processes is requiring our workers to develop the skills that will enable them to adapt to a process of continuous change.

There is a model, or an image, that I think most people have in their minds about the typical manufacturing production worker, and it is rooted pretty much in the industrial era's second wave period in our economic growth. The image is of an individual who basically focuses on one craft or one skill area and stays in that area for his or her entire career. In fact, the German apprenticeship system, which some of you may be familiar with, is based upon that same notion: 362 different specializations in which one stays for the bulk of one's entire career. That whole notion is changing radically.

In fact, when you think about work in manufacturing today, I would suggest that you also begin to think beyond the factory. To understand manufacturing in the contemporary environment, you really have to look at the larger manufacturing enterprise, the distributive manufacturing enterprise, e-commerce, integrated supply chains, and large service and IT sectors, which support the manufacturing base. So, the very definition of work in manufacturing is changing.

Because of these changes, there is a growing premium on workers who have what we're calling core skills and competencies -- those basic skills and knowledge sets that cut across all sectors of manufacturing. Workers who have developed competencies in these core areas will be better able to adapt to change, more easily cross-trained, and more capable of moving from one area of manufacturing to another and across the operations of the company.

My organization has been doing research in this field for a number of years for the U.S. Department of Education. We have published a report called *What Manufacturing Workers Need to Know and Be Able to Do*, which is a very interesting report and is based on empirical research. According to this research, just to give you a little example, the core skills that we've identified encompass communications and teamwork, math and measurement, problem solving, learning skills, quality assurance, business planning and operations, computer use, process control and improvement, manufacturing fundamentals, and so forth. As this list indicates, core skills incorporate basic skills and knowledge, technical skills, and organizational skills. Of course, beyond these core skills, workers need to develop some areas of specialized skills and company-specific skills as well. But, with a firm foundation in these core skills, our workforce will be able to function efficiently and successfully in what people are calling today the high-performance workplace.

Now, those of you who spend any time in this area, keep hearing this term "high performance." As part of the work of the Manufacturing Skills Standards Council that I'll refer to in a moment, a good deal of research was done last fall on trying to get a clear and succinct definition of what the high-performance workplace actually is. There is quite a lot of literature on that subject. The Council pulled together some experts, looked at the literature, and worked on a definition with the rather large community that makes up the Manufacturing Skills Standards Council. I'd like to read our definition, which was wrought with some difficulty. It's hard to get consensus on these formulations, as you know. But I think this definition tells you quite a lot about how the modern worker is working in an advanced technology marketplace. It says:

"A high performance manufacturing workplace is quality driven and customer focused in order to ensure an economically viable future for the company and its employees. In such workplaces, a streamlined, decentralized decision-making structure that maximizes communication and flexibility is utilized. Such workplaces clearly and consistently share their strategic goals, priorities, and operating information to empower and enable all employees to share in the decision-making process."

That is rather an unusual statement if you reflect on it for a moment.

"High performance workplaces are free of recognized occupational and environmental hazards. Innovative work practices, such as teamwork, are common. Appropriate advanced technologies, such as computer-based information and process control technologies are integrated throughout the organization. Lean and agile manufacturing practices are optimized to improve productivity."

And finally:

"In a high performance workplace, the diverse skills, knowledge, and abilities of employees are leveraged to improve the manufacturing process. By systematically investing in workforce development, the skills and knowledge of all members of the workforce are continuously updated and aligned with those needed to accomplish the work of the organization. Employees are provided with positive rewards and incentives in recognition of their value to the company's long-term success."

To take another slice at this, we asked a leading expert on work analysis in the manufacturing workplace, Dr. Robert Sheets from Northern Illinois University, to do a functional analysis of the high-performance workplace and from that to derive some definition of changes in the workplace that are a result of this phenomena. He identified a series of changing roles for workers in this new environment.

Let me just indicate these briefly. As I go through them, what you'll recognize are a lot of functions that were formerly performed by managers or production engineers, but are now increasingly performed by an empowered workforce.

- Involvement as members of cross-functional teams in earlier stages of product/process design, supply chain, and distribution;
- Involvement in production scheduling and inventory control management;
- Shift from operating only one unit process to multiple unit processes.
  (This reflects on the statement I made earlier about workers no longer functioning on a single craft, but on multiple processes.);
- Enhanced responsibilities for setup, troubleshooting, and changeover processes for shorter production runs;
- Shift from mainly process operation to more process control and improvement activities;
- Greater responsibility for preventive maintenance functions;
- Involvement as members of cross-functional teams in improvement of equipment design and reliability;
- Involvement in all aspects of planning and maintaining quality systems; and
- Involvement in all aspects of planning and maintaining health and safety and environmental management systems.

So I think what this research and these indicators show pretty clearly is that we're now dealing with a new generation of worker in manufacturing, a person quite different from the kind of manufacturing worker we would have found in plants 30 and 40 years ago. This is an empowered worker, a business-oriented worker, a customer-focused worker, and a flexible worker -- able to keep pace with the rapid pace of technological change.

Having said that, let me hasten to add, that our education and training systems massively have failed to keep up with this transformation in the workplace. In fact, the gap between what the modern workplace is requiring, at least in advanced manufacturing, and what the education and training systems in the country are providing, has, if anything, grown, not diminished.

According to a Grant Thornton survey in 1997 [The Skills Gap], 88 percent of responding manufacturers report difficulties in finding qualified candidates in at least one job function. That's a trend that Grant Thornton has been tracking for a number of years, and that percentage has been growing, not diminishing. More than half reported that their workforce lacked basic employability skills, math skills, reading skills, and writing skills. That survey also determined that a third or more of manufacturers found that skill deficiencies among workers made it very difficult to improve productivity.

As a result of the skills gap, companies must spend increasingly large amounts on basic, remedial education rather than on the more occupational and company-specific areas in which they would like to expend their training dollars.

The lack of workers with the right skills leads to high scrap rates, rapid turnover rates, increased down time, and as I said before, increasing difficulties in adopting new technologies.

A U.S. Census Bureau survey reports that over half of the companies responding cited the need for education and training and the lack of a skilled workforce as the most significant barriers to technology adoption. So, this is a major business issue and not just an education and social issue.

At the same time, from the perspective of the worker, the workplace has been experiencing severe challenges. These challenges include cases of business downsizing and relocation and also cases of the many businesses that are not modernizing, that are not adopting new technologies, that are not training, and that are not making appropriate use of worker skills and knowledge. Businesses and workers simply must have the tools necessary to keep pace with technology, and many of those tools are currently insufficient.

This is not a trivial problem. This is a profound structural problem that permeates our economy. A solution to this problem has to involve many sectors of our economy, certainly companies and unions, but also schools, government, and many other community-based organizations.

It is especially important that companies invest in workforce training. They are increasing that investment to some degree, although the investment varies significantly from company to company.

One thing is very clear. If companies do increase their investment, the chances are that their profitability and their productivity will also increase.

PricewaterhouseCoopers just did a study for Industry Week, which stated that world-class plants, the world's most productive and successful plants, are three times more likely to provide more than 40 hours of annual training for their workers than are companies who are not world-class. They are also two times more likely to have their employees working in self-directed teams. So, there is a direct correlation between profitability, productivity, and investment in workforce education and training.

My organization, NACFAM, is focusing a great deal of our energies in what we see as a very promising new tool in this area, namely, national skill standards. We've been working on national skill standards for a number of years.

In 1997, NACFAM and the Working for America Institute of the AFL-CIO received a grant from the National Skill Standards Board to develop a voluntary partnership of industry, labor, and educators to build a nationwide system of skill standards in manufacturing.

We have built that partnership. It's a very large, very robust organization, with over 250 national organizations represented in it, about half of which are companies and industry associations.

We are now in the process of developing standards under the name of the Manufacturing Skill Standards Council. We're beginning to work on assessment tools and certification regimes, all within the framework established by the National Skill Standards Board.

The idea is to develop a common set of assessment tools, standards, and certificates to help the portability and the flexibility of the workers. This will help companies understand and recognize the credentials that people are placing at their doors and will allow companies to use skill standards as a foundation for their own workforce development programs. We've already done a fair amount of this work in companies, and it has been successful. This is one new tool that we've been spending quite a lot of time on.

We're convinced that through a combination of this national system of standards and increased investment in workforce education and training, our country will indeed not only maintain our productivity growth, but increase it.

I'd like very much to associate myself with the speaker last night, Rich McGahey from the Department of Labor, who pointed out that productivity growth in the final analysis is really the name of the game in terms of our overall national economic well-being and our overall standard of living.

We think that this is a vitally important issue and that some of tools we begin to see developing on the horizon will make a contribution to enabling workers to deal more efficiently with rapid technological change.

Thank you.

DR. HERTZ: Thank you, Leo, for setting the tone for our first discussion. Before we get into that discussion, let me now offer the opportunity to respond to our two respondents, starting with Pamela Kurstedt, who is the Assistant Dean of the College of Engineering at Virginia Tech.

Respondent, Session One:
Ms. Pamela Kurstedt, Assistant Dean, Virginia Tech

When I looked at the list of participants, I saw a lot of people from business and a lot of people from policy organizations. How many of us are engineers? Oh, good -- I'm not alone.

I am from the largest university in Virginia, Virginia Tech. We are also the land grant university in Virginia. And, Virginia Tech's College of Engineering is one of the largest colleges of engineering in the United States.

As a member of the dean's staff in the College of Engineering, I am presently serving on two major executive committees in engineering education which gives me some background to respond to Leo.

The first one I serve on is SUCCEED, which is an NSF-funded engineering education coalition of eight southeastern engineering schools. One of the major projects that we're working on, for which I'm the team leader, is the Outcomes Assessment of Key Attributes of Engineering Graduates.

Secondly, I serve on the executive board for the Global Engineering Education Exchange Consortium, which is an international organization of engineering schools, about 30 engineering schools in the United States and about 50 engineering schools in Europe, Latin America, and Asia.

We're all trying to work together to produce engineers for the future and for high-performance workplaces.

Coming from an educational institution, I can tell you that it is important for us to collaborate, not only among the four-year institutions, but also between four-year institutions and community colleges. We

also do a fair amount of work with high schools. Although we do collaborate some, typically an educational institution is going to respond according to its institutional mission.

For example, Virginia Tech, as a research university, is going to be able to respond in the area of bachelor's, master's, and Ph.D.'s, but we're probably never going to be a source of technicians for you. I think that has been a real problem for us in the past in working with the growth of information technology -- there has been some confusion about the different missions of educational institutions. We have to make sure that everybody understands what our purposes are.

The core skills that Leo talked about are really combining technical and people skills, and they are echoed in ABET's EC 2000 as to what engineering colleges are now required to teach their students. ABET is the Accreditation Board for Engineering and Technology. Every engineering school in the United States except for MIT wants to be accredited. We are reviewed every six years, and it is a very thorough review. It's as complex as the Malcolm Baldrige Award, and we have no choice. We have to do it. Every engineering degree program must go through that.

Interestingly enough, the key attributes, as we call them, that our students must demonstrate, are listed "A" through "K." There are 11 core skills or key attributes. And, if I look at Leo's list, it shows 11 core skills that he says production workers should have as well.

I think that's very interesting. There's a great deal of overlap between what we're expecting of our engineering graduates and of our production workers. I think that fact is something that engineering colleges have not considered in the past and something that we need to consider in the future: many tasks that engineers have been expected to do in the past are now a responsibility of production workers. That will be a little bit of a shock to some of our faculty.

One of the problems that we've had as engineering programs working with our accreditation board, is that they just listed these "A" through "K" key attributes. They really didn't give us a good definition of what the stated attributes meant.

So, for example, when they talked about "must perform effectively on a multidisciplinary team," the first question everybody asked is, "What's a multidisciplinary team?" Does it mean within mechanical engineering that you can have someone that's interested in power and someone else that's interested in machine design? Or does it mean you have to have a mechanical engineer and an electrical engineer? Or does it mean you have to have a mechanical engineer, an electrical engineer, and a business major? The answer wasn't clearly stated.

There was similar confusion about all of the listed attributes.

Leo assures me that the report that he showed to us has good definitions of all of those core skills for production workers. I think the definitions will also vary depending on the work site. These definitions have been a real issue for us. Trying to change our curriculum to produce engineers with these key attributes is difficult when we don't have clear definitions.

My last point is an observation. Having been involved with the major engineering schools in the United States and in Europe, I have seen very few engineering schools that have structured activities for bachelor degree students to participate on a team that involves someone of a different educational level: such as technicians or certificate production workers. We just have not addressed that challenge.

When I read through Leo's remarks, I realize that this is something we really need to be thinking about. There's a place here for collaboration.

Most major universities have community colleges close by that provide associate degrees, as well as certificate programs. We probably ought to be working with them on our design projects in the senior year or even earlier, where we're combining teams from those different educational levels.

Presently, I don't know of any university that has a major effort to prepare our engineering graduates, especially those who are going into manufacturing, to work with production workers. I think that the assumption is that will be done on the job. Perhaps it is in some cases, and perhaps it isn't. But I can tell you, at least for the engineering schools I'm familiar with, we really aren't doing anything to prepare our engineers to be the first-line supervisors of high-performance production workers. I think that's probably something that we need to work on.

Thank you.

DR. HERTZ: Thank you, Pamela.

And now let me turn the podium over to Nancy Mills, who is Director of the Center for Workplace Democracy, AFL-CIO, to deliver the second response.

Respondent, Session One:
Ms. Nancy Mills, Director of the Center for Workplace Democracy, AFL-CIO

Thank you. It's nice to see so many friends and colleagues whom I've worked with in a variety of different places and times. I want to pay particular tribute to some of the folks who have been leading the labor movement for a number of years and have been pushing us to be thinking about these questions -- particularly Lynn Williams -- without whose bold leadership, you wouldn't have found a Center for Workplace Democracy at the AFL-CIO. So, I owe a personal point of thanks.

In addition to Lynn, Rudy Oswald, the former research director, also has really pushed the labor movement to think about these issues more carefully; Brian Turner, obviously; and Ken Edwards, who's been representing the IBEW in this national skill standards effort that Leo talked about, have been really challenging us to think very carefully about what we, as a labor movement, need to do to prepare workers for the jobs of the future.

I was struck, however, in listening to Leo's remarks, about how much this world that he describes is a world that we in the labor movement would indeed like to have. It almost struck me as this shining factory on a hilltop, on a mountaintop, one in which workers feel free and justified in contributing all their skills, knowledge, and abilities to the success of that firm; where technology relieves the drudgery, tedium, and danger of work; where productivity increases are such that we can share in those gains to improve the quality of our lives. That is the world of work that our members dream about. That's what unions have committed themselves to fighting for.

Unfortunately, we don't see that world of work very much. I decided to use our new technology recently to send out an e-mail to a variety of folks who are much closer to the world of work than I am. These folks were from the industrial unions in the AFL-CIO, and I just asked a variety of levels -- business agents, research people, and so forth -- to give me some reactions to the picture that Leo paints.

I will tell you that the roar was deafening. Although we have a few exceptions, exceptions that we could all probably point to or names that we would be familiar with -- the Champion papers, Harley-Davidsons, Intec Steels, Detroit Diesels -- and although I will also say that in many of the regular workplaces we see elements, pieces, small pieces of this high-performance workplace that Leo's describing -- the fact of the matter is that most of our workplaces are still pretty much command and control operations, with very little independent authority for workers to make decisions about how they conduct their work.

I would urge people to read Prosperity, if you haven't done so, the book by David Wessell, the Wall Street Journal reporter. The book basically argues that the real productivity increases that we are hoping for, increases caused by computers, for example, we've really yet to see. In many of our workplaces the computers are used more as a fancy word processor than as something that really actively changes the way work is performed. A recent study describes an analysis of a number of different insurance companies, showing how the

computers are being used in very different ways. In one case, the computer is actually being used to de-skill workers, and workers are working in huge pools doing nothing but data entry all day long. And that's the case in a number of the large insurance companies. And then, in some of the smaller ones, it's exactly the opposite. Computers are being used to allow up-skilling and to have folks doing much more of their own work to price out policies and so forth.

So there are very broad differences out there in the world of work -- both in how technology is being utilized and what its benefits are for American workers.

But I want to be clear. We want the high-performance workplace. We want the high-road workplace. And, in fact, we think that what that workplace needs from workers in particular is the following.

Workers are going to have to commit to learn what they can to improve their contribution to the workplace. That's a commitment that workers, in fact, will need to make for that high-performance workplace. They will have to commit to proactively using that knowledge for the good of the firm. And they will have to commit to loyalty to that firm.

Now, this may sound like heresy coming from a labor leader. But let me tell you why. What I'm really saying is that without those commitments, you're not going to get the kind of results that you need. Just training workers or educating them without them having that desire to proactively contribute to the success of the firm, isn't going to result in the kinds of productivity increases that we all need or the success that we all want.

So the question is, why don't we get that commitment in many cases? What are the commitments that employers need to make to get that kind of commitment in return?

I'm going to just focus very quickly on five. And they're the "C" words, I'm calling them.

The first is really a question of fundamental choice. Employers have to make a fundamental choice to compete on the high road. There are three more factors which are factors of commitment to workers. And the fifth and final one is what I'm going to call courage.

These are the five "C" challenges that I think employers have to meet, in order to get the kinds of commitments that I was talking about, and that workers will need to make to create these high-road, high-performing companies.

This question of choice. Despite all of our rhetoric and proselytizing about the need of companies to invest in their workforce, the fact of the matter is that the market is telling employers something very different. There really is a choice about how they can compete.

Companies can choose to compete by investing in their workforce and making a commitment to that workforce and empowering that workforce. Or, they can commit to a low-road choice, which is to decrease labor costs, not through smart automatization or technology, but by simply reducing workers' living standards.

That's a choice we believe that many American employers are, in fact, making.

I was reminded the other day that the number of American workers without health insurance has increased from 35 million to 40 million in just the last five years, and that number is continuing to increase. These are working Americans, people who actively hold a job, who don't have health insurance.

People who go to work, or young workers who go to work today, no longer expect pension plans. An employer contribution pension plan is no longer an established and expected benefit to work. That was unheard of when most of us -- I'm looking around the room and we're all pretty gray here -- when most of us entered the work world. Most of us would never have imagined that the burden of preparing for one's retirement would have fallen almost entirely on the individual.

I don't need to tell this audience about how, as productivity has increased, in fact, workers' wages have not kept up with those productivity increases.

On the question of education and training, in particular, our statistics are indicating that the total dollars spent on education and training are, in fact, going down in America as a percentage of payroll. The dollars are being spent more and more on supervisors, managers, and engineers.

The recent study by Lisa Lynch and Peter Black indicates that you're much more likely to get education and training in America if you already have high levels of education and training. If you are, however, a lesser-educated and lower-skilled worker, you're much less likely to get any increased education and training.

The first thing that we need to do is make the choice. We would argue that you can make money on either the high-road or the low-road path. One may cost a little bit more in the short run. The statistics about increased productivity and increased financial performance are real ones, but we shouldn't forget the fact that there is a choice that employers are making. We need to figure out ways to foreclose that choice, to close off the low road, as an option.

Let's assume for a second that an employer says he does want to go on the high-road path. There are still the three "C"s of commitments that we think employers need to make if they're going to get the kinds of commitments that I talked about earlier from their workers.

One is that employers have to commit to share the burdens and the cost of preparing workers for the skills they need for the world of work.

There's a trend now that says basically that workers should go out and prepare themselves. Then, employers are surprised when workers take that investment that they've made, getting more skills and more education, and take it to the next highest bidder. This is exactly what workers are doing.

At the recent Vice Presidential Summit on 21st Century Skills for 21st Century Jobs, employers reported that the main reason they were not investing in education and training for their workforce was because they saw their workers being scooped up, stolen, by the employer down the street.

So if employers want commitment and loyalty from workers, then they're going to have to contribute to paying for it. We're very encouraged by some new high-road regional partnerships that are springing up around the country. Groups of employers and unions, in some cases just groups of employers, are coming together to share the costs and the practices of equipping their workforce with the kind of generic and generalized skills -- problem solving, computer usage, teamwork, and so forth -- that every employer needs, because they are not company-specific skills.

We encourage you to think about how government can support these high-road regional partnerships, because we think they are an example of real solutions to real problems that employers face.

The second commitment employers need to make is a commitment to employment security. I know this sounds like an old paradigm, but the fact is it's the Ralph Kramden problem.

How many of us are old enough to remember the suggestion box routine? What Ralph Kramden said basically was that you put a suggestion in the suggestion box and then you get a pink slip.

Well, unfortunately, this is still a real problem. If we want loyalty and commitment and we want American workers to contribute to the success of the firm, there needs to be an accompanying commitment to their employment security. Nobody is going to make a suggestion that's going to result in the abolition of their work. I think we need to be creative about the employment security question.

It's one thing for a major auto company to provide that kind of security. It's something very different for a small machine shop to provide that kind of security. There are ways of linking employers together with other employers, and there are other social safety nets that we ought to be exploring.

The last commitment we think employers need to make to get the accompanying commitment from their workforce is a commitment to share the rewards of success. Sharing takes many forms. We all know that there have been profit-sharing plans and gain-sharing plans, but just good old fashioned collective bargaining is a way to commit to share the rewards. Workers need to have a say in how the rewards are shared.

The last of the five "C" challenges is courage. What I mean by this is that employers need to have the courage to give workers the authority to make the decisions -- to allow workers to use their knowledge, skills, and abilities to contribute to the success of the firm.

I was struck by your comments, Pamela, about how engineers and managers aren't being prepared to work with production workers. Part of the problem, I think, is that there really is the very deeply held view that managers know all the answers about how things should get done. It takes a tremendous amount of courage for an employer to empower its workers to make decisions.

It's our sense that if employers make the fundamental choice to compete on the high road, if they give the three commitments -- sharing the burdens of preparing workers, providing employment security, and sharing the rewards -- and if they have the courage to give workers the authority, you'll get the commitment.

I want to just make one last closing advertisement, which is that we don't think it's an accident that unionized workplaces outperform nonunionized workplaces in high-performance settings.

This recent study that Lisa Lynch and Peter Black did shows pretty conclusively that although unionized -- and I'm going to tell the whole truth here -- that unionized traditional workplaces, traditional in the sense that they don't have the elements of a high-performance workplace, were the least productive. Nonunion so-called high-performance ones were a little bit more productive. But, what beat the pants off everybody was the unionized high-performance firm.

We believe it's because unions provide a way to both structure those commitments that we talked about -- the choice, the commitments, and the courage -- and also provide a social sanctioning of workers performing their role and their commitments to the employer. Unionized workplaces make it okay to have that balance between the commitments of the employer and the commitments of the worker.

Therefore, if unionized workplaces are, in fact, the leaders here -- leaders not just in the outputs, the outputs of higher productivity, but they're also the leaders in the inputs. Unionized workplaces spend more money on technology. They spend more money on training. Unionized workers avail themselves of training more than nonunion workers do.

If this is the case, then I guess I want to make a pitch here. The country has a tremendous amount to learn about how unionized workplaces, and the exercise of commitments, make the transition to a high-performance workplace easier and more successful. I urge NIST and those of you who are concerned, as we are, about creating workplaces that will provide high-quality jobs for our children and their children and their children's children to learn what works in a unionized workplace. Learn what makes technology, teamwork, education, skills, training, and all the commitments that we've talked about come together and figure out how we can spread that to more American workplaces for the sake of our Nation's economy for the future.

Thank you.

DR. HERTZ: Thank you, Nancy.

Let me now offer Leo a brief opportunity to comment on the responses to his opening remarks and then open the session for discussion. Leo.

MR. REDDY: I'll only take a moment, because I'm anxious to hear other views around the table. I do want to thank Pamela for her comments and the fact that she noted that some of the functions formerly performed by engineers are beginning to migrate.

I want to add that since our skill standards work is focused on production workers, we are trying to communicate with the engineering community. We do have engineering associations on our committee.

I also have a few comments on what Nancy had to say. I was very pleased that we seem to share the same vision of the high-performance workplace. But she's quite right about it being a vision. In working on high performance and the definition of high performance, we were asking ourselves, "How many companies really fit that category?" It is more than a few. She mentioned some. I think there are quite a few companies, particularly in the high-tech industries, that would fit into this category. But it's certainly not the majority. The high performance workplace is a vision that I think management, interested in productivity and profits, and workers, interested in sharing the gains -- both have a mutual interest in promoting. So I think it is a worthy concept; one which should motivate many of us.

I must say that I disagree a little bit. I think that, historically, productivity data and income levels correlate very closely. There has been a lag in real wages in recent years, but historically there's a very close correlation. And, according to the briefing we got last night, real wages are beginning to pick up somewhat.

There is certainly a correlation between productivity growth and technology. That's also a correlation that's very obvious.

I've also read Dave Wessell's book. I'm very interested in it. He talks about the lag time. Given the fact that companies have adopted information technologies quite aggressively in the last ten to twenty years, why aren't we seeing a stronger rate of productivity growth? He explains it in terms of electricity taking a long time to seep into our national economic infrastructure. It would take time for that to show up. I think that some of the productivity data that I just mentioned indicates that we are now beginning to see the impact of those investments on productivity, because growth has been sharply improving the last year or two.

DR. HERTZ: Thank you, Leo. Let me now open the floor up to questions and/or comments. We have approximately half an hour. I encourage you to keep your questions and comments crisp, so that we can hear as many viewpoints as possible. Please state your name before you make your comments. Everyone has a full participants list in your packet, so you can associate the names with people's affiliations as well.

With that, let me open it up to any questions or comments.

MR. HECHT: Larry Hecht. I've been involved with the Ioccoca Institute. I'm also on the Society of Manufacturing Engineers Education Foundation board, so I'm interested in engineering education as well.

In talking about the high-performance workplace, relating back to Leo's comments and the German apprenticeship program, I believe something as strict as the German apprenticeship program doesn't really fit the U.S. situation very well. Community colleges, as we mentioned last night, are starting to pick up some of the slack.

My question is, how do we upgrade the community colleges? How do they know what they're supposed to teach? How do they help the union-based education programs? Is there room for a new apprenticeship-type program for the U.S. that is much less structured, and where does it come from?

MS. KURSTEDT: I believe there's someone on the participants list who represents community colleges. I can speak for Virginia. In Virginia, we have had a number of partnerships between community colleges and regional businesses to do this type of thing. They are not really apprenticeship programs, but more work study programs. It's very individualized by company.

In Virginia, our community colleges are very, very active. I believe we have 27 community colleges. Our general assembly, the legislative body in Virginia, just had a regional summit to talk about how the community colleges were impacting the workforce needs of the information technology companies in the Northern Virginia area.

So I think that in some places in the United States, they really are working on the community college - workforce issues. It's very individualized by region.

DR. HERTZ: Maybe that's the problem, though. Maybe it's so individualized that there is no structure to get at it in an organized way.

MS. KURSTEDT: I can also say that in Virginia the general assembly has allocated a fair amount of money for community colleges to provide training for high-performance workers. I'd be interested in hearing from people in other states also.

DR. HERTZ: Well, let me offer a speaking opportunity to James McKenney from the Association of Community Colleges.

MR. MCKENNEY: Thank you. I think you hit on the horns of the dilemma. So much of this is spread across the individual efforts of 50 states. Some of those efforts are very poor. Community colleges are, in fact, not in all 50 states. That makes for some difficulty. I think you will find that community colleges are in heavy existence in areas of high population concentrations. You'll find them in the old Rust Belt states, which are no longer rusting.

In fact, I think you'll find community colleges collaborating very nicely with unionized companies, particularly the big companies. Just last week, I had a meeting in Detroit, where we're working on a pilot project with UAW-Ford on trying to help workers move seamlessly across higher education, not just through community colleges, but the rest of higher education. They're not always easy to find, but many partnerships have developed between industry and the community colleges. It is difficult to keep up with, but it is going on.

MR. YUDKEN: Joel Yudken from the AFL-CIO Public Policy Department.

I want to in part echo some of what Nancy said. But I also want to put a finer point on a couple of things.

On one hand the high-performance workplace is an ideal, a good ideal. It's something that I've worked on and researched. In the abstract, it looks like a good thing. And, I've seen plants where it's actually worked. But it's not clear that the trends we see of globalization and technological change are leading in that direction or providing an environment that is going to really allow us to create high-performance workplaces in most or in many of the industries throughout our industrial base.

There's a lot of hype about moving towards a virtual workplace, the virtual enterprise, and increasing our reliance on information technology, the Internet, electronic commerce, and so on. But, are those trends and those technological changes leading in the direction that really make it possible to move towards a high-performance workplace? Or, in the global competitive environment that we are in today, will we really be moving towards a situation where we're going to see tremendous personnel reductions in many sectors. This is especially a concern in manufacturing, where we've already seen tremendous decline over the last couple of decades, even as productivity and output have increased.

We recently did some evaluation of energy-intensive industries, as we call them, several sectors involving steel, aluminum, petroleum refining, and several others. If you look the trends in those sectors, output has been increasing since 1986 and will continue to increase through the year 2006, while employment has dropped precipitously.

What's driving these trends are two things: trade impacts and technological change. With technological change, we're talking about new process technology, more process approaches, and more process controls. Increasingly, that means you'll have less and less workers needed through more integrated work systems, through information technologies, and so on.

We're moving in a direction that requires us to have a policy framework and a policy environment with a government that provides support for technology changes and technological experiments that are going on in industry. We are moving, I believe, very far away from the ideal that Leo Reddy has talked about.

Let me just read something that a major oil company put out, its vision statement on process automation. What it says is, "This company assumes that all companies will have equal access to commercially available process technology. In this environment, competitiveness can still be achieved by either paying the lowest wages or having the fewest workers. This company is looking to reduce the number of people required to run its business and expects to accomplish this through process automation." This was written by a multinational oil company.

A major component to oil production is, of course, computerization. The computer would run the plant, and our role is to support the computer. The plant is not to provide the operator with additional tools to do the job better, but to take the job away from the operator. They are talking about ultimately a remote control with a single operator in headquarters for a lot of their plants that are going to be around the world.

Is this trend more predominant or less predominant than the move to high-performance workplaces, which are building on the notion of increasing and improving the workers' skills? I think that this is a very important issue. It's all great to talk about training, and we support that. I think the AFL-CIO supports the importance of better training, more training, higher quality training, increasing the skills and the capacity of workers.

But is this really where the economy is going? Is this what the federal government programs, including NIST and various other government agencies that promote technologies and industries of the future, for example the Department of Energy, support. Are they promoting a future which really encourages and supports a high performance workplace?

I think we have to look at this issue more carefully. We would like to see high performance workplaces, but I think there are some additional fundamental challenges here.

MR. DEAN: I'd like to respond to that. I'm Jim Dean. I think that was a provocative question.

I think it's not a coincidence that the industry selected for the example was the oil industry. If one thinks about the measures of effectiveness in a manufacturing industry, from a company's standpoint, you think about cost and you think about quality. You think about flexibility and speed, which is in some sense an element of flexibility. Depending on the industry, different indicators become more important.

By contrast, oil is fundamentally a commodity. Cost is the critical issue. And so I'm less shocked to hear that sort of a statement coming out of the oil industry than I might be if it had come out of another industry.

In some of the more technologically intense industries, things like quality and particularly flexibility become more important. So, I would expect that we would see more enlightened use of high-performance practices in those industries than we would in commodity industries where cost is really the driving force.

DR. HERTZ: Thank you.

MR. BLUMBERG: Mel Blumberg.

If I could return for a moment to the topic of the session, having to do with the core skills needed by manufacturing workers -- it seems to me that manufacturing workers are not all the same.

Are we talking, for example, about line workers, or process design engineers, or packaging engineers, or people that do the business resource planning, or people who are loading the machines or running the machines? It seems to me that one size does not fit all, that really we're talking about a number of different skills, skills across occupations and also across levels.

For example, the engineer at the lab table needs very different skills from the engineering team leader, the engineering executive, or the vice president for production. To me, the question is really what skills are needed, how can they be delivered and over what period of time?

So as we talk about education, we're probably not talking about a need for a Ph.D. education for people who are doing process design. We might be talking about master's level education, engineering combined with an MBA. We might be talking about bachelor's level engineering education. We might be talking about four-year technical training in engineering technology. All of these might be delivered by a university.

Then, there are other kinds of education that might be delivered more effectively by community colleges or by company or union apprenticeship training programs. Still other kinds of training might be done on the job.

So, I'm not sure that it's monolithic. It's more like the old Persian tale about the blind people who were trying to figure out what an elephant looks like. I think we're touching the leg. Some people are saying, "It's obviously university education." Others are saying, "Well, it's obviously community college." To me, it's really a lot of different kinds of training needed -- ongoing over a long period of time, over an entire working career.

DR. HERTZ: Jim, did you want to comment?

MR. AUERBACH: Jim Auerbach, National Policy Association.

Just a cautionary note. The title of the conference is How Are Companies and Workers Preparing For the Workforce of the Future? So far, the conference has had a rather heavy emphasis on manufacturing, when nine out of ten new jobs are in the service sector. We might want to focus on that part of the economy as well.

MR. HALE: You cite the NAM/Grant Thornton study which states that 88 percent of responding manufacturers report difficulties in finding candidates. More than half reported that their workforce lacked basic employee building skills -- math skills, reading and writing skills, and so forth. That survey was really a follow up on a 1990 or 1991 survey done by NAM in conjunction with a national management consulting firm. I believe the AFL-CIO had input into that survey. The figures look almost exactly the same. No improvement at all. How do you expect that to change?

MR. REDDY: It's Leo Reddy again.

Actually, the latest NAM interpretation of this survey is that, in fact, the trend has gotten worse, not better. It's not much worse, but a little bit worse. So if there's any trend, it's in the negative direction. I tried to explain that by suggesting that while there is very rapid change in the workplace through all the different processes and technologies, the education and training institutions have not kept pace. It doesn't mean they haven't changed. It doesn't mean there are not new types of education being developed. But that means that obviously the change is simply not keeping pace.

If you ask how can we do something about that, I think that we're seeing a trend around the country of a closer alliance between education and business.

Now, Bob Jones is here today; he's certainly one of the leading experts in the country on this whole question of education-business alliances. It goes well beyond manufacturing. So, maybe he could answer both questions.

Certainly, the whole concept of skill standards is that it's an effort to have employers articulate in very precise terms exactly what they're seeking.

In fact, there was a NAM survey in '93, which reported that all of the CEOs surveyed said that the education system was a "failure." And so, there's been a lot of hand wringing and a lot of finger pointing in both directions.

One of the organizing principles of the skill standards concept is that it really forces employers to sit down and think through very carefully and articulate very clearly and in a consistent way, in a consistent format, what their needs are. We're hopeful that that will be a powerful communication tool back to educators and trainers, and they'll begin to adjust their curriculum in that direction.

Now, this may or may not be a pipe dream, but I think there are things like this going on. I heard a talk the other day by Graham Spanier, President of Penn State. He said that Penn State is now beginning a regular procedure of consulting with the leading employers in the state and the region before completing their science and technology programs, including engineering and others. There's an active dialogue going on with high-level people in the employer community.

I know that in SME they have a new manufacturing education program, the Manufacturing Extension Partnership (MEP), which is also based on that same concept. Much more aggressive, up front communication is made with the employer community. That is a potential way at least to begin to close the gap. But it's going to have to happen quickly. If we can close the gap, it will have a very powerful, favorable impact on our economy.

DR. HERTZ: Thank you. Jim Dean.

MR. DEAN: Okay. Thanks, Harry. Jim Dean.

One of the problems that was identified by the speakers and I think also last night is the reluctance of firms to provide expensive training for workers, based on the premise that workers may walk to the next organization. It struck me that within certain professions a solution that has been used, particularly in medicine, is that an employer picks up the costs of medical school or other kinds of training if the individuals agree to stay with that organization over some period of time. We see that with MBA students as well.

I was wondering whether this sort of solution has been used by companies -- and I have to betray my ignorance of labor law here -- whether it's legal, to start with, and whether it's been used, and if not, if it's a potentially viable solution to the problem? Anyone who knows the answer is free to respond.

DR. HERTZ: A quick response.

MS. MILLS: Nancy Mills.

It's definitely legal, and it has been used in labor contracts for years. My sense, however, is that the employment of this practice is actually diminishing. Ten or fifteen years ago, you saw more contracts in which unions had bargained for education reimbursement or tuition reimbursement programs, in which employers demanded some commitment in terms of time. I think that's not so much the case now, interestingly enough, for a couple of different reasons.

One is that -- and this is all anecdotal, so take it for what it's worth -- one is that we're seeing a growth of joint labor-management education and training funds. More and more -- instead of tuition reimbursement programs in unionized workplaces -- we're seeing programs in which unions have bargained for a nickel an hour, a dime an hour, a penny an hour programs, that the employer contributes to actually pay the cost of educational programs. That fund is usually jointly managed by the union and the employer.

Sometimes those programs are directly provided. Sometimes they're contracted with local community colleges and sometimes in some other way. I think what this has done is put walls around the costs to the employer. As a result, the tendency toward demanding loyalty has gone down.

Another thing to note is that turnover is much less in unionized firms. Because these tend to be employers with better compensation packages, better pension plans, and so forth, you don't see workers walking from well-paid union jobs, or even from lesser paid unionized jobs. So, our experience is that it's not as much of a problem among the unionized workforce as it is in the nonunion workforce.

DR. HERTZ: Rudy Oswald.

MR. OSWALD: I'm Rudy Oswald, and I have a two-part question. Part of it goes to Leo's listing of 11 core skills. As I look at those core skills, well, what do high schools teach? They teach three of those: math and measurement, computer use, and maybe blueprint reading. There is very little teaching of communication, of problem solving, of learning skills, of business planning, et cetera. How do we get the schools to teach these things? And, do schools even know what these things are, in order to teach them?

The second part of my question relates to the union side of that. I look at particularly the early skills that he talks about: communication, teamwork, and problem solving. The use of psychologists to develop a union-free environment screens out people who have teamwork elements and who work together for problem solving, because those people tend to form unions. If you want to stay union free, you keep those people out of the workforce.

MR. REDDY: Well, Nancy already commented on the union point. But in terms of the lack of correlation between these lists of core skills and what you actually find the high school, I think that illustrates the point I've been making. There is not a very strong correlation between what actually happens in the workplace and what education and training institutions are providing. That is a fundamental structural issue.

MR. OSWALD: Do we know what we want them to teach in these areas?

MR. REDDY: In skill standards, we've spent a long time defining exactly what we mean by the different terms. Let me give you one little example. What does math mean in a company? Well, for one thing, it means the ability to add, subtract, multiply, and divide with the use of a calculator, with one hundred percent accuracy.

Now, you have to think about that for a second. There is an active controversy in schools whether a student should be using a calculator at all in taking exams. In a company, if you don't have a calculator, you go find another calculator. You always use a calculator. A "C-minus" is not good enough for somebody who's learning how to repair a part on a 777 airplane. You want to make sure of 100 percent accuracy in all of the calculations. So, there's a different way of defining what math and measurement mean in an actual manufacturing environment. We're trying to communicate some sense of that to schools.

DR. HERTZ: Pam, do you have a quick comment?

MS. KURSTEDT: I do. I'm Pamela Kurstedt from Virginia Tech. I've been a consultant to many companies for worker training, both at the engineer management level, all the way from executive down to first-line supervisors as well as production workers. I have to say something in response to something Nancy was saying earlier.

There are some companies that spend a lot of money on training and education. And sometimes they waste their money, because they will bring in so many different consultants to teach whatever is considered to be the new thing. I've been involved in workshops that lasted several months with production workers, where they were zoned out, because they were so tired from a different consultant coming in every couple months to teach them a new thing. It was very frustrating for me as a trainer, because I knew they just weren't listening anymore.

So I guess there's also a caution to those companies that spend a great deal of money on training to find their theme or to decide what their objectives are; not just evaluate the training by the number of people in seats. Sometimes we have two consultants coming in, working with the same production workers, teaching them opposing approaches.

I don't know if anyone else has had that experience, but I think that's something that goes on in industry that I find frustrating.

DR. HERTZ: When we were designing today's workshop, our major fear was we wouldn't know how to cut off conversation once it began. I saw three hands up, and then I'm going to have to cut it off. Please keep your comments brief. Susan Smock.

MS. SMOCK: Thank you. Sue Smock.

I was pleased to hear Mr. Oswald's comments. I think one of the things we've been avoiding in this discussion is the huge number of people in our society that cannot read or write and certainly can't solve problems in the way we'd like to see. One of the things that occurs to me also responds to the question about that.

I think one of the things that industry needs to do is think about how they can become more education friendly. There are ways. I think we have to focus on that a little bit.

MR. LINOWES: Richard Linowes, American University.

I just want to share with you -- I was at an executive training session some months ago, where a senior human resources professional declared that loyalty is dead. Given the emphasis on trying to encourage loyalty of employees to the workplace and given the need to try to encourage as much innovation and experimentation, and mindful of the success of the Japanese industry, at least on the shop floor, are we hearing a call for enterprise unions?

MS. MILLS: No. In fact, I'll quote Lynn Williams on this, if I may. The problem with enterprise unions, I think, is that what it indicates is that we want one healthy firm, the one that happens to be the one that we're working for. Lynn always said, "I didn't want one healthy steel company. I want lots of healthy steel companies." That's what the labor movement wants: lots and lots of healthy companies that can afford to provide lots and lots of healthy benefits for workers.

I think, because of the choice issue that I talked about first, the fundamental question is whether employers are going to choose to compete on the high road or on the oil company road, which is, I would argue, a low road. You need to figure out how to put good solid floors under minimum conditions across companies. It's obviously our labor movement's roles and goals to keep raising that floor, and you can't do that with enterprise unions. You need unions that cut across companies to try to figure out what is the solid floor, whether it be health insurance, or pensions, or minimum wage, or whatever.

I want to pose a question about this "loyalty-is-dead issue," however, because I think it gets to a pretty fundamental question. I'm sure you'll hear some of these words from my colleague, Ron Blackwell, who will be here this afternoon raising some policy questions.

It is possible to have a high performance workplace without the commitment of workers to the firm -- I think that is a pretty fundamental question. I think the answer is absolutely not. Workers will not offer proactively their knowledge, skills, and ability, without a return commitment made to them.

That raises very fundamental questions about the core commitment of the firm. What does the firm do? One of the things we're seeing, I think, is that firms are busy shedding different pieces of their work. I think that there's got to be some piece of the firm that is core to its existence. The firm has got to then make a commitment to the workers who do that thing.

If we want a country that is going to have high value-added jobs which can provide decent standards of living for our grandchildren, then there really is only one choice, because the low-road choice doesn't provide that high standard of living for our children and grandchildren. It may provide great profits for companies, but it won't provide college educations for my grandkids.

That's why I think that that question of commitment and loyalty is the key one.

DR. HERTZ: Thank you, Nancy.

Let me just offer one comment, because there was a challenge at one point during this discussion to NIST for its commitment. I would commend to you, for those who haven't looked at them recently, the Baldrige criteria, as another definition of what a high-performance organization looks like and an indication of the commitment, on the part at least of NIST, to this type of organization. I think that if you look at the Baldrige Award recipients, you'll see a lot of high-performing organizations at work on a daily basis.

With that, let me thank Leo Reddy, Pamela Kurstedt, and Nancy Mills for sparking lively discussion during our first session. Please join me in thanking them.

(Applause.)

Session Two: How Are Companies Responding to and Preparing for These Demands?

Moderator: Mr. Howard Samuel, Senior Fellow, National Policy Association

Good Morning.

I will take about 30 seconds of the moderator's privilege to point out one thing that perhaps we ought to look at a little more carefully at this session -- it was raised very briefly by Jim Auerback at the last one -- and that is that when we think of industry, we generally have been thinking of manufacturing. Manufacturing does play an important role, much larger than the number of its employees, but I learned some years ago that in Pittsburgh, which is known as a center for steel, the largest employer is the University of Pittsburgh. In Nashville, which is known as a center for manufacturing in Tennessee and the middle south, the largest employer is the state and local government -- not quite the same kinds of employers that we usually think of. And one of the largest employing groups in Mississippi are catfish farmers. I suspect -- and I say this a little facetiously -- that the largest employer in south Florida will soon be nursing homes. Don't laugh at that. A few of us may soon be there.

So these are not companies which are affected particularly by trade or by the threat to move. They are certainly affected, or many of them are, by technology, but all I suggest is that our discussion -- this session and the next one -- embrace a much larger sector of our economy. These very large sectors of our economy, which are, I suspect, growing, not getting smaller.

Our speaker today, who will take us into the next part of our discussion, is Bob Jones. Bob was the former Assistant Secretary of Labor for Employment and Training, and has a long experience in this area. He is now the president of the National Alliance of Business, which is the major organization dealing with some of the issues we're dealing with today - training and employment.

Chair, Session Two:
Mr. Roberts Jones, President and CEO, National Alliance of Business

Thank you, Howard.

I appreciate the opportunity to be here and to listen to the dialogue and conversation. I think it is extremely useful.

I also, in full disclosure, have to acknowledge that I am on this panel with Joel Marvil. Joel and I both serve on the Baldrige Board, so we need to be open and honest about our biases and our interests. Secondly, I am here with Lynn Williams who happens to be a mentor and leader of mine. In fact, there are several around this room that I have worked with. I am honored to be here.

Given the dialogue in the last session, I'm going to spend just a few moments on what is happening in training and education, and then spend most of my time on the impacts inside of corporate America.

I think it is important for all of us to acknowledge that this whole field is filled with buzz words and gurus, and it is important to try to separate these out in our conversations.

We have kind of a motto around our place: training is good, education is good. And it's a joke: it is our way of making ourselves aware that that is not the way one comes to good policy in this particular kind of recession. And, like some of you, I sit in a lot of broad-based, major meetings and listen to some guru folks, and it is not a positive experience. I often think that we perpetrate an awful lot of formulas that don't seem to respect the marketplace, don't seem to respect individuals, and don't seem to respect the changes that are going on, or help people relate to them.

I think it is important to focus on a couple of things that are affecting the underlying issue today, and one is called the "death of experience." You can see it in a lot of studies; the markets no longer reward experience. They don't reward heritage in terms of companies or institutions, and they don't reward long experience or credentials or such things in workers. They reward competencies. It just doesn't make an awful lot of difference that you have been there a long time or that you're the most experienced widget maker in America. The real question is, What are the competencies that the market is demanding as the next set of skills? We see this dominating the conversation everywhere, and it is driven by a lot of things discussed here -- the time factor and the change in technologies and many other things.

The second point is, that with all the restructuring that has been referred to earlier here and the consistency of it, one of the side products is an increase in the quality investment of production. Whatever choice companies make and whatever directions they go, one of the things that we notice is that companies simply cannot afford to invest in the product in a way that causes them to have to recycle that process. The market doesn't allow it any longer. Building systems that are far more responsive to the quality demand issue is, in fact, a behavior pattern within both the corporate and industrial sectors that has some very dramatic implications on the rest of these kinds of conversations.

The third factor I would point out -- and the one that I think drives all of these things more than anything else -- is the speed of change of skill sets and demands. This comes from the change in a lot of other things - technology, competitors, markets, and productivity rates.

This debate is not a zero sum game. In this country, we have tended over the years to act like it was. We talked about training. Back in Secretary Willard Wirtz' time, our whole focus was on training for those folks who weren't in the market, didn't have access to it. It was a simple issue. You fixed it, and something good happened. We didn't do it very well sometimes, but that was the public policy issue.

Well, today these factors create an environment of continually escalating change in the workplace and in the skill sets and in the way we come to this relationship. The issue is not how you fix training or education, the issue is how do you create an atmosphere within a corporation, university, community college, or high school, for continuous improvement in order to maintain currency with whatever the demands of the new market are going to be, and that's a very different kind of question than public policy debates have dealt with before. It is why we see the struggle the schools are going through that Rudy Oswald was talking about.

This is not about schools being good or bad or teachers being good or bad; it's a cultural thing. How do you create an atmosphere in a high school that is designed against a set of continually rising expectations, and how do you create a whole different management system that deals with that?

I want to return to Leo Reddy's comments just for a second to keep our focus. The skill issue today tends to continue, I think fairly, to reside in three different categories. One is soft skills. How do you inculcate analytical thinking, judgment, communications, and a whole series of other things? There is absolutely no question that the hiring and recruitment process looks at these issues, respects these issues, and tries to find people who can work in an environment in which there are fewer constraints on the definition of the job and greater responsibilities and more individual decision-making and operation. That's true in services as well as manufacturing.

Second, an extraordinarily important issue is what are the core sets of skills? We business communities are now engaged with the higher education community in trying to understand the disconnect between those two worlds. It is very interesting to find that everybody wants to figure out how to add technical classes to meet the business demand need when, in fact, when we survey the employers, they need employees to have basic competencies in math, science, reading, and writing. It's not writing for business, it's not technical writing; it's competency of communication.

The definition of core skills is an extraordinarily important one, and it is not a fixed target -- it keeps rising. One of the worst things we do is ask businesses, "Well, give us a math example," and they do, and it always turns out to be about a seventh-grade example and destroys the whole conversation.

But that's why the education debate is important. We can sit here all day long and talk about training, but unless we deal with the basic education system and the core sets of skills that employees need when they walk out of that system, no matter where they are going -- workplace or university or any place else - we will not have addressed the underlying issue.

The third issue is competencies, which raises this discussion to another level. In many cases, the companies and the institutions will do the training themselves, and sometimes there are certain entry-level competencies that are important for marketplace responsiveness. They are not necessarily seat time or courses, and in some places, as we'll discuss, not even degrees. The market seems to have a high focus on competencies themselves, in a variety of areas, and one suspects that those will probably change over the course of time.

Now, these things have some impacts that are probably worth focusing on, at least from a general policy standpoint.

One is that we are truly at a point in time where we must stop making distinctions on institutional relationships. The simple fact is we are reaching numbers now where the vast majority of our working population is going to be engaged at one point or another in the higher education system as much as they are in the workplace. They go take courses in all these new places, and the issue Howard and others have been struggling with for a long time on lifelong learning has become a reality.

If you want to worry about both the efficiency and productivity on the corporate side or the rights and livelihood of the worker, it is an issue you have to take head on. You have to start asking a series of structural questions and stop acting as though certain people are going to Harvard and certain people are going to the workplace and certain folks are going to be low skill when, in fact, the market no longer deals with that.

Second, this discussion -- and I guess in this case I would draw a little distinction from some things I heard earlier this morning -- is very employee-centered. It is not necessarily workplace centered at all. And I don't mean that as a philosophical argument, I mean it as a personal investment argument.

The data is beginning to show us that employees understand that more and more their future security is vested in these sets of issues, and they are beginning to draw distinctions accordingly.

Now, they may be happy to take some technical training that the corporation provides them as a new system comes online, but I think it is wrong to assume again that that's a zero sum game. The issue is that the same employee may be taking all sorts of other courses in four other environments which benefit their own ability to compete in the marketplace. That changes the rules a lot in terms of corporate involvement or investment.

This issue has now become more a question of corporate benefit. In the tight labor markets today when you try to recruit people, one of the questions that is high on the list of demands is training and education investment. People think: "I'm not going to go to work for somebody who doesn't invest in the education and training I need not only to be successful in the company but also to protect my own employability on a longer term."

That's a fact. We have studies that show it. And, again, it is an escalating issue. More and more with the kind of relationships we see developing, it is going to be an employee-driven set of issues. Corporations will continue to do the things necessary for them to make sure that employees are productive, but it is not at all clear that corporations will make a lot of other decisions on broader skill bases and education bases other than to respond to the demands of the employee in the system.

Lastly, we need to think a lot about the fact that this is a valued competency conversation, and it no longer fits our traditional institutional responses.

It is not at all clear that bachelor's and master's degrees define market competencies, and employees and employers are reluctant to send people off to two-year programs to sit behind a desk some place and then have

them come back. It may happen on a specialized basis, but competencies are driving this market. We find an enormous growth in certificate programs which are shorter and in more manageable pieces, and are user friendly in application, both in terms of technology and in that they are offered at alternative hours and settings that folks can deal with.

Now, that system is still pretty much undefined. At the same time, it is counter to the institutional arrangements in this country that determine how a population accesses higher education and how they understand the relationship between the education that is offered and the demands of the workplace. And that's a very difficult issue.

We hear it all the time.

Look at the numbers and you will see that the traditional higher education numbers aren't changing very much in our top universities. The phenomenal growth is all in private proprietaries, community colleges, and non-traditional students in basic regional universities. And those numbers are all going to continue to increase at a rapid rate. They're all characterized by this discussion -- more certificates, more competency, shorter periods of time, different access routes, highly flexible. And, by the way, most of these education providers are much more aligned with workplace discussions and demands than the rest of the system is.

I just had the unfortunate experience of spending four days in Oklahoma as a part of a team of business leaders and academic leaders who reviewed the entire Oklahoma State University system. It was quite an enlightening experience. But one of the distressing things was that in some basic academic areas the curriculum is essentially the same as when I went to school. That's a little distressing. And there's this tendency to either keep things that way and/or to do just the opposite -- to run off and create customized courses that meet some immediate demand. This comes very close to the buzz word "guru" kind of thing, and it is not at all clear that that benefits people in the long term.

Let me walk through what I think are a list of important issues that affect the corporate impact of this kind of discussion. And this is just a list of things for discussion purposes, but they are things that affect the conversation you want to have if we want to try to go some place.

First, there is serious blurring of job definitions and career definitions. We are disadvantaged today by one of our most precious institutions, the Bureau of Labor Statistics, in that it is very difficult for them to maintain currency with any kind of a definitional standard for most of the job structures in America, both in service and manufacturing, and then accumulate all the numbers and definitions and studies. This is because those traditional definitional sets simply no longer respond to the kind of definitions that people have and the way they are working.

This problem extends to the industry, as well. The way we do industry classifications is now a bit bizarre in that it simply doesn't reflect many of the changes in our marketplace.

This is a problem in doing studies and making generalizations about what is needed or not needed. We need to respect the actual on-the-street market definitions more than we do some of the traditional lines.

Second, there is an absolute blurring between education and training. We've kept these two terms apart for a long time in this country, both in public policy and in practical application inside of schools, and it simply isn't the case any longer. The definitions we increasingly find apply to K-16 or K-20, and whether or not you are using school-to-work or on-the-job training or community college training or technical structures and issues mixed with academics at whatever level.

There is simply no separable distinction that is likely to be valid, and that's true for companies that are setting up training systems and education systems, both from the standpoint of investment and the rest of the process.

I've already mentioned the fact that there is a shift from the corporate view of this issue to the employee view of it, and that does have an impact internal to the company in terms of what they offer in systems benefits, financing, and other kinds of issues. No company I know of can address this issue without addressing it from an employee standpoint.

That brings us back to the loyalty issue. I don't think it is a question of loyalty being dead; I think it is a question of loyalty being redefined. It is now a question of the total package offered by the company; correctly raised, the pension or health issue. And the issue there is portability. It's not to the employee's benefit to behold to the company. Sorry. It is to their benefit to ensure that they have access to an ongoing pension system, health system, training and education, and a series of other things that the company will invest in me.

Getting into this recruitment issue today in the context of the current tight labor market is one of the most elucidating things we've ever done. I'm beginning to understand what some companies are having to do to create a sense of loyalty. And it may not be loyalty to the structure, but it certainly is loyalty to the employment contract.

It is non-institutional, and this is a tough one. There is no longer a simple, clear relationship between the company and a certain school or the company and a certain structural response to the system. One of the things we hear constantly now is that this whole debate breaks down institutional walls and is really based only on relationships and competencies and whatever kind of feeder systems will deal with that. It really doesn't make a lot of difference what your name, history, or federal legislation happens to be.

There is a concept that is important here when we talk about de-institutionalization. The corporate world has now moved increasingly towards a knowledge supply chain concept, a value-added chain. Inside the company, it is a value-added analysis in terms of where the value is added and what kinds of functions need to be increased and where training and education need to be focused.

Outside the company, it is now a given across the country that we find in the regional relationships, industrial relationships, and corporate relationships a communication process that sets up a feeder system that may involve community colleges, corporate universities, technology training systems, and all kinds of other pieces.

I want to give an example. We now have been tracking a lot of these examples. A corporate name that I will leave out now provides incentives for its people to move into the community two years ahead of the operation of the plant and negotiate with the competitors, those other steel mills that Lynn Williams wants to be successful, in terms of what the skill sets are and education demands are for the next 10 years. They then negotiate with all of the feeder systems in the community -- anybody, community colleges, high schools, all kinds of people -- who are willing to build that curriculum into their system. They also jointly invest in public advertising in the community that says, "If you send your students to these schools and you take these kinds of programs, these are the career paths in these industries and employers that you will have."

Now, in that example we solved several problems. We communicated the skill sets, education sets, and demand sets on the business side to the educational institutions. We made it clear to students and families and community leaders what those things were and how you dealt with them. We removed the institutional alignments and traditional views of degree programs and built it into the system. And at the same time, the presumption is that these workers will, in fact, gain academic credit towards degree programs in whatever processes they want.

That model is, in fact, beginning to dominate the marketplace, and it does so in several different ways. One is, as in this case, where an industrial group, itself, makes these decisions in a regional way. The regional coalitions that were mentioned before, both union and non-union, that are beginning to dominate this conversation - we now work with 250 of those that do nothing but workplace issues. All of them engage in one way or another in these kinds of discussions, some more effectively than others, all the way to Leo's skill standards set, which is a broad industry effectively doing the same thing -- communicating a set of skills to a wide set of educational institutions in the process.

Second, the regional aspect of the issue is absolute. In terms of education right now we work with over 450 regional business groups that are doing education reform at the state and local level in a very real, very invested way. Those institutions were not there10 years ago. They are the primary drivers behind this debate today, in spite of the fact that every Presidential candidate will have education as number one. That's a national leadership

issue and we need that. But the real debate is occurring in these other kinds of institutions, and the relationships there are across all lines -- unions and companies and political groups and schools.

Technology obviously changes this debate inside companies, and I guess, judging by all the gurus that tell me about this, that in the next two to four years the ability for employees to access training and education in a user-friendly manner will expand dramatically. This will affect what the company can offer and provide, and it changes the time process and the cost process for how they do it. It is not stand-alone. It cannot replace things. It can only work with other systems, but it is substantial.

It is not unimportant that this last week in the newspapers we all saw this series of articles that the first Internet bachelor's and master's degree programs have now been accredited by the North Central States process. In that particular case, that company will greatly expand the offerings that are available to every employee and every worker in its system.

Lastly, partnerships are key. Everybody likes to write about corporate universities. Well, if you look at corporate universities, basically they are a series of partnerships, in most cases, with outside folks of various types. Most of the companies that we now see doing this are accomplishing it through partnerships with other groups and organizations. It is almost impossible for corporate America to deal with the training issue on its own. Particularly when you get into smaller or medium-sized companies that are working with regional or other associations, it's all partnerships every place you go.

The funding sources are changing, and that's a big debate that we are, and need to be, engaged in. How do you ensure that every employee has access to these systems? Some government process that somebody decided for political reasons on a different level is not necessarily the right answer.

It's good that we have corporate tax incentives to invest more in training, but I'm not at all sure that every employee ought to have access to training through that route alone. There's a whole series of other issues that simply says, "Now we need to ensure that everybody has access in a way that allows this process to work."

Companies are increasingly viewing training and education in terms of an investment rather than a cost.

And the last issue is one of equity. It is an issue of respecting employees and their ability to maintain their standard of living. We are a bit beyond the debate of whether or not the senior managers are the only ones who get training. But when you look at this whole issue, assuring that everybody can access the process is the only way we can ensure any kind of equity on a long-term basis. You can't legislate it in a market in which competencies are the driver. But you can, and I believe we will have to, find ways to ensure that everyone has access to, and is engaged in, this system in order to maintain equity and to close the gap.

In closing, I would like to touch on two public policy issues.

One is this investment issue. We're going to see it in the education debate this year, or the next two years. And we're going to see it, I believe, in the training issue. It is now very clear that in this country the basic skills set is an equity issue and an investment issue for everyone in the country. You simply have to move beyond arguments about public education and invest more specifically in those things that will dramatically improve the competencies of people coming out of that system.

And the second, as someone touched on, is that there's a very, very major policy issue that people in this room probably need to lead on more than anything else, and that's recession policy.

In the past, the approach to recession was that you put people on unemployment for a while, the economy blipped back up, and then everybody went back to work.

There is something we need to respect in this market, and that is that while there's any blip in a sector or across the economy or in a company, the constant change in skill sets and education sets and demands doesn't stop. So whatever we do from a public policy standpoint to forge links between schools, companies, and the government has to take into account that we must find ways to invest in people during that time in order for them to be productive when their (or the company's or the country's) circumstances shift.

That's a significant issue that is not in the public debate today, and you can't legislate around it. There's no way to create programs that will protect people from a market that is focused solely on increasing competencies.

MR. SAMUEL: Thank you, Bob. That's a very good start to this session. We'll ask our two respondents to give brief comments and then open the discussion for all.

First, Joel Marvil, who is chairman and CEO of Ames Rubber Company. One distinction about that company, is that it was one of the earliest winners of the Baldrige Award.

Respondent, Session Two:
Mr. Joel D. Marvil, Chairman and CEO, Ames Rubber Corporation

I am awed by the people around this table and the various constituencies they represent, and I'd just like to point out that the company I run is a small one. We have about 450 people, and we're in a rural area, so we try to reduce things to their simplest fundamentals, because we don't really have the time and the ability to get terribly elaborate with the way we try to solve problems.

This workforce readiness issue is certainly a major thing, not only for us, but also for every other business executive that I've spoken to. In the five or six years since we won the Baldrige Award, I've had occasion to speak to many of them.

I think that what you need to understand is that when we got involved in the total management philosophy we found that we had to do a lot of training, which was something we hadn't gotten too involved with in our company before. We had to do that because we were putting in some new systems and we were trying to train people in problem-solving techniques, quality improvement processes, statistical process control, group dynamics, and all these other good things that you have to do.

So we developed a lot of training routines and we started to deliver this training. After a while it became very clear to us that we were spending an awful lot of time and money on training. And, incidentally, the cost of the training isn't the cost to deliver it, it's the cost of having the people away from their jobs.

It was not taking hold the way it was supposed to, and that led us to an examination of the basic competencies of our workforce. We tested the entire workforce from myself right on down to the newest person that just walked through the door to see where we stood on basic literacy and mathematical competencies. (I passed, thank God.) We had some rather senior people who didn't.

And we said, "Okay, if we are going to become a learning organization" -- and we believe that you have to become a learning organization if you are going to survive in the next century -- "we've got to fix this literacy, this basic competency problem, or we cannot deliver the training that we need to deliver."

So we are still in an ongoing process now of delivering basic competency remediation to the people that need it, and that is somewhere in the vicinity of 61 or 62 percent of our people; some not so much, some quite a bit.

To me, that's the national disgrace that we've got to face when we talk about our forthcoming problems with our workforce.

Back in the Stone Age when I was first starting in the business, the late Stone Age, I had a mentor that said to me, "Young man, the person who needs machinery and doesn't buy it is going to pay for it anyway."

You know, that's every bit as true with the investments that we have to make in our workforce. If you need to invest in your people, who are after all your scarcest and most valuable resource, and you don't do it, you're going to pay the cost of that one way or another. You'll pay it in reduced productivity.

A lot has been made of the loyalty issues. In my experience, loyalty down will generate loyalty up. If you treat your people right, if you do the right things, you'll get the loyalty mostly. That's really all you can hope for.

So, having realized that we had to make these commitments and that we have to find ways to deliver this training, the crime of it was that we had to increase the basic competencies first.

I would sincerely hope that, if we do nothing else as a matter of national priority, we take it upon ourselves to fix the K-12 educational system in this country, so that it will give us people entering the workforce that can read and write. Again, I'm not talking about writing technical papers, but an ability to communicate and perform basic mathematics -- with a calculator, that's fine. Because if we can get past that then we can get back to training in the specific competencies. We know how to deliver that kind of training. We do it. We have a great partnership with our community college. We bring people in from outside. We have people that give courses inside.

We're delivering, on an average, about 42 or 43 hours per year to every teammate in the organization. One of our objectives is to set some minimum standards, but everybody gets at least 20 or 22 hours, something like that. We'd like to see those minimums raised. But we need to be able to deliver that training effectively and we need to be able to deliver it quickly. To do that we've got to get the basic competency levels up, and that's what's killing us and lot of our people around the country.

It's not that they don't want to train. It's not that the training costs too much. It's that the training cannot be delivered in an effective manner.

So if we're going to do fire prevention, I think it is good to sit around and let's talk about what we are going to do today. Training is good. Education is good. And the people that don't do that aren't going to be around in terms of the competitive situation.

But let's fix it at the core. What Bob Jones didn't tell you is that the last two years, on the Board of Overseers for the National Quality Award, he was one of the major movers and shakers for establishing the Baldrige Award categories for health care and education. I think that's a start toward fixing this system, but we've got to put more heat on that and we've got to get some r rements and minimum standards for graduation from high school. We've got to stop social pro...otions. Newspapers are written at an 8th or 9th grade level -- it would be nice if everybody could understand them (not to believe what they say, but just to understand it).

So I think that is the major challenge we face, and we're going to have to limp through this thing for the next few years. Industry is going to have to be committed to doing the remediation, because if you don't do the remediation you can't do the training that you need to do to survive. And there is hope for remediation. We've had help from the State of New Jersey. No one will reimburse you for the time that your people spend off the job, but at least you can defray the cost of instruction. I think those programs exist in many states, if not all, but that's the stop-gap. Fix the root cause and then let's get on with doing the training that we need to move forward.

We have good people, by and large. We have people that want to do the job. We're moving towards the high-performance workplace. I will tell you it is not an easy journey. There are people who don't want to take responsibility, because with the authority comes the responsibility and the accountability. We're getting there. We've got some self-managed work teams. We're changing our compensation systems.

We used to pay for how much skill a person had in a given job -- for instance, he ran a rubber roll grinder and he was a grade one, two, three, four, or whatever, and, depending on his competency he

got certain pay raises. Now we're saying, "Look, the teammate that has the most value to us going forward is the person that can do the most things. If we're going to have a self-managed work team or if we're going to have a manufacturing unit, then we want the person that can do every job in that unit."

So we're having to change the way we compensate people, and that's got to be transitioned so you don't hurt people in the process. To my way of thinking, this is the kind of objective that you're going to approach but never quite get all the way there. Still, the closer you get, the better you get and the interesting thing about this is that as you raise your general competency levels, your ability to train gets better and your learning slopes go up -- so it really feeds on itself.

I think the nice thing about this is that we not only can do the right thing, which is to invest in our people, but also the smart thing from a business standpoint. We've got some very interesting correlations between the training that we do and the organizational effectiveness and productivity that results from it, so it is a sound business investment.

MR. SAMUEL: Our second responder, Lynn Williams, is retired president of the United Steelworkers, former member of the AFL-CIO Executive Council and the Canadian Labor Congress Executive Council, and one of the most innovative and progressive members of the labor community.

MR. WILLIAMS: I want to make a few comments about Bob's remarks. He didn't let us know what he was going to talk about ahead of time. I heard his remarks as you heard them, and they were interesting and challenging and detailed and varied. I can't begin to comment about all of them, but I'd like to make a few comments.

I'd like to say a word or two about the loyalty question, because that's part of the earlier session and also about my own experience. I appreciate how Bob said experience doesn't matter any more, it's competency, but some of us don't have any competency left, we just have experience. So I'm going to talk about experience, regardless of his observations.

My experience has been that workers are tremendously loyal, very anxious to be loyal to their employers, and they want their employers to succeed. No worker I have ever been involved with, no member of my union I know ever came up to me and told me, "Everything is going great, Lynn. Our company is about to go out of business." They want successful organizations, and they are prepared to be loyal in that regard. But there has to be a return of the loyalty -- loyalty down, as Joel said. Loyalty has to go.

My own first instinct from experience is to just not count on loyalty from above. Yet, that's too simplistic. We need to find some new mechanisms and determine what loyalty means in the contingent circumstance. I remember when AT&T announced their big cutback, I read the vice president of industrial relations quoted in the New York Times as saying, "Every white collar worker in AT&T from now on should think of themselves as a contingent employee, having only temporary employment." Well, is that going to result in the kind of contribution needed to drive the corporation to success?

If we have to change as often as is predicted, and I'm not sure that's necessarily correct, then there has to be a way for the needs of employees to be represented over time. Maybe we need a new kind of labor movement structure. Maybe we need unions that are more like unions for the building trades, where the worker gets the benefits and establishes pension rights and the like within the organization. But we do need to address that. I think it is critical for our success going forward in terms of developing these competencies and maintaining relationships in which workers can be comfortable moving forward.

I want to say a word or two about our training experience with what we call our "Institute for Career Development." This is one of these training consortia we've been hearing a little about this morning. We bargained for ours in 1989, driven by the general need for training and the general need for improvement in high-performance workplaces and all the rest of it, but also, in our particular circumstance in the steel industry, because we became very bothered by the number of people we heard who were retiring early, because they felt threatened by all the changes that were coming into the workforce in terms of technology and the demands for literacy and numeracy.

We felt we needed some way to address this, and, frankly, the companies were not very willing partners in the beginning. We had to negotiate this and bargain for it. What we bargained for was ten cents an hour to go to something called the "Institute for Career Development," which would have a small central secretariat to set goals and objectives and prepare materials and supervise and monitor. We wanted a locally-based arrangement where there would be joint committees at every steel enterprise in the country that would develop programs according to the needs and interests of the people in those enterprises. The programs were to be focused particularly (but not exclusively) on basic skills, particularly on literacy, on math, and then computer literacy, because we saw computers moving into the industry in a big way.

It has been an enormous success. I can't tell you how much our members appreciated this. It is certainly the most significant thing we've ever done in terms of a benefit provided by the union. Our participation rates have been extraordinarily high, as high as 35, 40-plus percent of the workforce are involved in these programs in some locations.

A little tuition assistance is involved in it, but mostly it is programs prepared either by community colleges or our own instructors depending on the size of the enterprise and the local desires of the people.

The point I want to make is how enthusiastic workers are, how they understand this situation and they seek training and are interested in pursuing it. This is an industry where capacity utilization has been enormously high until the trade wars started again in the last few months or year-and-a-half. It's an industry in which there has been a lot of overtime, and yet this off-the-job training on people's own time has had a spectacular reception. I think that speaks to the general interest of workers in improving their circumstances, improving their training and learning so they can cope with today's circumstances.

In terms of the high-performance workplace, I just wanted to make one particular observation. The main issue of our subject here is how companies are responding. Again, on the basis of our experience, the critical issue in terms of the company response to this is the whole challenge of power sharing. We've had major participative efforts across the industry. Some have succeeded, some have not, many are in the middle of success or failure. But the principal difficulty, from a union perspective, is whether they're willing to really significantly share power with the workers, because what drives a lot of innovation and success in terms of moving things forward is if the workers do feel empowered, do have a voice, do have input, do have a significant say in what goes on in the place.

We've observed this when we became involved in employee-owned companies, and we became more involved in the choice of managers than we had ever been before. Frankly, we came to have a new appreciation of how important managers are, and found one of the most difficult things in our employee-owned enterprises was to find managers who had both the skills necessary to manage in that particular industry and business as well as the sensitivity to do it in a participative way.

That's always important, but it's particularly important in an employee-owned operation where employees expect that, as owners, things are going to be a little different. They frequently discover, after about two weeks, that everything is just the same. They're still going to work every day. They still have the same boss. They still have the same dumb decisions being made. And they don't have much more to say about it than they had before.

So you need to do critically-important work to change that to a participative arrangement where workers really have a voice. Workers need a voice in the whole range of decision-making, from top to bottom of an enterprise. They need a voice in issues like what is going to happen with technological change.

Technological change is a very threatening experience. I was reminiscing in another context the other day, as old-timers do, about one of my favorite organizing campaigns, which was at the beginning of the computer revolution. But I was involved in organizing a group of office workers. Our campaign was built

around the fact that the company had just bought a great big computer and put it in the middle of the office and built a glass case around it and invited everybody to come and admire this new marvel. What they did was scare everybody to death. But there was reason to be concerned about what this new device was going to mean in terms of their future, in terms of the reduction of employment that technological change often represents.

Workers need a voice in technological change and how technology is going to be used. They need to participate in exploring how it can be used to enhance opportunities, not to destroy opportunities, and how it can be made a positive feature. Power sharing is very significant.

I guess I want to say a word or two about education, because everybody does. I have a daughter who is a teacher, so I always feel obliged to put in a word for the teachers. I think one of the things that we've missed in this whole struggle about improving our education is really enlisting the teachers and the teachers' unions to the extent that we should in order to bring about change and meet these needs as we go forward.

I certainly appreciate very much Bob's remarks that it is important that the needs be made clear, and the idea that they go into communities ahead of time and let people know what they're going to be needing is a very significant and important point.

We really need to enlist the teachers, not bash the teachers -- not try to have them solve every social problem all the rest of us have created, which we ask them to do often -- but enlist them on a participative basis as we talk about participation in industry and participation in modern enterprises.

I think we have a great deal to do on that. There are some interesting experiments that have been undertaken in that regard. There was the American Federation of Teachers Union (AFT) in the Pittsburgh area which made significant progress. But I think far more can be done to address this whole situation and really enlist the teachers as active participants to bring about change.

Finally, I just wanted to underline and endorse Bob's idea about recessions. It's one we pursued on an industry basis, but he is talking about it in a much broader sense, that we should use downturns in our circumstances as an opportunity for training and education.

I remember the first recession I was involved in significantly as a union leader back in '57 and '58, and I talked at that time about a lot of retraining and had a lot of resistance from my members and everybody. "What are you going to retrain people for? We don't know what the jobs will be." I argued vigorously that people should have an opportunity to learn something, and should not just sit at home hoping for the economy to turn around or search vainly for jobs when it was apparent in our industrial area there just weren't any jobs available in the short run. But I think Bob's idea that we need to find a way to do this in a much broader way in our whole society is very important.

MR. JONES: I am obliged to take two minutes and suggest that we have succeeded in getting the Baldrige Award extended to education, but we have done it with a very Machiavellian agenda to take that kind of a process and model to the rest of the school systems in the country, not just those that apply for the Award.

And as we sit here this week, there's a national partnership that includes the AFT and the National Education Association (NEA) formally and directly, every education organization -- school boards, principals, everybody - and business organizations, to take the Baldrige model into the school systems. This is the way you begin to involve teachers and administrators in the reform of a system that heretofore has been handled as a political debate from the outside.

For the last 10 years we've had this argument in this country about education reform without ever involving the institution itself in reforming how it goes about adjusting to this new culture where change will be constant.

You will hear a lot about this in the next few months. There are a series of school districts -- not schools, school districts -- in the country that have been doing this and whose data has now become rather public and will be more public in the next few months. Brazosport, Texas went from the worst school district in the state to the

best. It is very multi-ethnic and low income. It is a broad school district geographically. The test scores now surpass state standards for every ethnic group and every school in the system, and it has all been done by taking the quality process into the school system and restructuring how they do their business.

It is a framework to help make sense out of standards and assessments and the accountability measures and such things.

But we have left out of this whole debate the richest resource that exists, which is highly-educated, highly-creative teachers. They have not been allowed to participate in this process.

So there are some significant things going on. The business community across the country is more involved in the education debate now than anybody else, for the reasons that Joel pointed out. And, unfortunately, Washington is no longer the substantive leader of that debate.

MS. MILLER: I want to raise some issues that have not been raised at either the first or second session that are of concern to me.

I think we have to keep in mind that the fastest-growing sector in our economy is the service industry, and I particularly want to address myself to the issues involving women and minorities.

We do know that, number one, there is a difference in wages of 70 percent between women and men. Therefore, when we talk about high-performance workplaces, I certainly would want to ask what we are doing to make equal wages between men and women.

Second, what is being done to create opportunities for women and minorities to rise within the corporate structure? I think that we're going to have to look at that when we talk about how we use technology.

Third, how do you create a change of culture in a company? I think that we have found ourselves, many times, against a brick wall when we try to change the culture.

And then, last and most important, what is the support for workers within a corporation? We talk about education and we talk about a worker, but what are we doing to look at the worker, as a whole? What are we doing to provide support for that worker, not just for education programs and training while they are in the company, but also what are we doing in terms of their total needs, whether it is child care or family leave, those kinds of issues?

At the Department of Commerce you've got the Baldrige Award, which is way up there, but way down here in the Labor Department we have the Perkins/Dole Award, and we look at those kinds of issues when giving that award.

To conclude, I think that when we talk about education and training and what are we going to do for workers in terms of new technology, we have to look at the whole worker and we have to see what kind of experiences will enhance workers, particularly for women.

MS. JEFFERS: I'm the Director of Human Resources at Ball Horticultural Company.

Our company is located in the suburbs of Chicago, which has essentially zero unemployment. In fact, in our region we've got more jobs than people, which represents a significant challenge.

One of the things that no one has talked about much today in terms of the skill gap is what I consider to be the most basic fundamental workplace skills. These include things like -- Can you be reliable? Can you show up on time? Can you come to work every day of the week like you are supposed to? Do you have a basic work ethic? Do you take responsibility for things? Will you follow through with things when you are assigned a task or you volunteer to take on a task? -- even things as basic as how to

treat and deal with other people. If you get upset with a customer, do you deal with that effectively or do you simply hang up on them, or walk out the door if you're upset at your boss?

We've had to spend a considerable amount of money and time training people in even those fundamental things, which five years ago I have to say we did not even concern ourselves with.

So I think that when you look at the workforce and you see the degree to which these fundamental skills are lacking, the challenge to get to where we need to be is kind of overwhelming.

MS. MCCAIN: I'm Mary McCain with the American Society for Training and Development.

I was struck earlier this morning by Nancy Mill's comment on her five Cs, one of which was that companies needed to make a choice about becoming a high-performance workplace. I think that's very, very true, but the sentence that doesn't always follow that comment is that they don't always know what to do in that regard. In truth, what we increasingly hear, as well, is this notion of the basic skills -- Can you show up to work on time? Are you responsible? Are you able to learn? This issue is the elephant in the corner that we all like to try to ignore, in many cases.

But it is very, very expensive to be a high-performance workplace. It is very expensive for unions to pay for those opportunities. It is expensive for companies, and it is expensive for governments.

I think everyone in this room would agree that the expense is more than justified by the return, but it is a commitment that people are reluctant to make when they don't know what they're doing.

I think it is similar to the situation of competing consultants and new theories. What is the right thing to do? What are the problems and issues? Often the employees know what the problem is, but the companies may not.

So I want to underscore this notion of identifying the desired outcomes and determining what changes need to be made in terms of the support systems, the education and training, and the cooperative mechanisms -- partnerships, coalitions -- that need to be put into place to help us get to this goal.

MR. MCKENNEY: I'm Jim McKenney.

I really appreciate this forum, and I would hope that we would do this more often. I would like to see all of the major Federal departments that have some impact in a major way on human resources policy engaged in this discussion together, as well as some of the larger organizations that are not Federal that have something to say and do about these issues.

I think everything that we have discussed thus far is very important. There's one issue that is out there that is another elephant, and no one has really talked about it, and that's the massive number of retirements we're going to face. All of the issues we're talking about are going to be multiplied simply because there are not going to be enough bodies out there.

I know Bell South talks about how 40 percent of its workforce is going to retire in the next five years, and they're absolutely petrified about that.

I mentioned earlier that I was in a meeting last week with UAW Ford, and one of the little tidbits that dropped off the plate was, "Oh, by the way, in about 10 years we're going to be in massive trouble because virtually every one of our plants hired their workers at the same time."

That's going to ripple through every industry sector in this country, including teaching. It is going to be a massive opportunity and a massive problem.

In our community college sector right now, most of the employees and professors are part-timers. I don't know what we're going to do when it comes to hiring the technologically-sophisticated workers that we need to train

the other workers. Where do you get them if you can't afford to pay what they can get working full time at Motorola or wherever?

So I raise that issue, Howard, because I think it is one that has not been addressed. It is very important. It will impact this issue of how you retain loyalty. People at Ford said, "When our people retire, they don't stay in the auto industry. They go on to a different career." I sat there and I said, "How can you afford to let that happen Ford? You can't. You can't let every one of those people just walk out the door and do something else." And nobody else can.

MR. YUDKEN: I'm Joel Yudken from the AFL-CIO.

Mary McCain made a point about how workers often understand where the problems are, although they're not often asked and consulted and allowed to participate meaningfully. And Lynn Williams also mentioned the problem of how we get workers engaged in the whole process of technological change and how is that managed.

I see two different discussions going on here. One deals with how we get the core competencies and training and so on necessary for workers to participate in the modern workplace, and the other has to do with how we get workers engaged and really participating in a process in which they need to have more authority and decision-making power.

I don't see these two discussions connecting. I do think we need to have this basic training going on, but I don't see how we've addressed the problem of giving workers the capacity to play a meaningful role in bringing in new equipment, or selecting and designing such equipment, or even thinking ahead of time about what kinds of solutions should be devised to address problems on the floor.

In the beginning, Bob Jones mentioned three different types of training: basic training, competencies, and soft skills. Maybe the soft skills area is too touchy-feely for some people, but it is something that needs to be developed, if we're going to talk about true high-performance workplaces. In addition, we need to give real authority and decision-making power to people at the shop floor level. Again, how do we do that?

MR. MARVIL: Just responding to your comment, actually, these two issues come together very, very closely. In fact, in my view they are totally intertwined.

If you are trying to operate your company in a participative management style with a lot of team-oriented solutions (as most Baldrige-type companies are), then that's really the way you get the participation. Using interdisciplinary and cross-level teams has been very successful for us. We try to involve different disciplines, plus different levels. In other words, we don't want a team if it doesn't have floor-level people on it, and that's how you get your input.

But just putting floor-level people on the team doesn't really guarantee that you're going to get the inputs that you need. They have to feel comfortable in that setting, and that gets us back to the training issue. We'd like them to be comfortable with group dynamics. That's a fancy word, but how do groups operate? How are they facilitated? How do you draw people out?

So you are right back in your training loop, and again we get back to the issue of how we get people trained quickly?

MR. WILLIAMS: I can't resist a quick little commercial, I guess. We do it best with collective bargaining. One of the things we're paying a terrible price for in America, in my view, is that collective bargaining isn't extensive enough.

I'm quietly trying, during this session, to persuade Joel Marvil of this. I haven't succeeded yet, in all fairness, but I'm working on him.

MR. LORENTZ: Norm Lorentz with United States Postal Service. We are both having technology inflicted on us and using technology to deal with ever-increasing productivity needs. We have 850,000 human beings that work for us. We employ one of every 180 employed individuals in the United States. Four years ago, when I was hired as the chief quality officer, we determined that we would apply the Baldridge model to the United States Postal Service.

We believe that the customer is served when everything fits together. So, while I hear a variety of different perspectives on what should be done here, it has to be done in the context of an overall model with the focus on the customer. We have been successful when we focus on outcomes and we focus on the customer, and then we align non-value-added and value-added capability to that.

We've redefined the term "productivity." When I arrived at the Postal Service, productivity was defined as "labor productivity." This is still the case in many areas of the Postal Service, and it means that the only way you achieve productivity is to remove people. Almost all of the technology investment that occurred, both prior to my arrival and since then, was focused on removing work hours, removing people. Now we're redefining the term "productivity" to include the customer and to look at value-added productivity rather than non-value-added activity.

We are also using technology as an enabler. In the absence of data, people are forced to deal with relationships. When you have 850,000 people with no data, you focus on relationships. We are attempting to use technology, both to automate the mail stream, and more importantly, to provide information to the management and the process people. This enables them to make data-based decisions and focus on data rather than on each other. Then, if there are people issues, they will fall out at the back end.

We have focused initially on fixing management, because when we've gone in and applied process and problem-solving tools for local work teams without taking the leadership on the journey, it simply has not been successful. So we've learned that you have to engage leadership, you have to deal with the management system, and then engage the people with data in the context of what the customer wants.

(Whereupon, the session was concluded.)

Opening Remarks: Mr. Raymond Kammer, Director, National Institute of Standards and Technology

Good afternoon. I am introducing Kelly Carnes, who is the acting Assistant Secretary for Technology Policy in the Technology Administration of the Department of Commerce. NIST is also part of the Technology Administration. Kelly was appointed as the Deputy Assistant Secretary for Technology Policy in 1993. Her organization, the Office of Technology Policy, develops policies that promote and advance technology innovation in the U.S. economy. Kelly has been personally a leading advocate for developing the nation's information technology workforce. She has spent a great deal of time on that in the last year.

Before Kelly joined this Administration, she was a lawyer specializing in technology issues with a leading law firm in Washington, D.C. She took her bachelor's from the University of North Carolina at Chapel Hill, and she graduated magna cum laude from Georgetown University Law Center. She was nominated by President Clinton to be the permanent Assistant Secretary for Technology Policy earlier this month.

With that, welcome, Kelly.

(Applause.)

Speaker: Kelly Carnes, Acting Assistant Secretary for Technology Policy, Technology Administration, Department of Commerce

MS. CARNES: Thanks, Ray. I'm really happy to have the chance to be here today. It's really a privilege to be a part of such a well-educated and expert group and to listen to the discussion that was going on this morning. I enjoyed it very much and actually learned a lot from it.

As Ray said, we have been spending a lot of our time in the Office of Technology Policy working on issues that relate to information technology and workforce development. What I think I'll do is spend a few minutes giving you an overview of the work that we've been doing and the issues that we've been thinking about. That will provide a further basis for discussion that is going to take place in the policy session this afternoon. I would also be glad to take questions.

We got involved at the Commerce Department in the issue of the information technology work force as a result of strong customer demand. Other than the work that you are all familiar with that has been going on at the Manufacturing Extension Partnership for a number of years, the rest of the Commerce Department has really not traditionally focused on issues of workforce development, education and training, and the relationship of those issues to competitiveness.

This trend started to change significantly a couple of years ago. When I first came to Commerce in 1993, Ron Brown was then the Secretary of Commerce. We never, never had CEO-level individuals come into Mr. Brown's office and say, "Commerce really needs to focus on the issues of workforce development and human resources and the relationship of those to the competitiveness of our businesses."

In contrast, now, ever since Secretary Daley has been on board, every CEO that visits Secretary Daley in his office and everybody that he meets on trade missions as he travels around the world brings the

issue of the link between human resources and competitiveness to his attention. That has happened particularly in the arena of information technology skills.

It is true across industry sectors. We have been visited by people from the electric power industry, from financial services, from traditional information technology manufacturing and services companies, as well as from the entertainment industry, all of whom have similar problems. It is very much viewed, from the industry perspective, as being a problem of crisis proportions over the last couple of years.

There are differences of opinion as you start talking to other communities, but that was definitely the view initially presented to us by industry.

As we began to look at this issue, we found that there were some industry surveys that projected an astronomical number of vacancies in the information technology arena in the private sector. There's a great deal of anecdotal information about what was going on in the private sector, and, just to give you an idea of how we initially got involved in this, let me share a couple of the anecdotes with you.

Essentially, there's a lot of evidence that companies are doing rather bizarre things that theoretically they wouldn't be doing if there weren't a serious problem in recruiting and retaining enough IT workers.

My favorite example is of some unknown, unnamed company in Silicon Valley that negotiated with their night-time systems person so that he could maintain a lifestyle as a nudist because they supposedly were so desperate and couldn't find someone else to replace this individual. So, he worked at night in the nude managing their systems, and they had a very happy relationship.

In addition, I talked to some people from Cisco Systems recently. They adopted recruiting strategies in Silicon Valley where they would send large groups of their employees out to local football games, like the Stanford-Berkeley game, with placards that said, "Do you need a job? We have them. Go to our website." Hits on the company website would go up by 15 or 20 percent every time that they went out in one of these ways.

We also saw some very interesting behavior at the state level in the number of states that have assessed the need for information technology workers. The most interesting one that we've run across is Michigan.

You'll be happy to know that Maryland considers itself a net importer of technology workers, generally. So, Maryland is probably in pretty good shape; undoubtedly this is at least partly due to the influence of NIST being here in Gaithersburg. The State of Michigan is not so lucky, and they have been engaged in a big campaign over how to get more people to come into IT jobs in the State of Michigan. Their experience over the years showed them that during times of economic downturn in California, they could attract large numbers of technology savvy workers into Michigan. But, as soon as markets would pick back up in California, everyone went back home to California.

So Michigan decided to change its strategy and started targeting states like New Jersey. This is true -- you can go check their website. Now, they're trying to get workers to move from New Jersey to Michigan, the theory no doubt being that Michigan doesn't have a competitive disadvantage with New Jersey on climate.

(Laughter.)

So we started seeing all these kinds of things going on and began to take a look at this problem. I believe that there are two sources that are really the cause of this becoming such an issue right now.

The first is the phenomenal economic growth that we have experienced over the last few years coupled with the fact that technology is such an important factor in creating that economic growth. We have the lowest unemployment rates in many, many years, and that really is putting an enormous amount of pressure on these companies' ability to hire, recruit, and retain workers.

Alan Greenspan said not too long ago that this is the best economy he has seen in his lifetime. These are really extraordinary economic times.

The second major factor is the importance of IT as an enabling technology across every single sector of the economy, as I mentioned before. Now you are seeing investments in IT representing over 45 percent of all business equipment investment. There are several industries, such as communications, insurance, and investment brokerage, in which IT equipment investment constitutes three-quarters or more of all their equipment investment.

Probably the single most important factor driving the demand for IT workers has been the phenomenal growth in electronic commerce and in use of the Internet. As this group all knows, when you look back to just 1994, you were looking at just a few million people using the Internet. And then, by the end of 1997, more than 100 million people were using it worldwide, with another 100 million logging on just in the 1998-99 time frame. We're looking at figures that say we'll be doing over $300 billion worth of annual business on the Internet by 2002. This really is extraordinary.

Now, let me give you just a couple of statistics on the demand for IT workers.

From 1987 to 1997, the employment doubled in core IT occupations: computer programmers, systems analysts, computer scientists, and engineers. Unemployment rates among those professionals was 1.3 percent, which, even with low overall rates, is still less than a third of the rate for all other workers.

About a year-and-a-half ago, we produced a report which many of you may have seen. It's called, "America's New Deficit." We used really conservative data from the Bureau of Labor Statistics that projects we're going to need 1.3 million new computer programmers, systems analysts, and computer scientists and engineers between 1996 and 2006.

Here is something that I think is really dramatic, demonstrating what an enormous challenge this is. If you think back all the way from the introduction of the ENIAC in the late '40s time period through 1996, we developed an information technology workforce of about a million and a half people. So, it took us 50 years to get to the first million and a half, and we're planning to double that workforce during the next 10 years.

That really is extraordinary, although we at the Commerce Department try to look at it as a happy problem and one that a whole lot of other nations around the world would like to have.

In partnership with the Departments of Labor and Education, the Information Technology Association of America, and University of California at Berkeley, we kicked off a dialogue that brought together the various stakeholders who have a role to play. Most of those stakeholders were mentioned this morning: academia, the K-12 education system, community colleges, universities, all different sectors from the industry, and employee organizations. We brought together all of these stakeholders to begin to discuss some of the root causes and some possible approaches to encouraging world-class IT workforce development in the United States.

Since our dialogue at Berkeley in January 1998, we have been all over the country. We started here in Montgomery County, Maryland. We traveled to Mississippi, Brooklyn and Hudson Valley in New York, Nebraska, Chicago, Seattle, Boston, North Dakota, and Phoenix, Arizona. We collected views and ideas and best practices from all those places that we visited, and we're currently in the process of sifting through all that information.

We're working to turn the data and information into a report which will do a couple of things. First, we'll highlight all the best ideas and innovative practices that we've come across as we've traveled around the country. There really are a lot of them. Second, we'll bring forward really crisp sets of recommendations that are directed toward some of the key players in the system. This will enable us to say, "If you're a company, here are the three or four most effective things that we think that you might do to begin to address this challenge." And, "If you're a university, here are some of the things that you might do."

One thing I want to do is actively solicit help and participation from everybody in this room. I have my business cards. We have e-mail at our website and we are looking for ideas and recommendations and also a way to test some of the ideas that have come out of the process.

Now, let me spend a couple of minutes talking about some of the issues that we've focused on and some of the key pressure points in the system that we've identified.

Clearly, as we've already heard several times today, over the long run the K-12 education system has to be addressed, and, within that, some of the best ideas that we've heard so far focus on really two critical issues.

One is trying to ensure that we have teachers with appropriate math and science training to teach our kids. Many places that we visited around the country said that they had a real problem with highly-qualified math and science teachers being lured away by industry or being taken into university-level and community college level teaching.

There is a real problem attracting and retaining people who are qualified as math and science teachers. That problem is compounded by the fact that many of our teachers who are already in the system are going to be retiring over the next 10 years. There are people in some quarters who are saying that we're going to need to recruit a million and a half to two million new teachers.

Given the current unemployment rates and given the typically low levels of compensation and low stature in many places in the country that teachers have, all of us should be scared that, not only in the math and science arena, but for teachers in general, there's going to be a big problem looming on the horizon.

In the math and science arena, probably you are all familiar with Third International Math and Science Study (TIMMS) sponsored by the Education Department. To me, the results of those studies lay out the problem very crisply. Fourth graders in the United States perform equal to or better than their counterparts around the world in math and science. By the time they reach eighth grade, there is a gap and we're not doing so well. But, by the time Americans become high school seniors, we perform terribly in those international comparisons. In the most recent study, the United States ranked 17th in the world. Somehow, we are losing a whole lot of kids during the K-12 period, and that's creating several of the problems with the competencies and the basic skill sets that people were talking about this morning.

We have concluded that this is really a critical pressure point where industry needs to be giving some time and attention. A couple of our ideas include strategies for trying to figure out how to make teaching math and science in K-12 more attractive, getting more people into those programs. We've seen some promising models in some parts of the country -- actually, in only a few places -- where teachers are being hired jointly by a school board and by a local company. The teacher is guaranteed a salary that is more commensurate with what they could get in industry. They spend part of their time teaching in the local schools and part of their time working in the company. Communities that have tried this have found it extremely beneficial for the students and for the teachers and for the companies, as well.

Another major issue that we've run across is the image of scientists and technologists in American society. I, for one, actually thought this was sort of a false issue. But, as we've learned more about it and we've talked to more people, we've found that it really is a barrier, particularly when you're talking about encouraging kids to come all the way through the pipeline and become scientists and engineers. We have to recognize that it is the teen years when we really start losing the kids, and that's the period of time when they are so image conscious.

In the preparation for the Berkeley conference, some educators in Jefferson City, Missouri, went to kids in third, sixth, ninth, and twelfth grades and they said, "Draw a picture of a technology worker." It's too bad that I don't have the pictures with me today, because they are quite entertaining. Kids at all levels depicted people who were wearing propeller hats and pocket protectors and high-water pants. They were a set of very unflattering images. Interestingly, out of the 160 pictures that were drawn by the kids, most of them were male. I think that only about 10 percent of the images showed up as being women. So, very early on, kids develop an image of technology workers as not being cool and not being something that they want to be. Sometimes, we see the image of mad genius or something else that the kids don't think they can achieve. Popular culture reinforce those images. These are things we probably need to be working on.

Here's an easy one. I'm not sure how many companies around the country have looked to see what kind of programming they're supporting with their advertising dollars. Is this programming promoting positive or negative images of education, in general, and scientists and engineers? We've spent a fair amount of time talking to some of the companies in Hollywood, and you'd be surprised to hear of our conversations with Sony and Warner Brothers and Disney. They are, on the one hand, saying, "We just can't find enough qualified workers." Well, what kind of movies and films and entertainment are you doing and what's your creative side of the house doing? They aren't even talking to each other about any of those issues.

A different set of issues has to do with training the incumbent workforce, and that was discussed at length this morning. It is another area of extraordinary challenge. Incentives must be created for companies to train their own employees on a much larger scale than many companies are doing today. We really believe that companies must also, particularly in the IT arena, move outside of their own immediate labor pool and engage in activities that help increase the labor pool in their area or region or potentially nationally.

There are some experiments going on in a few places, but they are not as widespread as we would like to see. In one example, Microsoft is conducting a pilot where they offer people who are exiting the military, that's about 250,000 people per year, the opportunity to get trained in one of the Microsoft disciplines. They have people take an aptitude test, they provide the training, and then they provide assistance in getting placed within the Microsoft network.

Tapping into former military people as a good source of employees has been thought about and talked about a great deal, but not a whole lot of people are trying it yet. I think someone raised the issues this morning about getting employees to show up at work on time, to be professional, and to be able to answer the telephone. The nice thing about former military employees is that they already have the basic work skills, many of the core analytical problem-solving skills, and the communications skills that we were talking about.

Here is another pool of workers that a few people are experimenting with in the IT arena. The strategy is to figure out how you take somebody who has a bachelor's degree in a liberal arts discipline and give them, on some kind of an expedited basis -- not a four-year degree program and probably not a two-year degree program -- sufficient education and training so that they can get onto the bottom rung of some IT job ladders. A few of those models are working reasonably effectively along the lines that someone mentioned this morning, where employees or prospective employees will make a commitment to be trained and to work a certain period of time for one of the employers in the consortia.

There is another pool of workers that is perhaps the most challenging in terms of retraining, and I haven't seen any good examples where people are doing this well. The strategy is to take people who are already trained in a science and technology discipline -- for example, aerospace engineers who have been downsized as part of the defense downsizing -- and develop appropriate curricula and training programs for those people where they can be redeployed in some of the IT industries.

Many people are talking about this strategy, and there is a good bit of controversy. Employee and labor organizations like the IEEE will come in and say, "Companies don't want to hire older workers, they don't want to retrain. They just want to hire kids out of school. Our people could do these jobs." And then, from the company side, you'll get all the reasons why those people aren't as good as the kids out of school.

Somehow, those two communities have to come together, because the needs for skills in these industries are really at a very critical level. It is moving fast, and it is probably getting worse. We're hoping that more retraining of the existing pool of scientists and engineers will take place.

The kind of model that people have talked about several times this morning, the consortia approach, seems to be extremely effective and is working a fair number of places around the country. We'd like to see this approach used even more.

We have come to the conclusion, after our year of effort, that all levels of government need to be doing a much better job of creating incentives for companies to get engaged in these kinds of consortia activities.

There have been some pieces of legislation on the Hill that are proposals for tax credits. To drive the kind of dramatic change that we believe needs to happen throughout the education and training system, we probably need at least a few years to realize a significantly different set of financial incentives than what is there at the federal level now.

The Department of Commerce has been a very strong supporter of the skills alliance model and the legislation that is proposed by Rob Atkinson and many people on the Hill.

Another critical area, already touched on this morning, is the tremendous need for business and education to work more closely together. Somehow, the fast-moving requirements and changes in the business world need to more quickly be translated into curriculum changes in education. As we traveled around, we heard frequently from business that their attempts to work with major universities wouldn't and couldn't result in any kind of curricular changes in less than three years. Apparently, that was the process for getting new university courses online, so there was some sense of frustration by the business at the lengthy time cycles. Now, we've also heard a lot that community colleges are able to move much faster, but that time cycle might still be a year. So there's clearly a great deal of work for all of us to be doing there.

With that, let me close. I would be happy to take any questions and comments. And, as I said, we're actively looking for ideas and recommendations to be included in our report as we go forward in May.

Thanks.

(Applause.)

MS. KURSTEDT: I'm Pamela Kurstedt from Virginia Tech. Your comment about the need for 1.5 million computer scientists and computer engineers between 1996 and 2006 is a real issue for universities. For example, we just recently did a survey of about 20 of the major engineering schools in the United States. In many cases, 50 percent of their applications for freshman year are for computer engineering and computer science. The problem is that only 15 percent of our faculty are computer scientists or computer engineers. So that's a real issue for us.

Changing a curriculum in three years is very fast for a university. It is a real problem for us, and we've gone through these cycles before. It used to be chemical engineering, and then it was aerospace engineering, and then it was electrical engineering, and now it is computer engineering.

We can't gear up that fast and, at the same time, gear down in other areas. It's a real structural issue for universities at a time when it is not only K-12 teachers that are being hired in industry, but a Ph.D. in computer engineering can make significantly more money working near the beltway than they can working in a university. It's a problem for us, and we're not sure how we're going to solve it.

MS. CARNES: Do you sense that that capacity issue is widespread? That's one of the things we've tried to research, but we didn't know enough to really draw any conclusions yet. The question is: even if we could attract more people in to computer science and engineering, do we have the seats to put them in to educate them?

MS. KURSTEDT: No, there are not enough seats. Computer engineering wasn't even a program much more than about 10 or 15 years ago. Computer science has been around a little longer. So yes, this is a problem.

MR. JAMES DEAN: If I could just echo the same comment from the business side. I'm at UNC Chapel Hill. We have been trying to gear up and focus the undergraduate and graduate level people in the IT area to either not become specialists or even become well-rounded managers who have an appreciation of IT issues. Our university went out into the market this year willing to hire as many professors in the IT area as we could. We felt very fortunate to get one. So, it is not from a lack of trying or a lack of intention. It's just that market is just white hot now. In fact, the guy who was leading the search committee told me that, for a while, offers for him to leave were running two-to-one over people willing to come.

MS. CARNES: I believe that.

FEMALE VOICE: There's such a salary escalation for IT people right now. Signing bonuses and starting salaries are so high -- are you finding that encourages young people to make an IT career choice?

MS. CARNES: With some people it does. If you talk to a labor economist, they will tell you there's no such thing as a shortage of workers, because as salaries go up more people will be drawn into those professions and then there will be an equilibrium.

I think the difficulty here is partly what we've been struggling with all morning. This transformation has occurred so quickly that the information is not necessarily available to everybody in the marketplace so that they can take advantage of it.

One of our real problems goes back to the K-12 arena. We know there are some important audiences who haven't made the connection between science and math education and job opportunities later on. I'm talking about parents, guidance counselors, and often the kids, themselves.

We think certainly for the next generation of people, that we're going to have to reach all those audiences. There's a great deal of research that says the two biggest determinants of a kid's career choice are the influence of parents and the influence of teachers.

So, if we have kids whose parents were somewhat intimidated by science and math as they went through the system, they are often communicating those attitudes to their children. And if you have teachers who aren't trained in science and math, as we do in many parts of the country, the teachers may also be intimidated by science and math. So, we're responsible for perpetuating some of these attitudes as the kids are going through school.

Now, are there a whole lot of kids out there who know how to use computers and think science and math are great? Yes. So it is working for a whole lot of kids. But, when you have the indicators of our national averages and the U.S. being 17th in the world by the time the kids come out of high school, there's a huge percentage of kids for whom the system is not working.

We tend to think that the images and the perceptions of the kids and their families haven't really caught up to the reality yet. And, that reality is: if you want to have a job in the economy by the time you graduate from high school, you'd better learn your science and math. You'd better learn how to read and write and analyze. You can't hammer that message in too strongly to kids.

MR. LAURENCE HECHT: We're talking about continuing education for industry. How about continuing education for teachers, not only in science and math, but also in IT? I kind of feel like there is a weakness in the infrastructure there, as well.

MS. CARNES: We've heard that comment quite a bit, and I think that you're right. We would like to hear any ideas you have about how to strengthen that. As I mentioned earlier, some of the best ideas that we have heard involve dual hires of teachers so that they get some time in industry, some time renewing their skills, and some time actually teaching students.

I also heard an idea the other day that I liked. The idea is to recruit K-12 teachers trained in science and math by giving them some kind of GI-bill-like scholarship in exchange for a certain number of years of teaching commitment. There might be something that states or even the national government could do to address that.

Other than those, I haven't really heard too many ideas about how you create the infrastructure or you address that hole. Most people, however, will agree that the hole is there.

MR. HECHT: Just a follow-up comment. I have a feeling that there is an opportunity for upgrading and changing not only the faculty at the teaching schools, the teaching colleges, but also an opportunity to encourage joint programs between the educational schools and maybe the engineering schools. Hopefully, in the future, you would get more well-rounded teachers.

MS. CARNES: Absolutely. We've heard that before.

Session Three: What Are the Policy Implications That Result From the Changing Nature of the U.S. Workplace and Workforce?

Moderator: Mr. James Auerbach, Senior Vice President, National Policy Association

I am Jim Auerbach with the National Policy Association, the moderator for this session. This is our wrap-up session on what are the policy implications that result from the changing workforce and workplace.

I want to try to place our last session in context at the end of this day-and-a-half of very interesting presentations and discussion.

During our first session this morning, Leo Reddy, in a session examining the demands that technological innovation are placing on the workforce, told us that the United States has regained its competitive leadership principally because of new investment in information-based manufacturing technologies. He noted that technological and organizational changes are requiring that workers develop the skills that will enable them to adapt to continuous change. Reddy also stated that the failure of education and training systems to keep up with this transformation in the workplace is a profound structural problem.

For Bob Jones, the primary issue was also how organizations and institutions prepare for continuous improvement and how workers invest in a core set of skills and competencies, because competencies are driving today's marketplace.

During lunch, Kelly Carnes described growing labor shortages, especially in the area of information technologies, because of strong economic growth and record low unemployment rates. High levels of investment by businesses and the rise of electronic commerce she said has contributed to this shortage of IT workers, and she recommended that both K-12 education and skill training for incumbent workers are in need of significant reforms.

To help us address the policy implications of these thoughtful perspectives and expressions of concern, we have two outstanding speakers that will give us their observations:

Ralph Craviso is Vice President, Workforce Effectiveness, for Lucent Technologies. In this role, Mr. Craviso is responsible for directing all aspects of Lucent's labor relations, employee relations, and labor strategy development. He is Lucent's chief strategist on labor/management issues. He is also responsible for leading the Learning and Performance Center and the talent acquisition and diversity teams at Lucent Technologies.

Following Ralph Craviso, we'll hear from Ron Blackwell, who is Director of Corporate Affairs at the AFL-CIO. This is a new department charged with supporting unions in their strategic relations with employers at levels ranging from capital stewardship in corporate governance, organizing and collective bargaining, workplace democracy, and technological change.

As a respondent to Ralph and Ron, we have Rob Atkinson, who is Director of the Technology, Innovation and New Economy Project at the Progressive Policy Institute and co-author of PPI's, The New Economy Index: Understanding America's Economic Transformation. The project is intended to raise the awareness of policy-makers about changes in the economy and the need for policies that reflect those changes.

With that, why don't we begin with Ralph Craviso.

Co-Chair, Session Three: Mr. Ralph Craviso, Vice President, Workforce Effectiveness, Lucent Technologies

Thank you, Jim.

Let me thank the sponsors of the conference for inviting me here today, and acknowledge my colleague, Ron Blackwell. I look forward to hearing his remarks.

Let me first put into perspective several factors that are at work changing the nature of the workforce, then make some observations about the changing nature of the work itself. I will then discuss the human resource challenges and human resource policies that have to evolve to address those challenges.

I want to talk specifically about human resource disciplines in the areas of talent acquisition and retention, compensation and benefits, learning and development, cultural transformations -- getting to the loyalty issue, and labor- management relations, finally. That would be a good segue for Ron.

The Changing Nature of the Workforce

I would like to put today's discussions into a different context than we have been talking so far today. Let me first talk about the aging workforce. The aging Baby Boom generation -- those who are now 34 to 54 years of age -- is currently the largest segment of the labor workforce. By next year, this group will make up 50 percent of the workforce, up from 38 percent in 1986. The U.S. business community faces a significant turnover as this large pool of older workers reaches retirement age over a relatively short period of time. Additionally, this generation of workers may not adapt well to the acceleration of technological change and the challenges presented by global competition.

This generation is marked by irony. Their paramount goal is to earn enough money. Yet, they face financial squeezes and have concerns for their financial well-being and retirement. Many will not achieve their aspirations on career goals, and many of this generation's women are frustrated at not achieving the success that they believe they deserve.

Let us move on to the next generation, the so-called "Baby Bust Generation," or "Generation X." This is a more diverse group. It is characterized by more individualistic and entrepreneurial spirit. It is the first generation of latch-key children influenced by dual-career families, high divorce rates, and single-parent families. Unlike the older generation, they expect their managers in the workplace to behave more like a coach and mentor than as a supervisor.

Then there are those entering the workforce today, the emerging "Generation Y." They have still different attitudes and values than those of Generation X, and it isn't clear to me yet how their experiences will shape their attitudes and values in the workplace.

Further, on the question of diversity, which was mentioned briefly this morning, within the U.S. population ethnic minority groups are growing at a faster rate than the traditional white majority. This, coupled with the steady influx of legal and illegal immigrants, will change the values and attitudes of the workforce. It is currently projected that, by the middle of the 21st century, non-Hispanic whites will represent only 53 percent of the total population. The result will be a higher value placed on diversity, and on tolerance for differences among the workforce. Intolerance will simply not be accepted in the workplace. This phenomenon will drive our legal system rather than the legal system leading in defining acceptable behaviors. That is the nature of the workforce.

The Nature of the Work

Information technology. In the next decade, as has been happening in the last, the world's society will experience -- and I say again the "world's society" -- will experience a thorough, massive, wrenching revolution driven by technology. There is a strong parallel to the industrial revolution of the late 19th century, as we transition from the industrial age to the information age.

Since 1991, corporations have invested more capital dollars on computers and communications equipment than the combined amount spent on industrial, mining, farm, and construction equipment.

As we experience this transition, the boundaries between organizations and world markets will blur. The emergence of multi-national corporations and the interdependence of economies will redefine the traditional nationalistic systems. Legacy systems for learning, our national education system, and our corporate training organizations will not be adequate to support the learning requirements of the existing and future workforce.

New issues, such as privacy, information access, and equality of information technology will redefine the social order.

Rapid advances in information technology have made global communications easier, less expensive, and faster; time zones have become irrelevant and international trade barriers have become moot.

One region's economy cannot be separated from any other. Stock and commodity trading is conducted around the clock. But, more importantly, the market is a global one. Goods and services are defined now by a much broader standard. They take into account the different requirements of the world community.

Products contain components manufactured around the world. No corporation can afford to define its market and its competition within a single national border. Corporations now grow, restructure, and downsize based on global requirements.

Social issues relating to labor standards, wages, hours of work, and working conditions are being redefined in global terms. The value of human capital has never been higher.

Social consciousness extends beyond traditional nationalistic values. And, as the worker is redefined in global terms, the skills of the managers must evolve to include a better understanding of economic interdependency, a broader definition of competition, and an ability to handle more complex and potentially disruptive cultural differences.

Corporate Restructuring

U.S. corporations have undergone dramatic restructuring. Mega-mergers have reduced competition within the U.S., but have enabled those same corporations to compete more effectively in global markets. Multi-national corporations have emerged that have no economic tie to any one nation's economy. Corporate reorganization often has resulted in downsizing, employee layoffs, and buy-outs. Worker confidence in continued employment has eroded. This insecurity undermines employee loyalty. Workers feel under-appreciated.

So, how must companies respond? We must accept the fact that the historic approaches to managing people and people issues will not succeed. Change is the constant, and acceptance of change and all that implies is an essential element to the success of U.S. business in the 21st century.

Talent Acquisition, Retention, Compensation, and Benefits in this New Order

Our record low unemployment rates reflect the tightest labor market in more than 30 years. As the economy moves toward information technology, those with the computer skills required by these new jobs, as we heard at lunch, are in greater demand than the supply of talent. Those with the skills tend to be younger. They possess marketable skills. Their attitude reflects little loyalty to the corporation. Value is placed on job mobility. Look at the typical 30-year-old today. It is common that they are working for their third employer since leaving school. The result is intense competition for talent among employers, and the challenge extends not only to recruiting but to retaining the talent.

So, what are the policy implications for corporations?

First, there is a greater emphasis on college recruiting. Today's battleground in the war for talent is being waged on college campuses.

Innovative recruiting strategies and compensation and benefit plans are emerging. The use of hiring bonuses and stock options is common. There is more flexibility in benefit plans and in hours of work. The traditional concept of full retirement benefits after a career is passe. We have moved to portability of retirement benefits and the creation of cash balance retirement plans structured within the shell of the traditionally defined benefit plan.

Contributions to 401(K) plans are as important to today's worker as investments into traditional retirement vehicles.

Mergers and acquisitions are highlighting the differences in corporate cultures and in compensation and benefit approaches. Corporations are creating a culture of ownership. Workers feel a greater affinity to the company when they are compensated through non-traditional plans -- the use of stock options, stock purchase plans, and when workers become more involved in the decisions of the business, itself. More emphasis is placed on pay for performance, even among production workers.

With the growth of the market outside the U.S., there is more talent recruited outside the U.S. to capitalize on the knowledge of cultural and market differences. Globalization has made the traditional U.S.-centered way of managing diversity inadequate. Patterns of ethnic relations change. The sheer complexity of races, ethnicities, religions, and belief systems are not supported by the systems currently in place to manage diversity. The challenge for U.S. corporations will be to establish a global community while valuing each nation's cultural diversity and respecting the diverse legal requirements.

Learning and Development

Traditionally, corporations have employed training organizations to assist employees in adapting to changes in technology and sustain management skills. Under today's imperatives, corporations must transition from training organizations to learning centers. Even as we say that, the investment in learning is in decline.

So what are the policy implications for corporations? Learning centers must change the role of the supervisor to one of coach and mentor.Traditional leadership skills are no longer adequate. The leaders of the business must possess basic business acumen to deal with the complex challenges created by the changing nature of the work. Learning organizations must become incubators for thought leadership.

To achieve a higher level of motivation among workers and breakthrough productivity, organizations are being redesigned to incorporate high-performance work teams. No less than fundamental behavioral changes are required.

Accompanying these efforts are wholesale cultural transformations. Employees are finding themselves empowered to act in ways heretofore reserved for management. Their judgment is relied upon. Their independence is encouraged.

These corporate behavioral changes are critical to becoming the employer of choice among the desirable candidates for employment.

Finally, learning organizations must rise to the challenges created by ever-changing and more complex technologies. Basic job knowledge requirements are changing incrementally with the technology revolution. Incumbent employees are challenged to keep up with the complexity, but in many cases do not possess the education foundation to meet the challenge.

Labor-Management Relations

In the U.S., few corporations have succeeded in setting aside the traditional adversarial approach toward resolving the differences between unions and management. The historic behaviors are counter-productive. They place U.S. corporations at a global competitive disadvantage, and they damage relationships not only among managers and union representatives, but also in the workplace.

Policy Implications

I believe union representatives must be given the opportunity and they must accept the responsibility to understand the business, what drives business decisions, and how labor costs affect those decisions.

Management must respect the role of unions and understand their institutional needs.

Traditional adversarial approaches must be set aside. Dialogue that is timely, meaningful, complete, and ongoing will set the precedent for more cooperative approaches to problem resolution in the future.

Interest-based bargaining and mutual problem solving will allow the parties to fulfill their respective responsibilities without jeopardizing the enterprise, while providing the workforce the benefits afforded by a successful business.

Finally, corporations that partner with their unions have higher employee morale. They take the lead in progressive human resource practices, and they achieve greater success in the marketplace.

In conclusion, even as a revolution is changing knowledge and information sharing, even as a world economy displaces traditional nationalistic business behaviors, even as information technology dramatically changes the nature of the work performed by the workforce, even as the changing workforce brings new values and expectations to the workplace, the traditional human resource policies of U.S. business must be replaced with new approaches to allow U.S. corporations to adapt to the evolving environment. Nothing less than the success of the U.S. economy and the financial well-being of the U.S. workforce is at stake.

Thank you.

Co-Chair, Session Three: Mr. Ronald Blackwell, Director, Corporate Affairs, AFL-CIO

Thank you, Ralph, for that segue into the question of labor-management relations. In looking at our subject, the changing nature of the workplace and workers, we need to make explicit the changing nature of the employment relationship and labor-management relations. I think Ralph has allowed us that opportunity.

Like Bob Jones said this morning, the American labor movement believes that training is good, education is better, and we do not have enough of either.

An interesting question is posed: Why not? Why, if training is so good, why is spending on training actually falling? Why, if it is so important to train, especially lower levels of workers, are so little of company resources moving in that direction?

I agree with Bob this morning that training is good, and I agree with Ralph very strongly that the context in which we pursue training matters a great deal. Like Ralph, I would also like to look at the changing workplace, the changing employment relationship, and the changing nature of labor-management relationships.

I was with a group of CEOs and their counterpart unions recently in a discussion about the changing nature of employment relationships and labor-management relationships, looking into the next century. It was an interesting, and free-flowing conversation concerning the direction in which employment relations are going.

One particularly far-sighted CEO offered the following prospect: To paraphrase: "Look, if we are really looking for the future of the American employment relationship and work in the future, we wouldn't be talking about jobs at all. We won't have jobs. We'll have work. And if workers have the skills to do our work, we're prepared to compensate them fairly based on their performance. We won't have jobs, but we will have work. We're prepared to compensate workers fairly for the work they do, but we won't pay 'wages'."

Now, this was a visionary statement. To an economist, it provided an interesting set of questions.

We have a $7 trillion a year economy. We are the richest in our history and the richest in the world, and a leading industrialist is actually proposing that going into the future we will organize this vast and complex economy on the basis of spot labor markets.

The image I had was workers reporting to the curb every day. Possibly, they would have lawn signs advertising their competencies. The employers would come by and hire the people whose competencies impressed them, no doubt agreeing to drop them off at the end of the day.

This raises an interesting question about the nature of the employment relationship. Clearly, what these employers were saying is, "We don't have the same relationship to our employees that we've had in the past. Also, they're not going to have the same relationship and dedication to their work that they've had in the past.

It caused me to think, when our public discussion is locked in a sterile debate between omni-competent markets on the one side and incompetent governments on the other, why do we have firms at all? Why is our economic life organized on the basis of corporations? Corporations are not markets and they are not slaves to markets, as much as they compete in them. Firms are internally organized. They report in hopefully a transparent way and are accountable to their shareholders. Firms are firms and markets are markets.

If markets are so wonderful, why do we have firms at all?

Some people will allege -- and this is the weakest argument for a firm that I know of -- that there are simple transaction cost problems in markets that are overcome by organizing things in firms. I want to argue that there is a much deeper reason for a firm. Something goes on in a firm and is expected by public policy to go on in a firm which does not and cannot take place in markets. It is relevant to the skills that workers have, the extent to which they are used in the firm, and especially the training that workers need to do these functions. Society expects that the firm, the dominant form of which exists today as a corporation, is the most efficient way for creating social wealth. That's why we have a $7 trillion-a-year economy. There is wealth creation going on in firms or there is nothing of social value going on in firms.

Now, I am using this term advisedly because I want to get into some questions that haven't been raised here. Why is it so difficult for firms that have this extraordinarily important function in our society -- of creating the material basis for our entire civilization -- to invest in training that is meaningful?

The first thing, mentioned this morning by my colleague, Nancy Mills, is the choice that firms have to make about their business and competitive strategies. Which product and service markets are firms going to enter? How are the firms going to meet their competition in these markets? Are they going to meet their competition on the high road based on product quality, customer service, and continuous innovation -- meeting the cost competition by mining deeply the commitment of their workers and the special knowledge that they have about what they do? Or, are they going to meet their competition on the low road -- do business the same old way, by slashing the costs of their imports, including training costs? Will they simply cut the costs of their employees, slice up the value-added chain, as Paul Krugeman says, and send the juicier parts overseas? Is that the way they're going to meet their competition?

It matters a great deal which strategy management adopts. Unfortunately, there are a number of things in public policy, since that's our subject here, which militate against firms pursuing a high road.

Everybody talks about quality. People give awards for it, I understand. The question is: how much is really practiced?

The governance structure of corporations is difficult to get your arms around. Corporations, as is famously observed in the Wall Street Journal, exist for the benefit of their shareholders.

Now, understand that shareholders are very, very important. If they did not contribute their capital, we could not organize these firms. They are contributing their capital and whether or not they get their money back depends on what is done with their capital, that is, how well it is used. They bear a residual risk in the enterprise; therefore, they deserve residual control rights on what happens in this firm, and the firm's management better be accountable to them. They also deserve a claim on the residual income that this firm produces. That is their incentive for contributing their assets to the success of this business and that is the connection between the private interests of the shareholder and the social purpose of creating wealth.

What I want to immediately rush to here is that it is not just the shareholder that invests in these companies. When workers bring their firm-specific skills to work and when they learn on the job, they are contributing an asset that is no less valuable and is comparable to shareholders' financial contribution to firm success. If the firm fails, they lose their investment. They bear some of the residual risk. They deserve, for the same reason as the shareholder, a share of residual control rights. And they deserve a share in the residual income. But do they get it? Are they represented in the governance structure of the company? Not very often.

What do economists say when you have firm-specific assets that are not represented in the corporate governance structure? What they say is that the owner of those assets will under-invest in your enterprise.

Imagine, if you will, "Contribute your capital to our enterprise. We'll take care of it. Trust us. You can't sit on our board, and you don't deserve information about our strategic decisions. You know, you don't really have competence in that way. But if we succeed, we'll give you something as a result."

How many investors would invest on that basis? Yet, workers are asked every day to contribute the unique knowledge they have at work to the success of this enterprise. Their ability to hold their job, much less wages and other benefits, depends on whether the enterprise is successful. But, they have no say in the governance structure of these companies. That is a problem.

This is not the case everywhere. In Europe, there are many different structures of corporate governance in which workers play a role in supervisory boards for precisely this reason. But, in this country, you would expect that there would be an under-investment in firm-specific skills on the part of employees.

What economists would also say is going to happen in the corporation is that there's going to be a temptation of the people who are represented, majority shareholders, to use their privileged power on the board of this company to shift resources from one corporate constituent to another, from those that are not represented -- importantly, workers -- to those who are, the majority shareholders, and that is exactly what you have. But let me point out that this severs the relationship between the shareholders' interests and society's interest. Corporations don't exist to redistribute income among corporate constituents. They don't exist simply to make shareholders rich. They exist to create wealth.

If we set in motion CEOs who are enjoying ridiculous levels of compensation or stock prices that are rising twice as fast as anything else in the real economy, then there is a serious amount of value shifting going on in the corporate structure. This is not in accordance with creating value and is not what the corporation exists for, which brings us to the question of the way our capital markets function.

We have notoriously fragmented capital markets. The secondary market is feverish. No one expects it to fall. When this bull market started, stock valuation was something like seven times what earnings were in the real economy. Now they are 28 times higher, and nobody can imagine the end of this. Has the financial world defied gravity?

The market can mean something only if the society is creating wealth, and that depends on the real economy. The markets are valuable only insofar as they provide capital to that real economy, and that is where workers live. That is where they work. That is where they make their social contribution. That is where workers acquire and apply their skills.

There is an unhappy relationship between the real and the financial economy. John Kenneth Galbraith has written a history of financial crises, and he notices that the most dangerous time in a bull market is when everybody forgets the last time it crashed. I suspect we are in that kind of phase right now.

But, if you have impatient capital, pursuing financial gains, value is redistributed, in this case from the real economy to the financial economy. CEOs will be compensated based on their agreement with the purposes of financial economy; hence, most executive compensation is through stock option plans. When you have a system like that, you have severed, or at least buffered the relationship between the corporation and its social mission of creating wealth. You have changed the environment in which you can, in fact, serve the core purpose of the corporation. This is a segue to training, which I want to get to right now.

I think it was Bob Jones who mentioned that you have to have a continuously escalating level of competencies in companies, and certainly that is true. But competencies, alone, escalating or not, will not give us the kind of economy that we need to underpin, on a sustainable basis, a prosperous global economy going into the next millennium. We have to have an enterprise, a corporation that is a learning organization that can innovate on a continuous basis. One that can startle customers with the quality of their products and the services they deliver.

That company, that enterprise, is going to have to mine deeply the knowledge which workers have about what they do, and it has got to harness the commitment and creativity of those very same workers. It is also going to have to -- especially since we are here at NIST -- invest mightily in labs and in scientific research and product development.

The corporation that I was describing earlier, however, is not one that is going to invest in its workers. It is not one that is going to invest in research and development. It is going to try to ride the competitive advantage that has already been built up. It is not going to create value; it is going to prosper by redistributing value. That is what many American corporations are doing now, despite what is said, and at a great cost to workers, and society at large.

The question of loyalty was raised here. I think it was mentioned earlier that teamwork is both the key to getting the input which I am describing and also one of the buttresses for worker loyalty. Teamwork cannot do that. Teamwork can deal with the question of how are we going to relate to one another at work so that we can use our collective skills in order to innovate as quickly as possible. But, teamwork does not deal with the question of the employment relationship and the imbalance of power in the employment relationship between individual workers and their employers. This is the reason for the importance of labor-management relationships in these discussions.

The reason for workers organizing is to balance the power between employees and their employers. And yes, then we can work in teams in order to create the learning and innovative processes that will be the key to building a sustainable competitive advantage in a globalized, rapidly-changing, technologically-revolutionary future. But, it is going to take a very different corporation than the one that we have today in the United States, and it is going to take a very different relationship to employees and to their representative organizations.

Finally, it is going to take a different policy set. I will just tick it off because I don't have time to get fully into it.

We have international trade rules which carefully attend to the concerns of companies with their intellectual property rights, but they are silent about human rights. Under this environment, companies are internationalizing their operations, and they are employing some of the most impoverished and the most oppressed workers in the world. If we had trade laws that did respect human rights as well as intellectual property rights, we would be able to build bargaining relationships internationally. We would be able to balance the power constructively between workers and between employees and their employers. With the current trade regime, it takes a hero of a company in the manufacturing sector, where I come from, to really invest in skilling their workers.

Times in the past 18 months have been relatively good, and I hope they continue, but I fear they will not. The average rate of economic growth is 2.5 percent, which is what the norm has been since the mid-1970s in this country. It is only one-half of what the norm was in the earlier period. That makes a world of difference in the ability to take markets and to create an environment of prosperity in which you can afford to invest in research and development and training.

Finally, there is much stress on labor market flexibility. Letting the minimum wage fall to zero or near zero or something irrelevant for most businesses and failing to enforce the fundamental human right of workers to organize and bargain collectively with their employers is not the goal. This is not the way forward. We need to respect the rights of individual workers to organize and to bargain collectively with their employers. There are 10,000 workers fired illegally every year in this country for forming a union.

Let us balance the power and harness the creativity and the knowledge which workers can bring to our common enterprise. Let us create companies that are capable of innovating on a continuous basis so that we can support prosperity in a high-wage, high-standard country in an increasingly globalized world.

Thank you.

Respondent, Session Three: Dr. Rob Atkinson, Director,
Technology, Innovation and New Economy Project, Progressive Policy Institute

Thank you.

In many ways, Ron and Ralph are talking about the same economy, talking about the need for innovation, learning, and constant change. But, it also struck me that they were talking about two different kinds of economies. Ralph was talking about an economy where companies are engaged in all the right things, which it sounds like Lucent is doing. Ron is talking about companies that were not engaging in the right things and what we can do to get them to engage in the right things.

I think we are really describing two different types of companies and two different parts of our economy. On one hand, Ralph is reflecting a big company that is knowledge-based and cannot survive without a set of workers that are well-educated and well-skilled. These companies have to compete and do all the right things to get those workers. On the other hand, there is a big part of the economy that I would suspect Ron is probably thinking about that is made up of smaller companies that have less technology, no specific human resources function, or little training.

Clearly, different companies have very different types of workforce practices. I want to talk about policy and offer several ideas that I have. I'll touch on Ron's point about why it is that we have so little training? If training is so good -- and we all say it is -- why do we have so little?

The Progressive Policy Institute (PPI) just released our report, "New Economy Index," and one of the index items was how much American companies are spending on training as a share of GDP. It has actually gone down from about 0.8 percent to 0.7 percent per year during the last 10 years.

What's going on? Are these companies stupid, or are they selfish, or is something else going on? I believe something else is going on -- I think three factors are causing this.

Number one is this whole issue that Ron addressed, and that is competition. The competitive environment that companies face is much more intense today, as we document. It is forcing companies to reduce investments in the kinds of things that have the attributes of public goods. Ron mentioned basic research and R&D. Training is another where companies don't gain 100 percent of the benefits of their investment. They're going to lose some of those investments through workers leaving or inventions going to other people or other companies. So, companies have cut back on those kinds of investments.

The second factor is that, despite what we say here, I do not think training matters, frankly, in some sectors. There is a new book by Stephen Herzenberg called New Rules for the New Economy, in which he states that today there are many sectors of the economy and a lot of jobs that simply don't require much training. Ken Voytek from the National Alliance of Business did some work for us looking at occupational projections. Occupations that are projected to grow the fastest are the ones that require an associate's degree and above. The occupations in the middle are expected to go down fairly significantly, while the occupations that require just three weeks or less of training are expected to remain a constant share of the workforce. So, it is not as if these occupations that require virtually no training and very low skills are going away. In fact, they are not going away. It does not make sense for companies who employ these workers to spend money training them unless they restructure the work.

Finally, the third factor is our mental model of training. If we went around the room and asked everyone what type of firm they were thinking of when they thought about training, I would guess that over half the people would

be thinking of a big, mass production factory. But, that is not the way the world is. Eighty percent of the jobs are in services. We did a graph in our index, provided by Steve Rose, on where the jobs are. Most of them are in offices now. The prototypical job in America is in a small company employing office workers.

As a result, there are some real issues with small companies being able to either understand the need for training or being able to afford it.

So, given that, what do we need to do? But clearly we need to fix K-12. We also need to figure out how to do three things from the public policy perspective. Number one, we need to have companies invest more in training. Number two, we need to have more companies do training. And, number three, we need to figure out ways to give workers their own tools so that if they are unlucky enough to be employed in a company that does not do training that they are not left out in the cold.

So, what can you do? There are several things, and I will try to go through them quickly.

One of the ideas that PPI has been proposing, Rob Shapiro, who is Undersecretary of Commerce, had advanced when he was at PPI, is to apply a non-discrimination test to companies when they write off training expenses. In other words, if companies are going to be able to write off training for their higher-end workers, they have to have some responsibility to extend training to a broader share of their workforce.

It would be similar right now to the way they deduct health care or pension costs. You have to have your whole workforce be eligible for it. I think we can use the same kind of approach for training. I do not know that we should have it be exactly the same, but something similar so that the tax code does not let companies just train the top end.

Number two, I think we ought to start at home. If you look at what the federal government and the states are doing when it comes to training their own workers, particularly in what you could call "high-performance government organizations," they are really laggards, not leaders. It is time we say, "Let's have the federal and state governments lead by example and really develop innovative training programs and train their own workers, particularly lower-end workers, including clerical and other workers, who aren't getting the skills they need."

Third, I would just commend Vice President Gore's recent announcement of a tax credit for remedial and literacy training. He recently announced this at his Lifelong Learning summit, and I think it is a great idea. Joel Marvil was talking about how his company is having to do the work of schools by training workers in remedial skills. Why are we making companies pay all the costs of this? It seems quite unfair. The Vice President's proposed a 10 percent tax credit for just those expenditures that involve literacy or remedial education.

Fourth, as several people have mentioned at this conference, we need to restructure our incentives. I think Nancy Mills mentioned that. When you look at state and local economic development incentives, they are all going the wrong way.

There is a recent study that a group called "Good Jobs First" did in Minnesota. Fifty percent of all the jobs created with corporate tax incentives there were Medicare eligible. In other words, Minnesota was just indiscriminately, willy-nilly giving tax breaks to companies, regardless of whether they were high performance or low performance.

One of the things that we did in Rhode Island, when I was the governor's economic policy director, was we put in place an investment tax credit for companies. But we made it contingent upon them paying above the median wage in their industry, which was the best proxy we could get for some indicator of high performance. So, we were saying essentially to companies, "We're willing to help you modernize, but you have to take the high-performance road."

There are many different ways to do that, but I think fundamentally public policy needs to say, "We're not going to support the low road."

Fifth, how do we get more firms involved? I think there is a real challenge. Certainly Lucent and the majority of the big companies are thoughtful, they are insightful, and they do the right thing. It is really the majority of the small firms where I think we have the challenge.

One of the initiatives that we have proposed at PPI is an initiative called the "Regional Skills Alliances." Kelly Carnes referred to it, and we have a paper on it called "Building New Skills for the New Economy."

There are many interesting examples around the country where alliances of firms or firms and unions have gotten together and said, "We're going to collaborate among ourselves to train our workers." This is the basic idea of the regional skills alliance.

Bruce Herman is here. Bruce ran the Garment Industry Development Corporation in New York, a classic example of such an alliance. Unions and firms got together and said, "We're going to modernize together. We're going to train workers. We're going to adopt technology."

The Wisconsin Regional Training Partnership is another example.

So, I think there is a real potential for these multi-employer and union partnerships to develop. Unfortunately, they are relatively slow in getting off the ground. We are still seeing only a handful of them. As a result, there was legislation last year in Congress and some funds that ended up getting allocated as part of the H-1-B visa issue. Essentially there is money now coming into this program in the Department of Labor to invest $60 million a year in these industry- and union-led regional skills partnerships.

I would just caution you by saying in the original bills in the House and the Senate last year that money was going to go to NIST. The backers of the legislation, principally Senator Sarbanes, Senator Lieberman, and Congressman Jim Moran, thought -- and I think correctly so -- that NIST would be better positioned to really support these multi-employer/multi-union partnerships as opposed to the Department of Labor.

I encourage you to provide input to the Department of Labor because they are in the process of writing the RFP for this program as we speak. I think this is an opportunity for them to break out of the box and do something new. They should say, "We're going to invest a small amount of money and to use it to catalyze these union, company, and other types of partnerships, and do it the right way." One of the key components of this program is that companies have to put up their own money and that companies and unions run these efforts. It is not clear that DOL will structure the program this way.

Sixth, I believe the NIST Manufacturing Extension Partnership (MEP) needs to do a lot more to focus on skills. I am a big fan of MEP. I think they do a great job, but historically they have tended to focus on the technology side of the world and not on the skills side of the world. I do not think you can separate the two. Some MEP centers do a better job than others, but I think, overall, MEP has not made worker skills the priority that they should have.

Seventh, how do we help individuals get the skills they need -- particularly if they are unfortunate enough to work for companies that do not provide them with any kind of opportunities that will help to advance their learning?

I have a couple of ideas here. One is an initiative PPI has proposed called "LEAP loans" -- Lifelong Education Advancement Pursuit loans. This is a relatively simple concept of expanding the eligibility of student loans to post-secondary learners, particularly for part-time learning. Right now it is hard, if not impossible, to get a student loan if you are going part time and you are outside the regular age and school group. So, the idea would be that individuals who want to go on their own and get more learning could qualify for financial aid through loans.

Finally, the last idea I will present, which the Vice President has announced at his summit, is an initiative called "individual learning accounts." The idea would be that individuals could participate in these learning accounts like IRAs by being eligible to contribute a small share, an amount of money each year to individual learning

accounts that would be tax exempt. Companies could voluntarily match it -- again, tax free. You could even envision that lower-income workers and individuals could possibly get a one-time capitalization of their account by the government to get them up to speed.

If we are to really build new skills for the new economy, we need to think creatively! We need to answer the question of how we help individuals engage in lifelong learning, particularly when they are involved with companies that are not going to do that for them.

Thank you.

MR. AUERBACH: I believe we have just heard two very stimulating and provocative perspectives on changes taking place in the workplace and the workforce by Ralph Craviso and Ron Blackwell. Rob Atkinson was presented with quite a challenge. I think Rob rose to the challenge quite well, presenting his response and perspectives on public policy implications.

With that, let me turn it over for your questions and comments. Who would like to begin with the first question?

MR. HOWARD SAMUEL: There is one institution that has not been mentioned here which does more training than any other single institution and probably does it better -- and that is the Department of Defense.

About two years ago, I learned that the entire private sector spent something like $45 billion on formal training. The Department of Defense, which is only one part of our government, although not exactly a small part, spent $15 billion. And that is in formal classroom training, not basic training.

I think they have a great deal to teach us. Incidentally, they are way ahead of most companies and institutions in using new technology to pursue training activities. Distance learning and computer training are two examples of newer educational technology.

It seems to me that one of the things we ought to do is see if we can get the Department of Defense to tell the rest of us how they do it. We need to learn what they do because many of the things they teach -- automobile repair and so forth -- are perfectly usable in the private sector.

MR. LYNN WILLIAMS: I would love to hear Ralph and Ron debate a little bit. Ralph presented a glowing picture of globalization that is unfolding, and we clearly, from the labor side, have a lot of reservations about exactly how that is unfolding, to which Ron gave eloquent expression. I wonder if we could have a little exchange between the two of you, and I am particularly interested in Ralph's responses to some of Ron's more provocative remarks.

I know you are up to it, Ralph.

MR. CRAVISO: Thanks, Lynn. If you want some controversy, maybe I can provide it.

I do not necessarily subscribe to the view that corporations have to be behaving in a fashion that shares the responsibility towards both shareholders and employees. I am not saying that employees are not unimportant. I am not saying that they are not valued. And I think that my remarks reflected a corporate approach which recognizes that.

But, ultimately, I subscribe to the theory that a successful business enterprise results in the ability to provide the worker with a fair share of the returns. Operating in a fashion that supports shareholders and shareholder value is not inconsistent with the ability of the corporation to share those benefits with workers.

That happens in two ways. It happens in collective bargaining, Lynn, that you have been promoting all day long. I also subscribe to collective bargaining because I think it's a useful method of finding different

ways of solving problems. I also think this culture of ownership I talked about is very important. I do not know how organized labor feels about it, but my experience throughout my career has been that when workers and the executives have a common reward in the success of the business, there is a higher level of alignment, there is a higher level of loyalty. All the oars are pulling to the same rhythm.

So, I subscribe very strongly to things like pay for performance, stock purchase, and stock option plans. Lucent has been particularly blessed with its stock price behavior. Today, an employee who was on the payroll in March of 1996 holds stock options valued in excess of $17,000. Our employees are aware of that. They understand why the stock has performed well. They understand, although not as well as I would like, what their contribution did to help that financial performance. They are motivated by it.

We returned that favor in collective bargaining by putting even more stock into their 401(K) plans, and the reason why we did that is we are shielded from taxes, so they got the full value of it. It shielded them from the ability to cash it out, and it gave them the visibility of another investment vehicle for sharing in the success of the corporation.

MR. WILLIAMS: Can you respond to the human rights issue -- international human rights in terms of globalization, trade, and such matters?

MR. CRAVISO: Yes. I talked a great deal about globalization and about the responsibility of corporations to think beyond their national borders.

Whether a corporation is a U.S. corporation that does a lot of business overseas or whether it is a multi-national corporation, like a Daimler-Chrysler for example, which is becoming more and more common, I think that there is a much higher level of awareness of human rights and worker rights in the executive suites than there ever has been.

We do a lot of work in China, for example, and the questions have always been raised, "Well, what do you pay your workers in China, and why do you invest in China?"

First let me say that, because we have a higher awareness of human rights and worker rights, the way we practice in China is very cognizant of a common view towards tolerance and fairness. But, by the same token, if we intend to do business in China we have to invest in China, because you cannot do business with China unless you invest in China.

I use China as the extreme example. I could substitute Brazil, where we have a factory. We would much prefer, because of quality and reliability, to produce our product in the U.S. and ship it to Brazil. In fact, many of the components that are put into the product in Brazil are made here by union-represented work.

Our motivation to put that work outside the U.S. is not motivated by a desire to avoid the wage and benefit level of a U.S. worker; it's because that is the only way we can compete in that market, either because of government tariffs and policy or because of competition.

Just as a local community in the U.S. welcomes the opening of a factory, investment outside the U.S. means that we have some factories in some out-of-the-way places. We have factories in Omaha and Oklahoma City, and we are very important to the community. When Lucent invests and wants to create a communications network in Brazil, they want to see Lucent as an employer creating wealth in Brazil. They don't want us to be bringing in a whole bunch of product and simply providing an infrastructure for a communications network.

So it is a balance, if you will, between human values and doing business outside the U.S. It is not easy. But, if the corporation has a conscience -- and we get back to the kinds of corporations there are -- I believe the corporation can operate outside the U.S. and do it in a way that they are both financially successful and respectful of worker rights.

MR. BLACKWELL: Stating something I said before a different way: in a world where only the shareholder really matters as a corporate constituent, if you really want to get somebody loyal to the company you treat them like

a shareholder, even if they are not. In a different regime, you would not have to. I mean, there's a Baldrige Award winning company with which I have a personal relationship that is a very high-performing company, the most advanced I have ever dealt with or seen. The company tried to sell itself to its employees, and they refused. They liked their work very much, and they wanted to participate. They wanted to run the company, but they were not interested in owning the company.

You can have a structure in which you think about the corporation as the institution that we rely on first and foremost to create wealth for society, in which the different corporate constituents are all treated respectively. As such, you do not have to rely on turning everybody into shareholders just to treat them fairly.

Secondly, the point you make about China is exactly right. That is the incentive system for every company. The trading rules being what they are and the performance requirements of the Chinese government being what they are, individual companies, the best and the worst, with or without conscience, have to deal with that. And that is a perverse incentive to the individual company. It is not a complaint about China. China is trying to use its power over corporations and its relationship policies with corporations to make sure that some part of the value-added chain takes place in their country. Brazil is doing the same thing.

I wish the United States were doing more of that. You mentioned, Ralph, that these companies are no longer in a country. Of course they are. Yours is. I do not know which state yours is incorporated in, but it does have a home. It exists by law for a very important social policy purpose. Companies like Lucent, companies that are creating leading edge technologies to underpin the economy of the future, need to create product that is really world class, not for your shareholders only but for a public policy purpose; that purpose is to make the United States a leader in this area.

Now, you may see it only as your responsibility to your shareholders. Many corporate leaders do, unfortunately. But the public policy reason for the sufferance of the existence of corporations is that they create wealth for society.

I am mindful that this is Lucent we are talking about, a manufacturing company and a high-tech company, a company that is greatly admired. I would think that being a learning organization would be crucial for a company like Lucent.

If a company, any company, has to rely on the skills it can buy in the market, it cannot function in a high-standard country like the United States. Anybody can buy on the market. To be special, you have to create something inside the company. You have to learn inside the company. That is your strategic resource as a company.

I assume that in one language or another you would think about those things.

Being able to develop that and cultivate that depends on public policy that supports everything from competition policy all the way to international trade policy. It is those policies that, under the current regime, tend to be so inhospitable to investing in new product development, research and development, and training.

We cannot leave all of those things the way they are. Every company has to struggle with it, and Lucent does it much better than most, but you cannot leave all of those constraints out there like they are. You cannot just "diddle around" with tax incentives for these companies and expect that we are going to change way the companies perform in servicing their mission of training workers to get the highest-skilled workforce in the world. That is just not going to happen. You have to take it as a part of an integrated challenge to shape all levels of public policy and corporate strategy and structure. We must create world-class corporations that continuously innovate, providing industrial leadership not only for the world economy but for our country's economy.

MR. CRAVISO: We are in violent agreement.

(Laughter.)

MR. JONES: Maybe you could both comment on this. It almost sounds a bit Pollyanna-ish that we act as though a company is a thing that is there, but the data tells us the opposite. Less than 14 percent of the workforce is now working in the Fortune 500 and that number will keep falling. In 1980s, alone, we lost 47 percent of the Fortune 500 companies. Those companies are not there any more. I do not know what the total number will be if we add the 1990s. So, how does your model work in a world in which we are increasingly seeing non-traditional corporate structures? Most of us grew up with a very different alignment.

MR. CRAVISO: One of the things I said in my remarks was that the past is not the prologue here. The old approaches and the old rules don't apply.

When you compare the Fortune 500 list from 10 or 15 years ago with the Fortune 500 list today, it is not so much a comment on corporations and their ability to run their business effectively as it is a shift, I think, in the economy and in the product. They are shifting from an industrial to a services economy. They are shifting to a high-tech economy.

I think that those companies that survive are those companies that adapt what they do to the market. Take Olivetti, for example. Olivetti, when I grew up, was a company that made the typewriters. Now, they are trying to become a communications company in Italy. There is a company simply trying to maintain its relevance and its financial success to its shareholders.

So, I wouldn't look simply at the statistic of the composition of the Fortune 500 and draw some conclusions about business, business acumen, or business performance. I would look at it more as a reflection of the changes in the economy, changes in the product mix, and a reflection of the advance of technology.

I would look 10 years into the future. The way Lucent looks at things is that we may be on top of the world today - but, by simply doing what we've been doing, we won't be on the top of the world 10 years from now.

MR. JONES: I would agree with that. In fact, one would suggest that it will escalate more. But, what that does is change the target upon which we can arbitrate Ron's policies. If the company is not there any more, if it is a new creation, or if it is a reformed creation in a shorter and shorter time frame, how do we put Ron's policies into play?

MR. BLACKWELL: Bob, when I use the word "corporation" I wasn't talking just about the Fortune 500. The world is changing very rapidly. I was simply trying to shift our attention to the corporation because it gets too little attention in our discussion of these things, and it really is the driver of our economic fortune, all the prattle about markets notwithstanding.

The corporation is not just big companies, and certainly not just the ones with the names we all recognize. That is changing very rapidly. That is part of the change we have to deal with, hence the importance of the point which Ralph originally raised. In a globalizing world, you do not think about your competitive policy the same way. These are big companies. They had better be fast on their feet because they will die if they are not quick. That implies very different changes for employment policy and for human resource strategy.

We are up for it. We are ready to go for it. Labor organizations think that there is not an iota of human resource that can be wasted here. The knowledge which workers already have that is not being used by the companies that employ them is the great untapped secret of competitive success. In our current industrial relations strategy, we cannot get this, and many managers do not even recognize it exists. But, we certainly can not waste it.

We have to find ways to tap deeply into it, -- the keys that I have seen are three. One is that workers must have some security -- when they contribute what they know about what they do, they are not going to lose their job as a result. Secondly, workers have to be compensated for what they contribute. It does not have to be stock option plans. We actually prefer it be in wages. Thirdly, and most importantly, they have to be given the authority at work to help find the problems and then prescribe the solutions.

Too often, management identifies a problem, and they hire a consultant to prescribe a solution. It's usually a very technology-intensive solution. Then, the problem is that you have to train the workers because they lack

the skills to run the machine that someone has decided is the solution to the identified problem. If, instead, you had a workplace that was correctly organized, workers organized in teams would find the problems and work with management to prescribe the solutions. In the course of this, conduct training in that context, the purpose of which would be clear to everybody as you do it.

MR. CRAVISO: Again, maybe to Lynn's disappointment, I am going to remain in violent agreement with Ron. This might be helpful in terms of pointing a direction for other corporations. And, since I am proud of the company I work for, I will use Lucent as an example.

The nature of the work keeps changing.Today, a production worker in a factory making telephone switches, operates an automated machine run by a CRT computer. If the individual cannot read and cannot do some basic arithmetic calculations, that person is unable to run that line. That one person is running a line that probably would have taken 20 to 30 people 15 years ago because the process was much more labor-intensive.

The fact remains that, in recognizing the transition of work and the requirements of the skill level, corporations often fail to understand the capability of their workers, and they do not step up to addressing the gaps through training. Some companies address the problem by finding alternative ways of producing and then lay off their workers. That is not the right approach.

So, again, I am in violent agreement, but I think there are corporations out there that do take a different approach.

MR. AUERBACH: Rob would you like to jump in here.

DR. ATKINSON: Let me respond by saying I am not in violent agreement.

Ron, I think you paint too black a picture. I have two points to make. If these competitive forces (which are clearly transforming the U.S. economy) and this intense dynamism and change has been so bad, why are we doing so well?

Look at where the Japanese are today. The fundamental reason the Japanese are in trouble is not because they are saving too much or they are saving too little, it is principally because they have not let competition emerge in their economy. If you look at the average price market-up ratio, Japanese manufacturers mark their prices up twice as high as U.S. manufacturers do in the domestic market.

To me, that is a good indicator that the Japanese simply are not facing up to the competition. They do not face competition in their stock market. They have all these rules and regulations. They are able to keep workers on when there is clearly no need to do that when there are surplus workers, even when they cannot really employ them in anything meaningful.

So I think a lot of the competitive pressures in the U.S. economy have driven many positive changes. Companies have to be dynamic and innovative. And 70 percent of the net new jobs in the last five years have come from what are called "gazelles" -- small companies that have grown and doubled in size in four years.

I do not disagree with the issues that you have raised by the new economy. For example, it makes it harder for companies to invest in skills and it makes it harder for companies to invest in R&D. But, it is not all a black-and-white thing and it is not all bad.

My second point is -- Ralph, you said, "Well, I think companies who invest in machinery to lay off workers, that is a bad thing." What worries me about what you are saying is that I can see where companies need to align their interest with workers more often, but this is clearly not always the case. Just this morning, Joel Yudken derided oil companies about cutting costs by automating production.

Essentially, we have increased wealth and wages in this country for the last 100 years because we have figured out how to automate agriculture, we have figured out how to automate manufacturing, and now we are figuring out how to automate services. Sometimes it is done by using machines, sometimes it is done by boosting worker skills, and sometimes it is done by using both in combination. But, I do not think we should be saying we can't automate any more by using machinery. The key is: how do we take care of the workers who are affected by that automation? We should not just throw them out on the street. We can retrain them and hopefully keep them in the company doing something else. Or, we can help them with their transition out of that position.

I think it is a very dangerous precedent to say that we do not want automation in the oil industry any more. If we do not get automation in the oil industry or any other industry in the U.S., we are fundamentally not going to be able to raise wages. The lack of productivity growth in the last 20 years is clearly correlated to the lack of wage growth in the last 20 years. So, if we can figure out a way to raise productivity, we can get back to higher wage growth.

MR. BLACKWELL: I am not usually accused of being black-and-white kind of guy, but I am obviously swallowing the nuance in my argument. I do not remember saying the word "bad." I think there is a lot that is very good, and I think there is a lot that is potentially a lot better. Part of my rhetorical tone is cut against the self-congratulatory tone about the American economy that is so common in these times, and especially in Washington, DC.

Secondly, I certainly did not mean to indicate anything that implied we're going to stop innovation or start smashing the machines. I was talking about the kind of workplace and the kind of employment relationship that allows for us to build collectively a workplace of the future.

We cannot build it on the existence of a given product. We can not build it on horseshoes. Part of the reason why we, the labor movement, need innovation is that it is one of the ways you hold market share as you adjust to a changing economy. That is the way you protect employment, and that is the way you provide employment security.

So there is a virtuous cycle in that if you do it right. If you fail to do it right, then it can turn into a vicious cycle where all the costs of any kind of adverse turn of business are placed on the employees. This is when they start withholding their knowledge and start training themselves for their next job with some other employer -- no knowledge is forthcoming from them, no learning is forthcoming from them, and no cooperation is coming from them. They are looking to the labor market, and they are operating in fear in their current place of employment. In that kind of environment, you obviously are not going to develop products or processes that are going to carry us into the next century.

There was a time not so long ago when the Japanese were congratulating themselves and we were in the tank. All of a sudden it is turned around. If there was reason to suspect their optimism, there might be some reason to suspect our own.

I am just trying to look at what I see as being the context in a changing economy, in which we need to think about training and where workers have things to contribute that are not generally acknowledged. If we can figure out the right employment relationship and the right labor-management relationship, we will have a chance of mining more deeply the potential that our economy actually has -- and maybe then our hopes for the future will be more justified.

MR. HECHT: The economy is changing a lot, and talking about products and training and workers is, to an extent, missing the point of some of these trends.

The trend has been away from product and more towards -- well, something else. Is Windows '98 a product? Is it a service? What is Yahoo? Is it a product? Is it a service? How do you train people at Microsoft? How do you train people at Yahoo? How do you train people at a start-up software company?

There is a disconnect here that bothers me. The apprenticeship programs and the skills of the past do not fit the new economy of the Yahoos and the Microsofts of the future. Now, that is not saying we forget about the

past, but it is saying somehow we have to relate existing education and training to this need for education and training in IT technology.

I am not saying it is easy in a policy sense for government or anybody else, but somehow we have to attack this. We have to attack what it means when we talk about training for the employees at Yahoo and the employees at Microsoft. What does it mean when AT&T breaks up into a bunch of parts and each one has a different goal? And, what does it mean when the product part of the economy in a hard sense goes down and the product part of the economy in an information sense goes up?

MR. YUDKEN: Joel Yudken from AFL-CIO.

While I do not consider myself a Luddite by any stretch of the imagination, I do have some concerns about recent statements on productivity and technological change, especially whether there is an automatic translation into higher wages.

Here's the question: who has the benefits of these higher wages, and who is paying for these higher wages?

I guess the worker who is going to be at the console in headquarters running these refineries probably will have an average higher wage than the workers that are going to be losing their jobs. While there may be a net gain, I think there is a real problem of transition.

How about the union who has the workers in these facilities and is concerned about the transition impacts that this is going to have? They know, and I think they are somewhat resigned that they are going to lose a lot of members because of these kinds of changes. There is no real adequate compensation transition assistance that is going to help these people. Maybe the younger workers will adjust. Problems are significantly worse for the 58-year-old worker, whether it be in a mine or in a refinery, who has waited for retirement and has now lost their job. How are we going to help them bridge that gap? I think that is one big issue.

When we talk about the high-performance work organization, there are different options for how we apply technology. There is a tendency to not ask all of the necessary questions. We just say, "Okay, we can implement this new technology, we'll replace these workers, put a guy on the console, and he'll run the refinery."

Even from a high-performance approach, putting in new technologies with the workers involved, some jobs will probably still be lost. However, if the market grows for that company as a result of the changes, then it may create new jobs. There is always that offset potentially.

I still think that we have a choice about how we introduce and apply technology. Automation is not a given that is somehow coming out from out there, coming into corporations, and then transforming the workplace. People make those choices based on what their goals are and who the stakeholders are. That comes back to, I believe, Ron's point, which is that if you change the stakeholders on how those technologies are applied, you do not necessarily get these large automation impacts.

I just want to make that point. I am looking for a different way of approaching how you utilize technology, how you introduce technology, how you deal with the transition cost for workers, and how you get workers prepared. We need to have workers actively involved in that preparation so they can fully gain from those new technologies. That is not being against technology. That is talking about a different type of technology.

MR. AUERBACH: On that note, I think we have run out of time. Let me offer any last words to Ron, Ralph, and Rob, that they might like to make.

DR. ATKINSON: One last word -- a cartoon I saw the other day said, "Tired of technology? Visit our website -- luddites.com."

(Laughter.)

MR. AUERBACH: Well, with that, let us thank our speakers and respondent. I think they did a wonderful job.

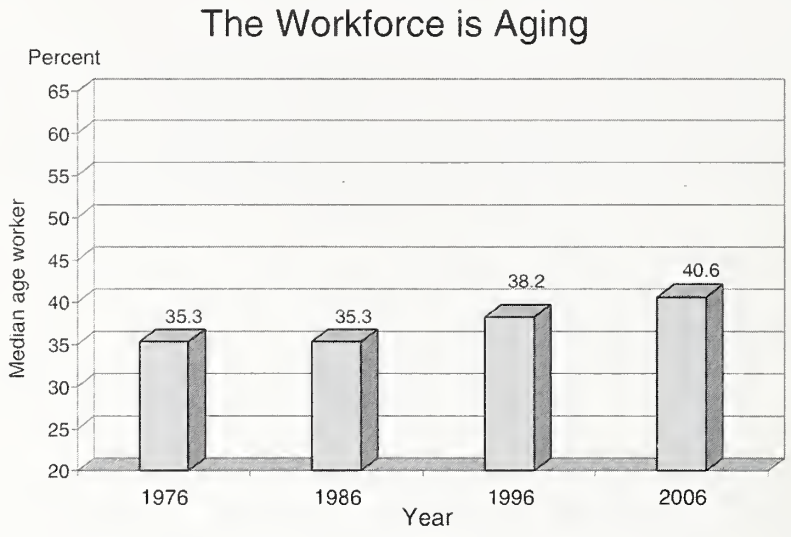
(Applause.)

MR. AUERBACH: And any last thoughts from our hosts, Harry from NIST, or perhaps Tony, representing NPA?

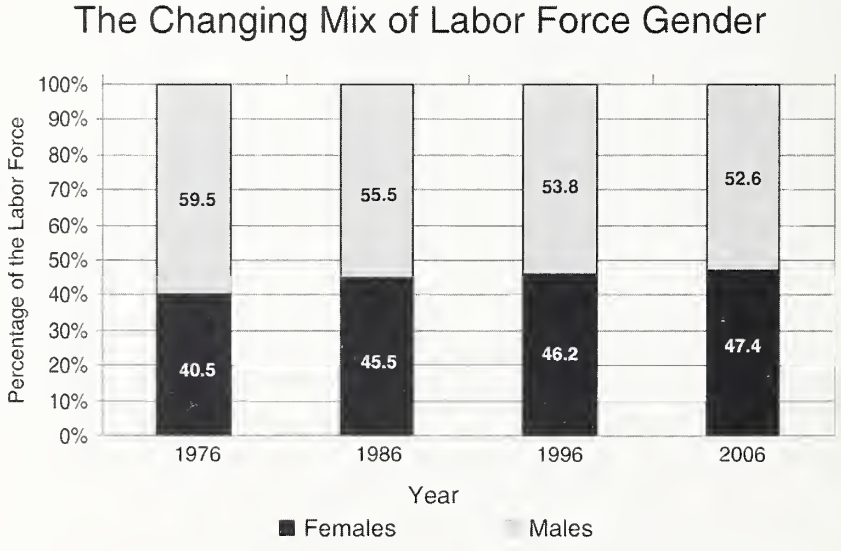
DR. HERTZ: Thank you, everybody, for coming. Thank you for a lively discussion. You will be getting a summary of this conference in the future. This has certainly sparked thoughtful endeavors for all of us, for the Baldrige program as we look at our future Baldrige criteria and for NPA as they look at their future undertakings.

MR. AUERBACH: Thank you one and all.

(Whereupon, the conference was concluded.)

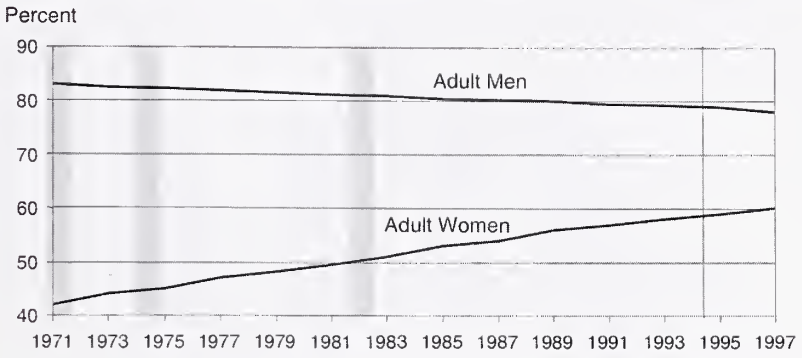


Source: Howard N. Fullerton, Jr., "Labor Force 2006: Slowing Down and Changing Composition," Monthly Labor Review, November 1997, pp. 23-38, Table 9, p. 36.



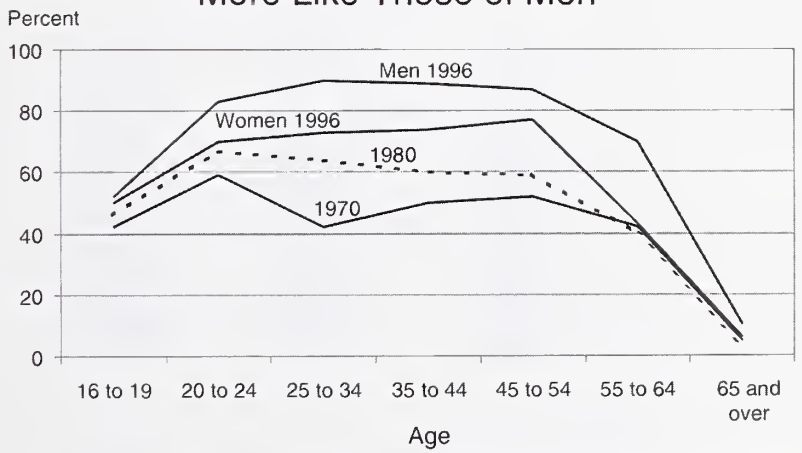
Source: Howard N. Fullerton, Jr., "Labor Force 2006: Slowing Down and Changing Composition," Monthly Labor Review, November 1997, pp. 23-38.

The Labor Force Participation Rate for Adult Women has Risen Sharply Over the Past Several Decades



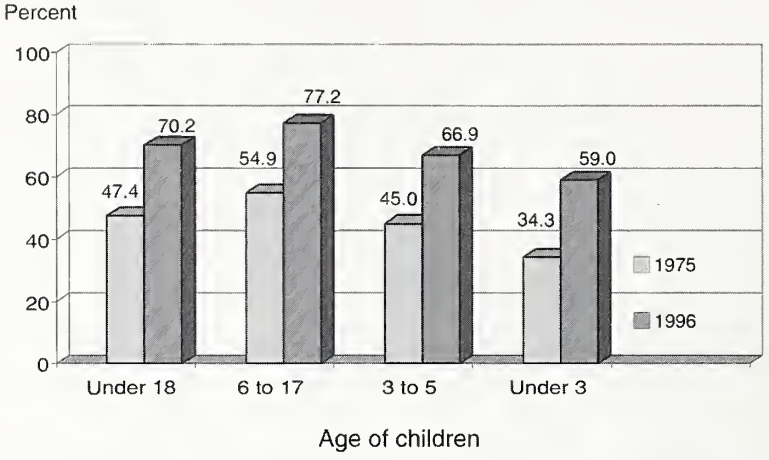
NOTE: Shaded areas represent recessions. Beginning in 1990, data reflect 1990 census-based population controls, adjusted for the estimated undercount. Beginning in 1994, data reflect the introduction of a major redesign of the Current Population Survey. Beginning in 1997, data incorporate revisions in the population controls used in the survey. These changes affect comparability with data for prior periods.
Source: Bureau of Labor Statistics

Women's Participation Patterns are Now More Like Those of Men



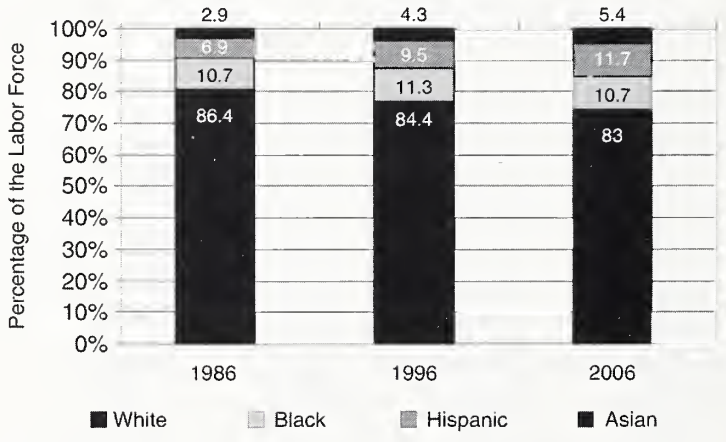
NOTE: Beginning in 1990, data reflect 1990 census-based population controls, adjusted for the estimated undercount. Beginning in 1994, data reflect the introduction of a major redesign of the Current Population Survey. SOURCE: Bureau of Labor Statistics

Labor Force Participation has Increased Dramatically Among Mothers



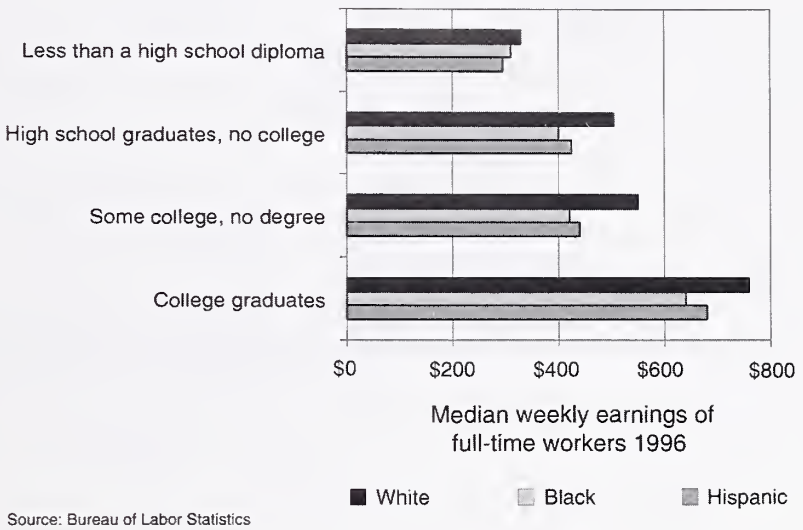
NOTE: Beginning in 1990, data reflect 1990 census-based population controls, adjusted for the estimated undercount. Beginning in 1994, data reflect the introduction of a major redesign of the Current Population Survey. SOURCE: Bureau of Labor Statistics

The Changing Mix of Labor Force by Ethnicity



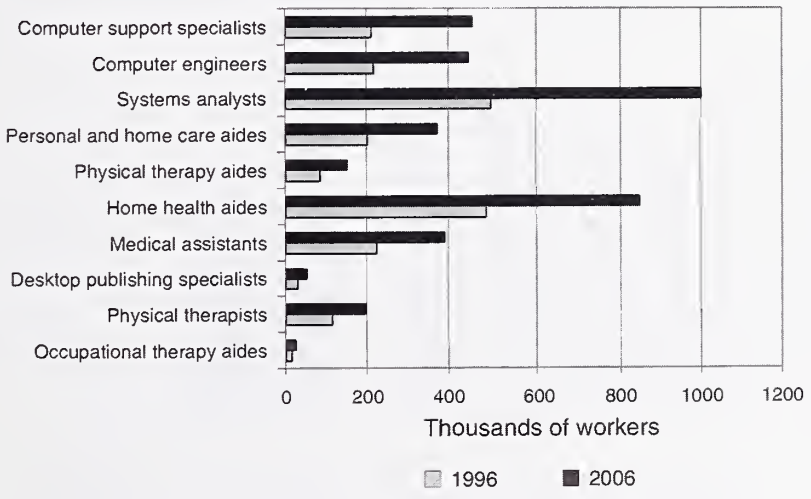
Source: Howard N. Fullerton, Jr., "Labor Force 2006: Slowing Down and Changing Composition," Monthly Labor Review, November 1997, pp. 23-38, Table 1, p. 24.

Education Pays for Everyone, Regardless of Race or Ethnicity



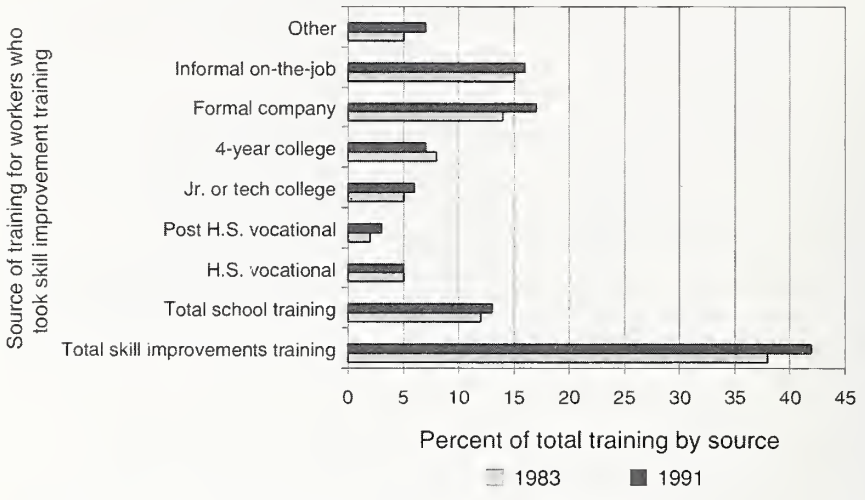
Source: Bureau of Labor Statistics

Ten Fastest Growing Occupations, 1996-2006



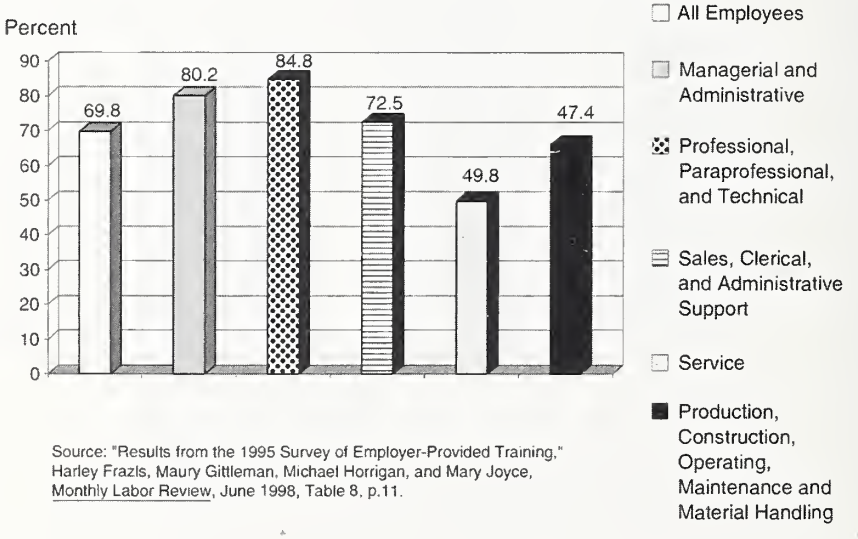
Source: George T. Silvestri, "Occupational Employment Projections to 2006," Monthly Labor Review, November 1997, pp. 58-82, Table 3, p. 77.

Employers Are the Primary Source of Skill Improvement Training



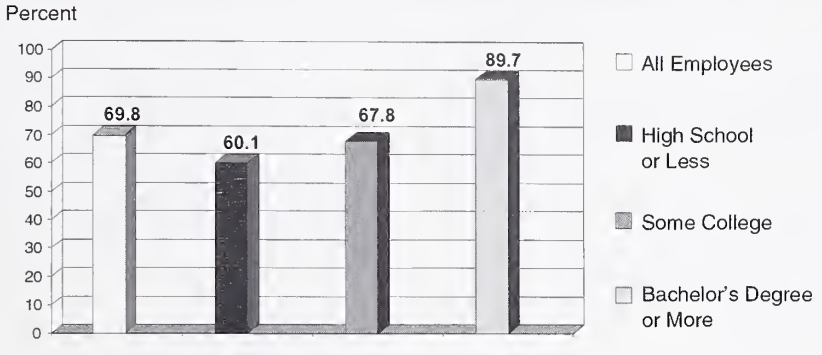
Source: Bureau of Labor Statistics. Current Population Survey. January 1983 and 1991.

Percent of Employees Who Received Formal Training in the Last 12 Months by Occupation - 1995



Source: "Results from the 1995 Survey of Employer-Provided Training," Harley Frazis, Maury Gittleman, Michael Horrigan, and Mary Joyce, Monthly Labor Review, June 1998, Table 8, p.11.

Percent of Employees Who Received Formal Training in the Last 12 Months by Educational Attainment - 1995



Source: "Results from the 1995 Survey of Employer - Provided Training," Harley Frazis, Maury Gittleman, Michael Horrigan, and Mary Joyce, Monthly Labor Review, June 1998, Table 7, p. 10.

Participants List

How Are Companies and Workers Preparing for the Workforce of the Future?
March 15-16, 1999
National Institute of Standards and Technology, Gaithersburg, MD

C. Michael Aho
Chairman, Aho Global Economic Consulting
Professor, Columbia University

Rob Atkinson
Director, Technology Innovation &
New Economy Project
The Progressive Policy Institute

James Auerbach
Sr. Vice President
National Policy Association

Steven M. Barney, FACHE
Sr. V.P. of Human Resources
SSM Health Care

Ronald Blackwell
Director of Corporate Affairs
AFL-CIO

Melvin Blumberg
Prof. of Management
Penn State Harrisburg

Kelly H. Carnes
Asst. Secretary for Technology Policy
(Designate)
U.S. Department of Commerce

Ralph P. Craviso
V. P. of Workforce Effectiveness
Lucent Technologies

James W. Dean, Jr.
Associate Dean
Kenen Flagler Business School
University of North Carolina

Barry Diamondstone
Deputy Director
National Quality Program, NIST

Kenneth R. Edwards
Director Research & Technical Services
Internat'l. Brotherhood of Elec. Workers

Patrick L. Forth
Comptroller
Mid-Atlantic Region, UNITE

Marvin Fooks
Adjunct Prof. of Economics
Montgomery College

Susan G. Goldberg
Organizational Development Analyst
The Arbitron Company

Randy Hale
President
Hale Associates

Laurence W. Hecht
President
Associates for Competitiveness

Bruce Herman
Director
AFL-CIO Working for America Institute

Harry Hertz
Director, National Quality Program
NIST

Roberts Jones
President & CEO
National Alliance of Business

Raymond Kammer
Director, NIST

Trudye Khan
Assistant Regional Director
Mid-Atlantic Region, UNITE

Pamela Kurstedt
Asst. Dean, College of Engineering
Virginia Tech

Anne Leventry-Jeffers
Director of Human Resources
Ball Horticultural Co.

Richard Linowes
Professor of Business Policy
American University, KCBA

Norman E. Lorentz
Sr. VP, Chief Technology Officer
U.S. Postal Service

Joel D. Marvil
Chairman & CEO
Ames Rubber Corporation

Mary McCain
V.P. of Policy and Public Affairs
American Society for Training and Development (ASTD)

Richard McGahey
Assistant Secretary for Pension and Welfare Benefits
Pension and Welfare Benefits Administration
U.S. Dept. of Labor

James McKenney
Director of Economic & Internat'l. Services
American Association of Community Colleges

Joyce D. Miller
President
Social Policy Initiatives

Robert R. Miller
V.P. Mfg. Admin. (retired)
Harley-Davidson

Nancy Mills
Director
AFL-CIO Center for Workplace Democracy

Edward Montgomery
Sr. Advisor to the Secretary of Labor
U.S. Dept. of Labor

Bruce Mullkoff
V.P. of Human Resources
Dana Commercial Credit

Jack Navarro
V.P. of Labor Relations
Bell Atlantic

Tom O'Gara
Director of Labor Relations
Bell Atlantic

Rudy Oswald
Economist in Residence
George Meany Center for Labor Studies

Robert Pleasure
Executive Director
Center to Protect Workers' Rights

Carol Pletcher
Asst. Vice President
Cargill

Anthony Quainton
President and CEO
National Policy Association

Leo Reddy
President
Nat'l. Coalition for Advanced Manufacturing

Ralph Richter
Program Analyst
Office of the Director, NIST

Stephen Rose
Sr. Economist
Educational Testing Service

Howard Samuel
Sr. Fellow
National Policy Association

Nancy Sedmak
Managing Editor
Labor Relations Reporter, BNA

Stephen R. Sleigh
Director of Strategic Resources
Int. Assoc. of Machinists & Aerospace Wkers

Susan Marx Smock
Senior Advisor
Office of the Assistant Secretary for Policy
U.S. Dept. of Labor

Deborah Smyth
National Quality Program, NIST

Roland Spant
Labor Counselor
Embassy of Sweden

Sara Torrence
Public and Business Affairs
NIST

Mark Troppe
Manager, People Systems
MEP, NIST

Brian Turner
Director of Research and Communications
AFL-CIO Working for America Institute

Lynn Williams
President (Retired)
United Steelworkers of America

W. Willard Wirtz
Former U.S. Secretary of Labor

Joel Yudken
Sectoral Economist/Technology Policy Analyst
AFL-CIO Public Policy Department

Marilyn Zuckerman
Vice President
National Policy Association