Trends, Models, and New Approaches:

A Review of Futurist Literature with Implications for Program Development in Georgia's Technical Colleges

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August 2001

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Introduction

Economists, policy makers, business leaders, and educators agree that all businesses and careers will be transformed by new technologies often in unpredictable ways (Centron & Davis, 2001). Identifying trends as they emerge is important for institutions, agencies, and businesses striving to maintain and advance their mission into the twenty-first century. The purpose of this report is to provide a review and summary of the trends and new approaches which are emerging and that have implications for developing educational programs in Georgia Technical colleges. Major forces shaping the future which are applicable at the state, national, and international levels are described, followed by information based on data and trends in the state of Georgia.

Major Trends Influencing the Future

Forecaster Marvin Cetron and science writer Owen Davies report annually on forces changing the world. In their report for 2001, they report major trends and implications for individuals and organizations, including policy makers. A summary of the major technology, workplace, management and institution trends and related implications from an article in the March-April 2001 issue of *The Futurist* follows.

Technology Trends

Technology increasingly dominates both the economy and society.

Technological advances directly affect the way people live and work. Mundane commercial and service jobs, environmentally dangerous jobs, and assembly and repair of space-station components in orbit increasingly will be done by robots. The engineering, technology, and health industries will all grow rapidly, and many new biotechnology jobs will open up.

Implications: New technologies often require a higher level of education to use them effectively and provide dozens of new opportunities to create businesses and jobs.

Research and development play a growing role in the economy.

R&D outlays are growing most rapidly in the information technology, electronics, biotechnology, aerospace, pharmaceuticals, and chemical industries.

Implications: The demand for scientists, engineers, and technicians will continue to grow.

Advances in transportation technology will speed travel and shipping, both on land and in the air.

The U.S. airline industry will begin to replace the spokes of its existing hub-and-spoke system with high-speed trains for journeys of 100-150 miles. Advances in automobile technology are rapidly giving us the "smart car". Between 2005 and 2010, fuel-efficient hybrid gas-electric cars will begin to win market share from traditional gas guzzlers. To reduce the number and severity of traffic accidents, trucks will be exiled to car-free lanes. Airline crashes will decline thanks to technical advances.
Implications: One of the fastest growing transport industries is trucking.

The pace of technological change accelerates with each new generation of discoveries and applications.

The design and marketing cycle - idea, invention, innovation, imitation - is shrinking steadily. In 1940 the product cycle was 30 or 40 years, now it is 30 or 40 weeks. All the technological knowledge we work with today will represent only 1% of the knowledge that will be available in 2050.
Implications: Industries will face much tighter competition and those who adopt state-of-the-art methods first will prosper.

Important medical advances will continue to appear almost daily.

Medical knowledge is doubling every eight years. The Human Genome Project has already begun to yield promising new treatments for genetic diseases. Because of medical advances, the need for hospital and hospice care could plummet. The ethical issues raised by technology will cause a growing public debate.
Implications: Five of the 10 fastest-growing jobs in the next decade will be in the health-care industry, but the hiring frenzy will play out by 2025. Nearly all of these jobs will require at least two years of college-level training, and many will require four.

The Internet is growing logarithmically and globally.

By 2010, most of the United States will be "wired" for high-speed data access. By 2015, most of the rest of the world will follow. Most Internet communications are commercial, business-to-business, rather than personal e-mail. Internet-based commerce will achieve sales of over $1 trillion per year by 2002, in part because the Internet is the largest tax-free zone in the world.
Implications: Internet-based operations require more sophisticated, knowledgeable workers. Technically trained people will be in short supply for the next 15 years, as virtually every business in the world competes for their services.

Trends in Labor Force and Work

Education and training are expanding throughout society.

Rapid changes in the job market and work-related technologies will necessitate increased training for virtually every worker. Automation, international competition, and other fundamental changes in the economy are destroying the

few remaining well-paid jobs that do not require advanced training. A substantial portion of the labor force will be in job retraining programs at any moment. Much of this training will be carried out by current employers, who have come to view employee training as a good investment.
Implications: Both management and employees must get used to the idea of lifelong learning. As the digital divide is erased, groups now disadvantaged will be increasingly able to educate and train themselves for high-tech careers.

Specialization is spreading throughout industry and the professions.

For professionals and technicians, the size of the body of knowledge required to excel in a particular area precludes excellence across all areas. The information-based organization is dependent upon its teams of task-focused specialists. Corporations will turn to consultants and independent contractors who specialize more and more narrowly as markets globalize and technologies differentiate.
Implications: This trend creates new niche markets for small businesses and more career choices as old specialties quickly become obsolete, but new ones appear even more rapidly.

Services are the fastest-growing sector of the global economy.

Service jobs have replaced many of the well-paid positions lost in manufacturing, transportation, and agriculture. These new jobs, often part time, pay half the wages of manufacturing jobs. On the other hand, computer-related service jobs pay much more than the minimum for those with sound education and training. Some of the fastest growth is in some of the least-skilled occupations such as cashiers and retail sales.
Implications: Services are now beginning to compete globally, just as manufacturing industries have done over the last 20 years.

Women's salaries are beginning to approach equality with men's.

Women's salaries in the US grew from 61% of men's in 1960 to 74% in 1991. This figure soon will top 83%. In the future, women's average income could exceed men's income. College graduates enjoy a significant advantage in earning; today, some 70% of young women enroll in college, compared with only 64% of young men. Older women should find it easier to reach upper-management positions.
Implications: More new hires will be women. The glass ceiling has been broken.

Workers are retiring later as life expectancy stretches.

People will increasingly work at one career, "retire" for a while when they can afford it, return to school, begin another career, and so on in endless variations. True retirement, a permanent end to work, will be delayed until very late in an extended life.
Implications: Older workers will partially make up for the shortage of entry-level employees.

Unions are losing their power.

One reason for the decline is that jobs now are free to move around the globe from heavily unionized areas to regions where unions are less well established. Another reason is the increased use of robots. The third reason is the high cost of strikes.

Implications: The old paradigm of unions vs. corporations is obsolete. In today's economy, workers negotiate alongside management, winning shared bonuses.

Second and third careers are becoming common, as more people make mid-life changes in occupations.

The fast pace of technological change makes old careers obsolete, even as new ones open up to replace them. Boomers and their children will have not just two or three careers, but five, six, or even more, depending on how quickly science further extends the human life-span.

Implications: Most people will have to study for their next occupation even as they pursue their current career.

The work ethic is vanishing.

Job security and high pay are not the motivators they once were. Gen X'ers watched their parents remain loyal to their employers, only to be downsized out of work. For Generation X, the post-baby-boom generation, work is only a means to their ends: money, fun, and leisure.

Implications: The new generations must be coddled, paid well, and made to feel appreciated. Training is crucial. Without opportunity to learn new skills, young people will quickly find another job that will help them prepare for the rest of their career.

Two-income couples are becoming the norm.

Between 1996 and 2006, the number of women employed in the US will grow from 61.8 million to 70.6 million, an increase of 14%. By 2005, 63% of working-age women will be in the labor force, up from 58.8% in 1996. In 75% of households, both partners will work full time by the year 2005, up from 63% in 1992.

Implications: Demand for on-the-job child care, extended parental leave, and other family–oriented benefits can only grow.

Generation X and dot-com will have major effects in the future.

Members of Generation X - roughly, the 30-something cohort - and especially of generation dot-com, now entering their 20s, have more in common with their peers throughout the world than with their parents' generation.

Implications: Employers will have to adjust virtually all of their policies and practices to the values of these new and different generations. Generations X and dot-com thrive on challenge, opportunity, training - whatever will best prepare them for their next career move. Cash is just the beginning of what they expect.

Entry-level and low-wage workers will be scarce.

The declining birthrate in the 1960s and 1970s means that fewer young people are entering the job market today. The number of jobs is increasing, creating entry-level labor shortages. Colleges, business, and the military will vie for youths 16 to 24 years old, who shrank from 20% of the labor force in 1985 to 16% in 2000. *Implications:* Employers will see more entry-level candidates with college degrees and technical training. Generation X has, on average, two more years of college than its parents, and X'ers are almost all computer literate.

Time is becoming the world's most precious commodity.

In the U.S., workers spend about 10% more time on the job than they did a decade ago. In this high-pressure environment, single workers and two-income couples are increasingly desperate for any product that offers to simplify their lives or grant them a taste of luxury - and they can afford to buy it.
Implications: Stress-related problems with employee morale and "wellness" will continue to grow. Companies must help employees balance their time at work with their family lives and need for leisure.

Management Trends

More entrepreneurs start new businesses every year.

Workers under 30 would prefer to star their own company, rather than advance through the corporate ranks. A large majority simply distrust large institutions. *Implications*: This is a self-perpetuating trend. Specialty boutiques will continue to spring up on the Internet for at least the next 20 years.

Information-based organizations are quickly displacing the old command-and-control model of management.

The typical large business is struggling to reshape itself. Soon, it will be composed of specialists who rely on information from colleagues, customers, and headquarters to guide their actions. Management styles will change as upper executives learn to consult with these skilled workers on a wide variety of issues. Decision processes, management structure, and modes of work are being transformed as businesses learn to use information generated by computer data that have been analyzed, synthesized, and organized in useful ways. Upper management will no longer give detailed orders to subordinates.
Implications: "Downsizing" increasingly will spread from manufacturing industries to the service economy. Again, this process encourages the entrepreneurial trend, both to provide services for companies outsourcing their secondary functions and to provide jobs for displaced employees.

A typical large business in 2010 will have fewer than half the management levels of its counterpart in 1990, and about one-third the number of managers.

Computers and information-management systems have stretched the manager's effective span of control from six to 21 subordinates. Information now flows from front-line workers to higher management for analysis. Thus, fewer mid-level managers are needed, flattening the "corporate pyramid". Downsizing,

restructuring, reorganization, outsourcing, and cutback of white-collar workers will continue through 2006. Information-based organizations will have to make a special effort to prepare professional specialists to become business executives and leaders.

Implications: Top managers will have to be computer literate to retain their jobs and must make sure they achieve the increased span of control that computers make possible.

Government regulations will continue to take up a growing portion of the manager's time and effort.

Since the U.S. Congress passed regulatory reform laws in 1996, more than 14,000 new regulations have been enacted.

Implications: Regulations, though both necessary and unavoidable, amount to a kind of friction that slows both current business and future economic growth. Their proliferation in the developed world could give a competitive advantage to countries such as India and China.

Institutional Trends

Multinational corporations are uniting the world, but also growing more exposed to its risks.

By 2005, parts for well over 50% of the products built in the United States will originate in foreign countries. Multinational corporations that rely on indigenous workers may be hindered by the increasing number of AIDS cases in Africa and around the world.

Implications: It is becoming ever more difficult for business to be confident that decisions about plant location, marketing, and other critical issues will continue to appear wise even five years into the future. All long-term plans must include an even greater margin for risk management.

This international exposure included a greater risk of terrorist attack.

Nothing will prevent small, local political organizations and special interest groups from using terror to promote their causes.

Implications: Western corporations may have to devote more of their resources to self-defense, while accepting smaller-than expected profits from operations in the developing countries.

Consumers increasingly demand social responsibility from companies and each other.

Companies will increasingly be judged on how they treat the environment. Safety testing of children's products also enforces corporate responsibility.

Implications: For industry, this represents one more powerful pressure to adopt "environmentally friendly" technologies, to work with area schools and community groups, and to participate in other local activities.

Institutions are undergoing a bimodal distribution: the big get bigger, the small survive, and the midsized are squeezed out.

By 2010, there will be only five giant automobile firms. By 2005, just three major corporations will make up the computer hardware industry: IBM, Compaq, and Dell. By 2005, there will be only three domestic airline carriers.
The 2000s will be our second decade of micro-segmentation as more and more highly specialized businesses and entrepreneurs search for narrower niches. These small firms will prosper, even as midsized, "plain vanilla" competitors die out. This trend extends to retail, hotels, restaurants, hospitals, agriculture, banks, and financial institutions.
Implications: Thus far, industries dominated by small, regional, often family-owned businesses have been relatively exempt from the consolidation now transforming many other businesses. Takeovers are likely even in these industries in the next decade.

In their book, *Workforce 2020,* Judy and D'Amico (1997) lay out the general contours of the employment landscape for the first 20 years of the 21st Century. Based on the work of economists, education experts, and policy researchers at Hudson Institute, *Workforce 2020* offers ideas about what lies ahead and what Americans should do to prepare for the journey to 2020. The major trends they identify as the formation for the future employment landscape they envision include the following: Rapid technological change; Global integration of the US economy; Rapid economics growth in certain developing nations; Deregulations and liberalization, both nationally and globally; and Demographic changes, especially the aging of the baby boomers. Their observations reinforce those of Centron and Davies. A brief description of each trend follows.

1. **The pace of technological change in today's economy has never been greater.**
    a. Automation will continue to displace low-skilled or unskilled workers in America's manufacturing firms and offices.
    b. The development, marketing, and servicing of ever more sophisticated products almost certainly will create more jobs than the underlying technology will destroy.
    c. The best jobs created in the Innovation Age will be filled by Americans to the extent that workers possess the skills required to compete for them and carry them out.
    d. Because the best new jobs will demand brains rather than brawn, and because physical presence in a particular location at a particular time will become increasingly irrelevant, structural barriers to the employment of women and older American will continue to fall away.

2. **Communications and transportation costs have plummeted, resulting in what some have called "the death of distance".**
    a. Manufacturing will continue to dominate U.S. exports.
    b. Globalization will affect low-skilled or unskilled American workers very differently, as these workers compete for jobs and wages not just with

their counterparts across town or in other parts of the U.S., but also with low-skilled workers around the world.

c. Manufacturing's share of total U.S. employment will continue to decline, due to the combined effects of automation and globalization; however, the millions of high-productivity manufacturing jobs that remain will be more highly skilled and therefore better paid than at any other time in U.S. history. Employment growth will remain concentrated in services, which will also benefit increasingly from export markets and will offer high salaries for skilled workers.
d. Globalization and technological change will make most segments of the U.S. economy extremely volatile, as comparative advantages in particular market segments rise and then fall away. Small- and medium-sized firms will be well situated to react to this volatility, and their numbers will grow. Labor unions will cope badly. Individual workers will change jobs frequently over time.

3. **By 2020, almost 20 percent of the U.S. population will be 65 or older. There will be as many Americans of "retirement age"as there are 20-35-year olds.**
   a. America's taxpayer-funded entitlements for its aging population are likely to undergo profound changes in the next two decades.
   b. Some who reach age 65 will continue to require outside income and will be unable to retire.
   c. America's aging baby boomers will constitute a large and powerful segment of the consumer market. Demand for entertainment, travel, and other leisure-time pursuits; specialized health care; long-term care facilities; and accounting, home-repair, and other professional services will fuel strong local labor markets.

4. **The U.S. labor force continues its ethnic diversification, though at a fairly slow pace.** Most white non-Hispanics entering America's early twenty-first workforce simply will replace exiting white workers; minorities will constitute slightly more than half of net new entrants. The aging of the U.S. workforce will be far more dramatic than its ethnic shifts.

Jobs and Careers for the Future

Information technology remains the best field in which to find a job (*21st Century Skills for 21st Century Jobs*, 1999, p. 5). Virtually every industry today depends on computers, from financial services to auto manufacturing. Health care is a growth business thanks to baby boomers living extended lives. Among declining occupations are private child-care workers and textile machine operators. Following are the jobs in which the Bureau of Labor Statistics predicts the most growth from 1998 to 2008 and their projected growth: computer engineers, 108%; computer support specialists, 102%; systems analysts, 94%; database administrators, 77%; desktop publishing specialists, 73%; paralegals and legal assistants, 62%, personal care and home health aides, 58%, and medical assistants, 58%. Eight of these 10 jobs require postsecondary or continuing

education; the three fastest-growing positions generally require college degrees. Other rapidly growing jobs include physician assistant, drafter, paralegal, emergency medical technician, construction manager, dental hygienist, computer programmer, licensed practical nurse, machinist and tool programmer, and dietician and nutritionist (*10 Hot Jobs*, 1999, pp. 26-27).

The Hudson Institute publication by Judy and D'Amico (1997) reviewed Bureau of Labor Statistics data as the basis for the following conclusions about changes in work, compensation, and occupations. The BLS has projected changes for the number of workers in more than 500 specific occupations between 1994 and 2005. Some occupations will obviously grow much more than others. White-collar jobs will grow rapidly; in particular, there will be a 29 percent gain in jobs for professionals and a 23 percent gain in service positions. On the other hand, three blue-collar job categories (Agriculture, forestry, fishing, and related occupations; Precision production, craft, and repair occupations; and Operators, fabricators, and laborers) are either shrinking or growing very slowly.

The authors conclude that if we consider only net job growth, blue-collar jobs seem to be disappearing. But when we look at the more relevant number – job openings, as opposed to net new jobs – we see that blue-collar positions fare much better: the disparity between white-collar and blue-collar occupations is far smaller. It is true that positions for professionals, for service personnel, and in marketing will show the largest gains: in each case, job openings over the eleven-year period will equal 48 percent of all 1994 jobs. But there will also be many jobs to be filled in the three blue-collar occupations: openings from 1994 through 2005 will range from 26 to 33 percent of all 1994 jobs. Similarly, administrative-support positions - a relatively low-skilled white collar category – will grow by only 4 percent; but because of turnover, job openings in this field will equal 30 percent of all 1994 employment.

The authors further suggest technological change does not mean that blue-collar jobs and relatively low-skilled white-collar ones will disappear. Rather, they propose that that eventually the share of blue-collar and unskilled jobs available to newcomers to the workforce will shrink dramatically, about twenty-five years after it was first predicted to happen. "Our task in years ahead is to improve our educational system and the functions of our labor markets. We will need to do more to prepare new workers for an economy in which most jobs will require better skills and higher levels of knowledge than most entering workers posses today" (p. 75).

According to Judy and D'Amio, (1995) "Net job growth will be greatest in three categories: professionals, service workers, and technicians. These three categories will account for nearly 60 percent of all new jobs in these years" (p. 77). Although hundreds of occupations will grow, twenty-five occupations will account for an impressive 22 percent of the economy's net job growth during the period through 2005. Significantly, eight of them – accounting for 55 percent of the new jobs to be filled in all twenty-five occupations – require great skill or substantial experience. Nine of the listed occupations

are in heath care; most of the employment growth here, on the other hand, will be for low-skilled to semi-skilled workers. The 25 fastest growing occupations and the percent change in employ for the 10-year period 1994-2005 are listed in Table 1.

Table 1: 25 Fastest Growing Occupations in 1994-2005

Occupation	**Percent change in employment**
Personal & home care aides	118%
Home health aides	102%
Systems analysts	92%
Computer engineers	91%
All other computer scientists	90%
Physical therapists	79%
Residential counselors	76%
Human services workers	74%
Medical assistants	59%
Paralegals	59%
Teachers, special education	53%
Amusement and recreation attendants	52%
Corrections officers	51%
Guards	48%
All other health service workers	43%
Dental hygienists	42%
Dental assistants	42%
Adjustment clerks	40%
Sales workers in securities and financial services	36%
Bill and account collectors	37%
Emergency medical technicians	36%
Management analysts	35%
Bakers, bread and pastry	35%
Instructors and coaches, sports and physical training	35%
Food service and lodging managers	33%
All 25 occupations	57%
Source:Bureau of Labor Statistics	

Fewer than a million jobs will disappear in the 25 rapidly shrinking occupations, whereas close to four million will be created in the rapidly growing ones (Judy & D'Amico, 1995). What the 25 shrinking occupations have in common is that they require a medium level of skill or education; for the most part, these are actually not jobs for low-skilled workers. According to Judy and D'Amico, "Most of the jobs will be lost because information technology is enabling machines to substitute for human labor" (p. 79) and

"The fastest growing jobs require much higher math, language, and reasoning capabilities…., while slowly-growing jobs require less" (p. 83).

Other writers note the impact of technological changes on the skills requirements for workers. Gordon (2000), in a book titled *Skill Wars: Winning the Battle for Productivity and Profit*, uses the term the "people paradox" and notes:

> Since the 1970s, the driving force behind the new industrial/technological revolution has been the explosive growth of computer, robots, "digital factories," and team/quality management systems. Yet by education and training, only 20 percent of all American workers can fit well into this demanding new high-tech workplace. The poor fit between available jobs and available workers is the people paradox that's been emerging in this last decade of the twentieth century. Blizzards of business, government, and think-tank reports contend that the other 80 percent of the nation's workforce lack the required skills and problem-solving abilities to participate fully in this revolution. (p. xvii)

Responding to Economic and Technology Trends

While there is generally consensus regarding the major trends brought about by rapidly advancing technology and demographic shifts and how that affects careers and jobs for the future, there are varying opinions on the implications for business, industry, government, and education. The ideas of several authors who offer different perspectives follow.

The book, *Skill Wars: Winning the Battle for Productivity and Profit,* by Edward E. Gordon (2000) focuses on the need for business to recognize the importance of "workforce education" in the preparation of "knowledge workers" as a key asset linking jobs-knowledge-profit in every organization. Recognizing that businesses now need fewer people because of technical advances, but that they need far better educated people, he predicts "it will be in the twenty-first century that management realizes that the so-called 'knowledge worker' (someone whose head is more important this his hands) has become a key business asset that links jobs-knowledge-profit in every organization. What we mean by 'knowledge' is simply 'finding a better way to do things'" (p. 7). According to Gordon,

> A 'people paradox' exists because, as …technological breakthroughs have multiplied throughout the U. S. economy, the 'education bar' has risen faster than the supply of knowledge workers. The workforce education our employees must have is much more sophisticated than 'skills' training. Math, science, communication, and computer skills are critical for today's employees. Even professionals, such as engineers, need to be comfortable operating in teams and communicating with earthlings who know nothing about circuit board design or quantum mechanics. With technology changing so rapidly, employers will want all employees to continuously update their technical and people-management skills. When discussing 'training,' we mean the information that changes all the time. But all employees will also need some additional education. These are the

> foundational building blocks they need to better process (i.e., comprehend) the explosion in work-related knowledge." (p. 13)

Gordon (2000) proposes that business has a leadership role to play in planning and delivering workforce education. This role is in collaboration with others in the community including union leaders, employees, parents, politicians, government leaders, educators, and trainers. "For those local economies that choose to participate, this will mean that a larger number of well-educated Americans will qualify for high-skill/high-wage jobs that yield business greater productivity and profit in the competitive high-performance workplace" (p. 16). At the center of every high performance workplace is workforce education. The book lays out the design of the Workforce Education Triad as a new business performance learning system composed of three essential building blocks which build upon each other toward a goal of personal innovation.

> The first component of the Triad is 'Skill', education to raise overall comprehension or fluency in writing, reading, math, foreign language or English as a second language. Skill requirements are no longer basic, but complex technologies will require a 12^{th} or 13^{th} grade level of reading and math comprehension for essential business tasks. The second component of the Triad, 'Training', includes fundamental knowledge of how a business operates. Examples of areas for training include supervision, sales, project management, service, assembly techniques, and other business behaviors. In the Workforce Education Triad, skills and training are prerequisites for the third component, 'Education'. Education is defined as the abstract-reasoning abilities and critical-thinking skills for problem solving, empowerment, decision making, personal creativity, quality programs, ISO-9000, advanced technical or professional education, and career education/apprenticeships for either school-age students or the present workforce. (p. 42)

The author offer a strategic plan to develop intellectual capital to enhance business capital with the following steps.

1. Redefine Schooling – Provide business with more "knowledge workers" by increasing the segment of well-educated American from 25 percent to 50 percent.
2. Adopt concepts from learning organizations, corporate university and lifelong learning using computer-based training, distance learning, in-house programs and external consultants to provide opportunities for degree/credit programs.
3. Implement Return on Investment Education (ROI). What is the exact return-on-investment (ROI) of each workforce education program supported by a business? Realistic ROI models and accounting practices may be used to create a new business revenue driver and profit center. (p. 45).

Gordon (2000) contends that what this strategy translates into is a new Twenty-First-Century Knowledge Economic Model encompassing policy, practice, and profit which ensures that the labor force receives an education that is not behind the times (p. 45). He offers a number of ideas that the United Stated can adapt from the performance

improvement programs of Europe and Asia, including skill standards, career concentrations mandated by state law, student choice, flexible career preparation, shared economic investment, improved teacher preparation, local program management, and parental involvement.

Jeremy Rifkin, President of the Foundation on Economics Trends in Washington, D.C. is a best-selling author and a fellow at the Wharton School Executive Education program where he lectures CEOs and corporate management from around the world on new trends in science and technology and the impacts on the global economy. In his book, *The End of Work,* Rifkin (1995) proposed that we are entering a new phase in world history in which fewer and fewer workers will be needed to produce the goods and services for the global population. *The End of Work* examines the technological innovations and market-directed forces that are moving us to the edge of a near workerless world. He explores "the promises and perils of the Third Industrial Revolution" and addresses "the complex problems that will accompany the transitions into a post-market era" (p. xvi). Rifkin differs from authors who suggest that displaced workers will be absorbed in the economy in the service sector or new occupations. He notes:

> In the past, when new technologies have replaced workers in a given sector, new sectors have always emerged to absorb the displaced laborers. Today, all three of the traditional sectors of the economy – agriculture, manufacturing, and service – are experiencing technological displacement, forcing millions onto the unemployment rolls. The only new sector emerging is the knowledge sector, made up of a small elite of entrepreneurs, scientists, technicians, computer programmers, professional educators and consultants. While this sector is growing, it is not expected to absorb more than a fraction of the hundreds of millions who will be eliminated in the next several decades in the wake of revolutionary advances in the information and communication sciences. (p. xvii).

The End of Work (Rifkin, 1995), chronicles the history of work and employment through three phases of the Industrial Revolution, resulting in the decline of the global labor force characterized by no more farmers, blue collar, or service workers. The price of this progress is described as follows.

> Two different Americas are emerging as we make the turn into the twenty-first century. The new high-technology revolution is likely to exacerbate the growing tensions between rich and poor and further divide nation into two incompatible and increasingly warring camps. The signs of social disintegration are everywhere. (p. 177)

Rifkin urges us to move beyond the delusion of retraining for nonexistent jobs and prepare ourselves for a world in which mass employment in the production of goods and services is phased out. Innovative alternatives to work will need to be devised and a new, post-market era is dawning. The dawn of the post-market era requires re-engineering of the work week, a new social contract, empowering the third sector of volunteerism, and

globalizing the social economy. Finally, according to Rifkin in *The End of Work* , "Re-envisioning work, however, requires that we rethink our notion of the body politic. Thinking of society as creating three types of capital –market capital, public capital, and social capital – opens up new possibilities for reconceptualizing both the social contract and the meaning of work in the coming era" (p. 294).

In his next book, *The Age of Access,* Rifkin (2000) further explores the development of the post-market era.

> In the new era, markets are making way for networks, and ownership is steadily being replaced by access. Companies and consumers are beginning to abandon the central reality of modern economic life - the market exchange of property between sellers and buyers. This doesn't mean property disappears in the coming Age of Access. Quite the contrary. Property continues to exist but is far less likely to be exchanged in markets. Instead suppliers hold on to property in the new economy and lease, rent, or charge an admission fee, subscription, or membership dues for its short-term use. (p.4)

The Age of Access will be characterized as one where "everything is a service" and human relationships are a "commodity". The capitalist journey, Rifkin argues, which began with the commodification of goods and the ownership of property, is ending with the commodification of human time and experience. In the future, we will purchase enlightenment and play, grooming and grace and everything in between. Rather than high tech skills and computer knowledge, the workforce of the future will need a different education to prepare them to work in a system based on the selling of cultural experiences. The center of an economy that trades in cultural resources includes global travel and tourism, theme cities and parks, destination entertainment centers, wellness, fashion and cuisine, sports and games, gambling, music, film, television, the virtual worlds of cyberspace, and social causes.

Trends in Georgia

Georgia Economic Outlook 2001

The *Georgia Economic Outlook* is an annual publication featuring the upcoming year's economic forecast for the state, including sectoral analyses. The report is compiled by the Simon S. Selig Jr. Center for Economics Growth in the Terry College of Business at the University of Georgia.

Excepts from the *Georgia Economic Outlook 2001* were published in the April 2001 edition of the *Georgia Trend* magazine for the following eight sectors of the state: Metro Atlanta, Northwest, Northeast, West Central, Central, East Central, Southeast and Southwest. Each excerpt provides statistical data regarding Population, Employment, and Per Capita Personal Income for the sector on a county basis. For all subjects, estimates for future years are based on existing trends. The economists report that fundamentally, the state economy remains sound. "Growth is slowing and for the first time in a decade, Metro Atlanta faces a serious economic slowdown and only the second

one in the last 25 years. And when Atlanta catches a cold, the rest of the state sneezes" (p. 51). A comparison of the population, employment, and per capita personal income data for each region and the state follows with implications for program planning for Georgia Technical Colleges.

Population Trends

Population data are provided for the years 1995 and 2000, annual growth rate for that period, and projections of the population and growth rates for 2000-2005. Table 2 provides a comparison of the annual growth rate for 1995-2000 and the projected annual growth rate for 2000-2005 by region and statewide in Georgia. Population growth rates for regions of the State ranged from 0.5 for the West Central Region to 3.0 for the Metro Atlanta Region, while the average statewide was 2.0. The population projected annual growth rate for 2000-2005 ranged from 1.0, for the West Central Region to 3.5 for the Metro Atlanta Region while the population statewide is projected to increase to 2.7. The continued projected annual growth rate for the population of the State has important implications for program planning for the Georgia Technical Colleges. Growing populations mean increased demand for programs resulting in increasing enrollments.

Table 2: Population Annual Growth Rate 1995-200 and Projected Annual Growth Rate 2000-2005 by Region and Statewide in Georgia

Region	Annual Growth Rate 1995-2000	Projected Annual Growth Rate 2000-2005
Metro Atlanta	3.0	3.5
Northwest	1.8	2.0
Northeast	2.3	2.5
West Central	0.5	1.0
Central	1.1	1.4
East Central	0.8	1.6
Southeast	1.3	2.1
Southwest	0.8	1.1
Georgia	2.0	2.7

Employment Trends

Employment data are for covered employment, which includes employment subject to the unemployment insurance law of Georgia, for March 1995 and 2000, annual growth rate for that period, and projections for employment for March 2005 and for growth rates for 2000-2005. Table 3 provides a comparison of the employment annual growth rate for 1995-2000 and the employment projected annual growth rate for 2000-2005 by region and statewide in Georgia. Employment growth rates for regions of the State ranged from 1.3 for the East Central and Southwest Regions to 3.9 for the Metro Atlanta Region, while the average statewide was 3.0. The employment projected annual growth rate for 2000-2005 ranged from 1.8, for the Central Region to 4.0 for the Metro Atlanta Region, while employment annual growth statewide is projected to increase by 3.3 percent.

Table 3: Employment Annual Growth Rate 1995-200 and Projected Annual Growth Rate 2000-2005 by Region and Statewide in Georgia

Region	Annual Growth Rate 1995-2000	Projected Annual Growth Rate 2000-2005
Metro Atlanta	3.9	4.0
Northwest	1.9	2.3
Northeast	2.7	3.4
West Central	2.2	2.4
Central	1.6	1.8
East Central	1.3	1.5
Southeast	1.9	2.4
Southwest	1.3	2.1
Georgia	3.0	3.3

Per Capita Personal Income

The Per Capita Personal Income is reported by county for the years 1995 and 2000, annual growth rate for that period, and projections and annual growth rate for per capita personal income for 2000-2005. Table 4 provides a comparison of the Per Capita Personal Income annual growth rate for 1995-200 and the Per Capita Personal Income projected annual growth rate for 2000-2005 by region and statewide in Georgia. Per Capita Personal Income growth rates for regions of the State ranged from 3.9 for the Southeast Region to 5.1 for the Metro Atlanta Region, while the average statewide was 5.0. The Per Capita Personal Income projected annual growth rate for 2000-2005 ranged from3.4 for the East Central Region to 3.9 for the Metro Atlanta Region, while Per Capita Personal Income annual growth statewide is projected to increase 3.9 percent.

Table 4: Per Capita Personal Income Annual Growth Rate 1995-2000 and Projected Annual Growth Rate 2000-2005 by Region and Statewide in Georgia

Region	Annual Growth Rate 1995-2000	Projected Annual Growth Rate 2000-2005
Metro Atlanta	5.1	3.9
Northwest	4.1	3.7
Northeast	4.8	4.1
West Central	4.7	3.8
Central	4.0	3.7
East Central	4.0	3.4
Southeast	4.1	3.6
Southwest	3.9	4.0
Georgia	5.0	3.9

Industry Outlook 2001

"It's been a remarkable ride. In constant (1996) dollars, Georgia's economy has nearly doubled in size since 1987. The numbers show gross state product over the period increased from $152.6 billion to $288.7 billion. In current dollars, GSP has almost tripled, soaring from $117.8 billion to $314.1 billion. Annual growth rates the past 10 years have averaged 5.6%" (p. 103). Now that the overall economy is slowing, Dr. Jeffrey M. Humphreys explores the economic, demographic, social and technological forces at play in the state in an article in the April 2001 edition of the *Georgia Trend* magazine. His article is based on the annual Industry Outlook complied at the Selig Center for Economics Growth at the University of Georgia. A brief description of the industry outlook for various occupational areas follows.

Lumber and Wood Products

The anticipated drop in the demand for saw timber and lumber primarily reflects a moderate drop in new residential construction – the industry's most important final market. There is an abundance of maturing pin plantings in the Southeast, and harvest from such lands are expected to increase. A large number of tracts planted in pines have reached stages of growth where they need to be thinned, which will put additional supplies of pulpwood onto the already oversupplied market.

Manufacturing Equipment

Even though spending for IT-related equipment is unlikely to decline, the sudden adjustment from many years of heady growth to slow growth will be painful. Companies will intensify their focus on increasing margins by reducing operating costs and eliminating inefficiencies, a strategy that often entails upgrading or adding equipment. Less positively, capacity utilization in manufacturing as a whole will be 80.8 %, a level that will provide only minimal support for the growth in the demand for industrial equipment and machine tools.

Automobiles

The forecast calls for sales to decline to 15.5 million units in 2001 (down from 17.3 million in 2000), which is still a relatively healthy level and well above that level that prevailed from 1994 to 1997. Some positive developments will appear. Even as new car sales fall, automakers will continue to benefit from consumers increasing demand for more expensive sedans and more costly options, which carry higher profit margins. Political pressures will encourage foreign manufacturers to invest more in U.S. production facilities and to buy automotive parts from U.S. manufacturers.

Automotive Parts

Despite the projected decline in the number of new vehicles sold, manufacturers that provide original equipment and replacement parts should enjoy rising markets but stiffer competition in this year. Automakers will farm out more parts and subassemblies, and demand for parts also will rise as new cars add complex and expensive features that enhance safety, performance, the diagnosis of problems, and convenience. Foreign

companies increasingly are choosing to produce vehicles in the Southeast, encouraging growth of automotive parts manufacturers in the region.

Aerospace

After difficult downsizing and consolidation, the aerospace industry is entering a period of reasonable stability. The outlook is good for U.S. manufacturers of military transport aircraft. The outlook for the commercial space market is good.

Food Products

Food processing is highly competitive and faces very demanding consumers, so firms will have limited flexibility in pricing and profit margins will be razor–thin. Because of slower growth in food consumption and intense competition, food processors are dividing mass commodity markets into narrow segments. Specialized products recognize consumers' increased health consciousness, greater ethnic diversity and the growing acceptance of foods from other cultures. The ubiquity of the microwave oven, busy lifestyles, more nontraditional households, and demographic changes bolster the market for convenience foods and eating out.

Apparel

Georgia's apparel manufacturing industry will continue to contract in 2001. More open world trade and the lower costs of labor abroad give a tremendous price advantage to many imported apparel products. Some manufacturers operating in niches that are suited to automation will survive and flourish, but such efforts will preserve only a small fraction of Georgia's apparel industry.

Pulp and Paper

Georgia's producers of pulp and paper were among the industries that suffered the most from Asia's troubles. The industry responded by merging and consolidating operations, which led to the mothballing or permanent closing of many mills in Georgia. Georgia's recent port and channel improvements potentially could lower the costs of exporting pulp and paper products.

Printing and Publishing

Georgia's printing and publishing industry faces more competition from other media, but many factors will lead to moderate expansion of sales and profits in 2001. Continued economic growth will generate book sales and print advertising. Higher tax revenues and enrollments will allow schools, colleges, and libraries to purchase more materials. Educational attainment is rising - a trend historically linked to increased sales of printed matter. In 2001, Internet and other media companies will spend heavily to advertise in magazines, newspapers, and other traditional media.

Chemicals/Pharmaceuticals

During 2001, the chemical manufacturing industry will benefit from continuing economic growth. Favorable demographics and cost effectiveness give pharmaceuticals good short- and long-term outlooks. Pharmaceutical companies largely have adjusted to the increased dominance of a few large buyers - the government, HMOs, and preferred

providers. A large number of new drugs in the development pipeline; better research and development techniques; faster FDA approval of new drugs; and the 1994 GATT agreement, which effectively extended the patent life of many drugs, favor the industry's long-run prospects.

Airlines

The outlook calls for airline profits to increase in 2001, reflecting several positive developments: cyclical growth in business and leisure travel, more international air cargo traffic, expanding services, capacity growth that closely matches demand growth, possible mergers, and favorable demographic and lifestyle trends. In 2001, airlines' margins will suffer from higher expenses for labor. In Georgia, limited capacity at Hartsfield Atlanta International Airport also will remain a major problem for the airlines and their customers.

Trucking

In 2001, the total volume carried by the trucking industry will increase slightly. Georgia's above-average growth in Gross State Products, employment, and population will help local and short-haul truckers substantially, and will benefit long-haulers somewhat. Manufacturer and retailer emphasis on electronic commerce and just-in-time inventory management systems are a boon to regional and less-than-truckload trucking companies that thrive on handling frequent, smaller shipments.

Railroads

Higher traffic will help profits, but intense competition from the trucking industry will keep considerable pressure on railroad freight rates. The railroads will benefit from recent and planned improvements to the Port of Savannah's Containerport.

Telephone Services

Atlanta has one of the nation's highest rates of cell phone use, and it will climb still higher. In 2001, mobile telecommunications services will be the industry's major source of revenue growth, and within five years, revenues from mobile services probably will exceed those from wired phones. Mobile phones and the Internet are converging rapidly.

Television Services

The industry's healthy outlook mostly reflects the increasing demand both for basic services and for the rapidly expanding menu of optional services. Growth in the subscriber base, plus an increasing number of channels and improved programming, will cause advertising revenues to grow faster for cable companies than for radio or broadcast television.

Internet Services

The advent of high-quality personal computers that cost less then $1,000 and the birth of the wireless Internet will draw more customers to cyberspace in 2001, benefiting both the firms that exist on the Internet and the firms who build and maintain it. As households and businesses switch from regular phone lines to digital subscriber lines and high-speed

cable modems, using the Internet will be much more convenient, encouraging the growth of companies that sell goods and services to consumers on the World Wide Web.

Electric Utilities

As a whole, Georgia's electrical utility industry is well positioned. Its operating costs are low, and the regional economy is strong relative to the nation's economy. In 2001, Georgia's electric utilities can expect slower growth in the demand for power, reflecting slightly less in-migration, lower levels of household formation, less new residential construction, slower business growth, a more moderate rate of increase in industrial production, and fewer new business start-ups.

Natural Gas Distribution

In 1998, Georgia became the first state to deregulate the sale of natural gas. A large number of marketing companies now compete for sales to residential and business customers, paying to use pipelines owned by distribution companies. Ultimately, competition will force all the marketing companies to charge almost the same price to similar types of customers. In time, several large marketing companies will dominate Georgia's natural gas market.

Financial Institutions

Many banks will find the quality of their assets deteriorating in 2001. Having issued many more credit cards and expanded these lines of credit, banks now must contend with relatively high levels of consumer debt and high default rates. Banks are also more exposed to upturns and downturns in consumer spending.

Online Banking

The rapid growth in the proportion of household with access to the Internet, the low cost of delivering financial products over it, its power as a marketing tool to publicize the institution and to find customers for additional products and services, and more competition from online financial service companies are some of the factors encouraging banks to embrace cyberspace banking.

Real Estate Brokerage Firms

In 2001, lower sales of new and existing single-family homes will reduce commissions earned by residential real estate brokerage firms. Slower economic growth will be the main force behind the slump in housing sales, even though the market for second homes and retirement housing should be relatively steady. The combination of the Internet, fax machines, and email makes it possible for people in California or Massachusetts to shop for a house in Georgia with minimal time spent locally.

Health Care

Georgia's rapid population growth underpins the state's health-care industry. Both domestic migration and foreign immigration will increase demand for heath care. The proportion of Georgians who have health insurance follows a cyclical pattern, which still is on the upswing. Sustained economic improvement means more permanent jobs, often in firms that provide health insurance, and also raises consumers' discretionary

spending for easily postponed or purely elective medical care, such as cosmetic surgery. The single most important limit on health-care firms is intense business and government pressure to hold down medical costs. Profit margins in many sectors of the medical care industry, therefore, are expected to narrow. To shore up the margins, the medical care industry is expected to embrace new technologies that are more cost-effective. Because customers prefer some choice of facilities and medical personnel, preferred providers will fare better than managed care organizations.

Education Services

Educational services will grow this year as new technologies and relentless competition will increase corporate spending on employee training. Individual spending will also rise. As incomes and employment grow, more people will be able to afford the additional education needed to remain part of a highly skilled workforce. Working in opposition to such developments are slower growth in corporate profits, slower employment growth, and fewer promotions and new hires, which will reduce demand for training. Long-term trends favor educational services, because today's and tomorrow's jobs will require significant investment in education beyond high school. Most of the fastest growing fields that provide higher salaries now require specific technical skills or a college degree.

Travel Agencies

Even though spending for travel will increase, travel agencies probably will see lower profits. Recent cuts and caps on the commissions that airlines pay travel agencies will squeeze profits hard, and the industry is intensely competitive. The Internet is a major threat to traditional travel agencies, but some agencies will use it to reach a larger number of customers inexpensively. Airlines, large hotel chains, and cruise lines are further undercutting travel agencies by encouraging direct bookings; they are continuously improving their Web sites and offering special promotions or discounts for online purchases. Travel agencies are likely to respond by offering more package tours and more customized services. In addition, travel agencies may benefit as more companies outsource the management of their travel budgets and arrangements for meetings and conferences. Eventually, the industry will be dominated by a few large international travel agencies that deliver a vast array of travel-related services through traditional channels as well as online.

Restaurants

In 2001, expenditures for food consumed away from home will grow moderately. Severe supply-side problems will be a challenge in 2001, because for several years the number of restaurants has increased much more rapidly than demand. Fierce competition for customers will limit the industry's profits. Finding qualified and motivated employees and containing labor costs remain both short- and long-term priorities for the restaurant industry, because the tight labor supply means that workers can demand and get higher wages and benefits.

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