VISION 2030

MAPPING THE VISION

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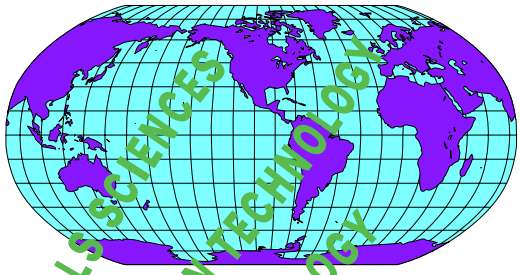


Updated Economic Cluster Analysis/Innovation Index - An identification of regional strengths in major industry clusters and analysis of 26 indices of innovation comparing North Carolina with key competitor states was conducted to form the basis of informed policy development. May 2000

Five Task Forces - Vision 2030 Task Forces developed policy recommendations concerning Science and Technology Workforce, Knowledge and Technical Infrastructure, Social and Ethical Issues, Innovation, and Global Competitiveness integrating Vision 2030 analyses with regional science and technology priorities. January - May 2000

Regional Conferences - More than 600 local leaders met in seven day-long , on-site sessions to learn about Vision 2030 and to prioritize regional needs related to science and technology. December 1999 - March 2000

Leadership Conference - 200 leaders in industry, education and government from throughout North Carolina participated in a two-day conference to consider the role science and technology will play in North Carolina's future, marking the public commencement of the Vision 2030 project. September 1999

Statewide Public Opinion Survey - More than 800 randomly selected North Carolinians expressed their opinions on the role science and technology plays in the economic health of their region and the State. September 1999 & December 1999

Regional Focus Groups - 130 regional leaders met to identify the needs and opportunities facing each of North Carolina's seven economic development regions. August 1999

Situation Assessment - Vision 2030 sponsored a retrospective and current context analysis of North Carolina's investments in science and technology. March - September 1999

R&D Benchmark Study - A study was commissioned to analyze North Carolina's academic and industrial research and development strengths. April 1998

Vision 2030 - Mapping the Vision - Final Report and Recommendations June 2000

Tracking Innovation: North Carolina's Innovation Index 2000 June 2000

High-Tech Clusters in North Carolina June 2000

Public Perceptions of the Importance of Science and Technology to the North Carolina Economy September 1999

Best Practices in Science and Technology-Based Economic Development Policy: U.S. and Global September 1999

Forces for Change - An Economy in Transition September 1999

North Carolina's Regions: Transitioning to the Knowledge Economy - Summary Proceedings of the Regional Focus Group Meetings September 1999

At the Crossroads: North Carolina's Place in the Knowledge Economy of the Twenty-First Century April 1998

VISION 2030 - PROCESS

START-UP MARCH 1999

VISION 2030 - PRODUCTS

LEGISLATIVE PRESENTATION JUNE 2000

Science and Technology - Driving North Carolina into the New Economy

A Vision for all of North Carolina, Developed by North Carolinians

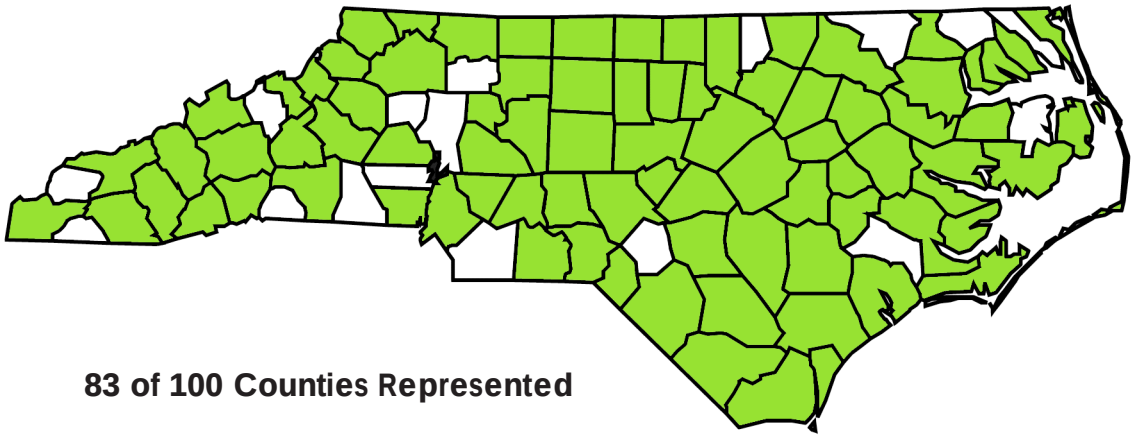
Over 15 months in every region of the State, the Vision 2030 Project took to the citizens of North Carolina a message concerning the critical role science and technology play in the economy of today...and tomorrow.

The message resonates strongly! In every county in North Carolina, across economic, gender, age, ethnic and geographic divides, North Carolinians recognize that science and technology are increasingly important contributors to their personal, local, regional and statewide economic health and quality of life.[1]

More than 800 North Carolinians representing 83 of the State's 100 counties responded to this message with a clarion call for action that is captured in the ten recommendations and fourteen region-specific requests for assistance contained in this document.[2]

The Vision 2030 Project was designed to educate and challenge leaders and citizens across North Carolina to begin building the science and technology-based platforms needed to support North Carolina's economy in the twenty-first century. This report, *Mapping the Vision*, is their initial response.

Participation in the Vision 2030 Process



83 of 100 Counties Represented

1 Public Perceptions of the Importance of Science and Technology to the North Carolina Economy. September 1999 (Ken Wilson). A publication of the NC Board of Science and Technology.

2 The NC Board of Science and Technology will publish a more comprehensive report containing the full set of recommendations developed by the Vision 2030 task forces during summer 2000. Pre-publication drafts will be made available upon request.

A Vision for North Carolina in 2030 ...

- A vital competitive player in the global economy
- Equal opportunity in a digital economy for all citizens to be active participants in America's economic, political, and social life through universal access to computers, the Internet, and other emerging information technologies
- Strategic investments in science and technology infrastructure that optimize the competitive position of established traditional and high-tech industries and support the emergence of entrepreneurial firms
- Public policies that weigh and balance the dynamic technological forces for change with people's desires for participation, permanence and self-determination

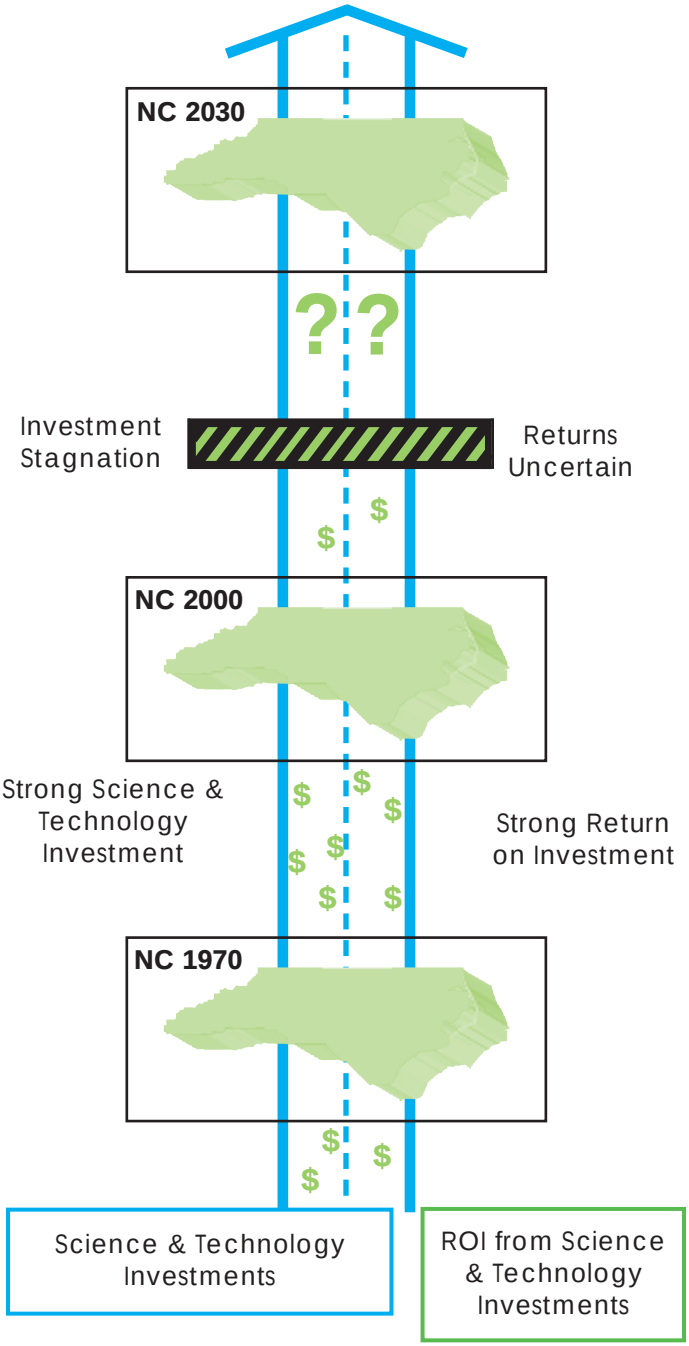
A Future Framed by Innovation and Competition

Innovation, and the science and technology that underpin it, will be the driving force for realizing this vision. States that recognize the value of innovation and institutionalize its support through policy initiatives and directed infrastructure investment will emerge in coming years as the winners in a highly competitive Knowledge Economy. **Once a leader, North Carolina now sits on the sidelines in this arena, spending the capital from past investments, rather than reinvesting in the New Economy.**

Investing in Science and Technology

We cannot realize this vision without a renewed focus on science and technology. We need to:

- Update policies and practices
- Inject flexibility into our approach to economic development and experiment with models and initiatives tailored to each region's particular needs and assets
- Link North Carolina's innovation system through creative partnerships and a well-connected technology infrastructure
- Focus the full power of our K-16 and lifelong education systems on science and technology literacy and the mastery of adaptable skills.



Realizing the Vision

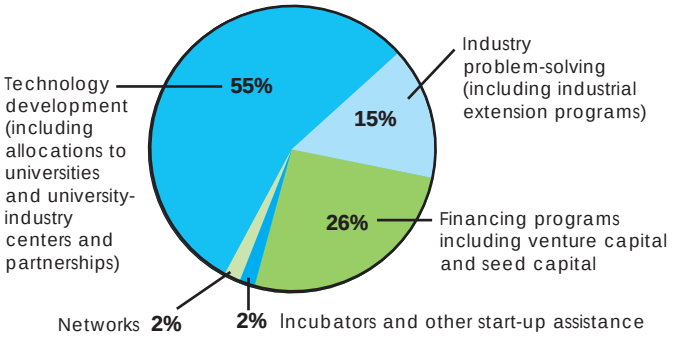
Vision 2030: Mapping the Vision**,** provides the blueprint to begin the journey into an uncharted future. From a partnership built on the intellectual capital of our universities and community colleges, the market savvy of our established and new industries, the indomitable spirit of our people, and the political will of a far-sighted legislature, we can make Vision 2030 a reality for all North Carolinians. Let's get started!

Falling Behind in a Race We Cannot Afford to Lose

Today's economy is knowledge and idea based and driven by the ability of firms to create and develop new products and processes. This innovation-driven economy is forcing states to become more innovative and entrepreneurial. States must act to bring technology to their established industries and communities in order to facilitate the creation of new technology-based firms and industries. It is important to ensure that all regions and all people are able to participate in the Knowledge Economy.

Between 1980 and 1997, more than 250 programs related to the use of technology for economic development have been initiated by the 50 states, with total annual funding of $500 million.[3]

Distribution of Research, Development, and Deployment Funds in U.S. States



Source: States Research Institute of the National Science Foundation

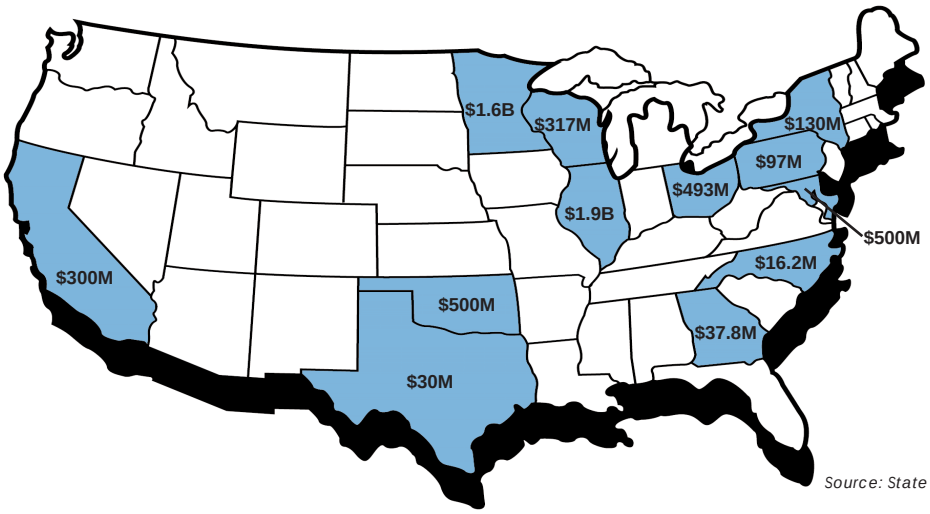
Innovation:

The embodiment, combination and/or synthesis of knowledge in novel, relevant, and valued new products, processes or services.

Since 1997, spending by states on science and technology has grown exponentially and has become ever more targeted. Catalyzed by an infusion of funds from pending tobacco settlements and legislated allocations, 20 states have announced initiatives totaling more than $5.6 billion to be spent over the next 20 years.

North Carolina is not keeping up! As other states make twenty-year commitments to science and technology, North Carolina's overall science and technology policy focus has become increasingly reactive and short-term in perspective. Almost 20 years have passed since our state's last serious science and technology planning effort. **To be competitive in the twenty-first century, North Carolina must rededicate itself to investing in science and technology-based economic development. It has never been more important!**

New Targeted Initiatives by States in Science and Technology Since 1998



Source: State Science and Technology Institute (2000)

3 National Science Foundation: Division of Science Resource Studies. 1999. "What is the State Government Role in the Research and Development Enterprise?" NSF999-348, U.S. Government Printing Office.

Science and Technology Investments: A Proven Winner in North Carolina

Returns on Science and Technology Investments - Select Examples

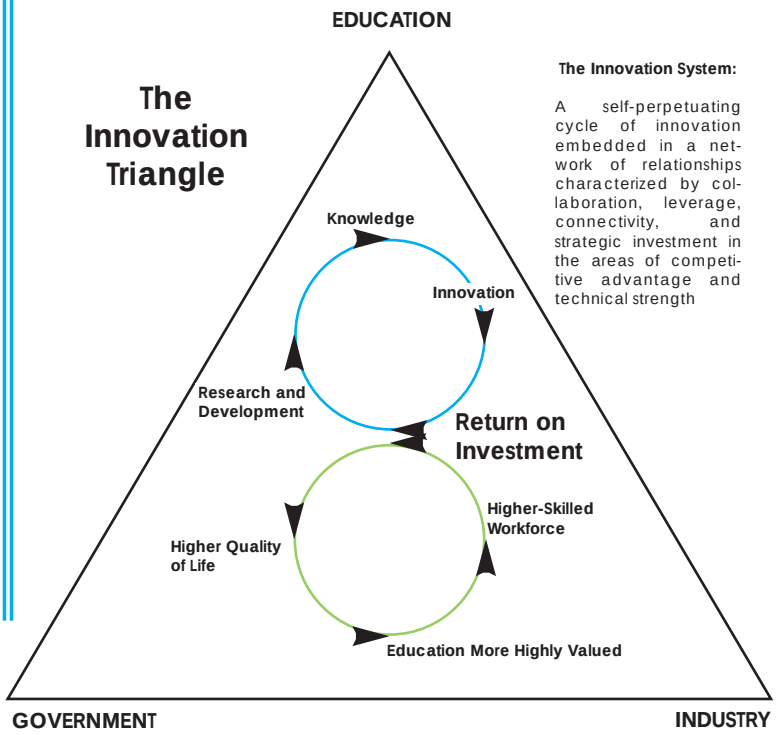
- **Research Triangle Park,** since 1990, has hosted 136 new technology firms employing 14,000. $300 million has been invested in 10 counties for RTP-affiliated production plants.
- **East Carolina Medical School** is emerging as one of the nation's premier training centers for rural practice doctors in the U.S. With 300 graduates and 5,300 consults in 33 specialties, ECU's Telemedicine Program uses technology to leverage the resources of the Medical Center throughout eastern N.C. and beyond.
- **NC Biotechnology Center** has shepherded the growth of biotechnology in North Carolina. The biotech industry has grown from 12 firms in 1988 to more than 100 firms in 27 counties employing 28,000 people, with sales exceeding $1.5 billion.
- **NC Community College System** enrolls almost 19,000 students in 19 high-tech related curricula throughout the system.
- **MCNC,** between 1991 and 2000, returned $433 million to the North Carolina economy on a state investment of $170 million, and spun-off 3 companies creating 170 jobs.
- **NC Technology Development Authority (TDA),** since 1988, has leveraged over $185 million on a $10.9 million state appropriation, investing in over 90 emerging companies and creating a network of 26 business incubators statewide.
- **Ben Craig Center - UNC-Charlotte** has graduated 70 firms since 1996 creating 1,000 jobs in high-tech areas with an estimated annual economic impact of $100 million.
- **NC School of Science and Mathematics** delivers advanced science and math classes electronically, reaching rural North Carolina students through its Cybercampus initiatives. NCSSM alumni fuel graduate programs at the State's universities and provide talent for growing technology firms.

Innovation, science and technology have a rich history in North Carolina. The national and world leadership position held by many North Carolina firms and industries today is tied directly to innovations and entrepreneurial research and development efforts that transpired in the State during earlier periods. Far-sighted leaders in the period between 1960 and the mid-1980s took bold risks in supporting an innovative portfolio of initiatives to capture and channel the power of research and development for economic development purposes. The North Carolina Board of Science and Technology provided the impetus and early-stage funding for many of these efforts.

That Was Then, This Is Now

By almost any metric applied to economic development, these initiatives have been successful. Collectively, they have been points of convergence around which the State has developed a rich innovation system that has been a model for other states and nations.[4] Returns from these early investments are bringing significant economic, health, and social benefits to North Carolina.

Awareness of the needed statewide investments in science and technology, and the acknowledgement that not all regions have benefited fully from earlier investments, prompted Governor Hunt to direct the North Carolina Board of Science and Technology to undertake the Vision 2030 Project to renew and re-energize the State's science and technology focus.



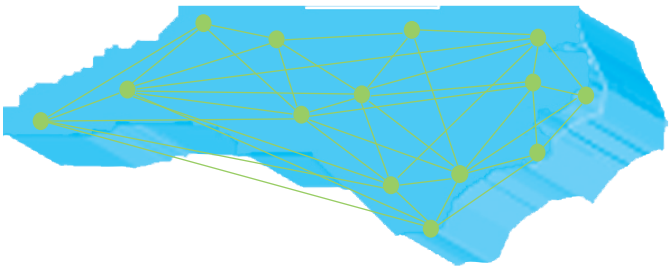
4 U.S. Economic Development Administration of the U.S. Department of Commerce. 1999. Science and Technology Strategic Planning - Creating Economic Opportunity. A Report prepared by the State Science and Technology Institution. Westerville, Oh.

Statewide Information Technology Initiative - A Preamble to the Future

In the emerging Knowledge Economy, access to computers and the Internet and the ability to effectively use these technologies will be key determinants of economic success for both individuals and the communities they call home. Universal connectivity is increasingly a necessity for business transactions, education and training, health care, government services and the democratic process.[5] The North Carolina Board of Science and Technology reasserts that affordable, high-speed access is a non-negotiable requirement for full participation in the global marketplace.[6]

North Carolina's position as an early adopter of advanced telecommunication technologies is eroding, leaving the State ill prepared to compete in this environment.[7] While certain urban centers boast state-of-the art connectivity and widespread access, the abysmal capacity that characterizes much of the State has been well documented in numerous studies and by a Presidential visit.[8]

Universal Connectivity Across North Carolina



The North Carolina Board of Science and Technology endorses proposed efforts to address the connectivity and access issues cited in these studies. The Board supports collaborative efforts being pursued by the State's telecommunications firms in proposed high-speed interconnectivity agreements. Ubiquitous connectivity is the foundation for realizing the Vision 2030 recommendations and will be the platform for North Carolina's progress in the twenty-first century.

The recent sale of an MCNC spin-off firm, Cronos, and multiple university spin-offs represent returns on a previous generation of science and technology infrastructure investments initiated by North Carolina. Information technologies have evolved significantly since the founding of MCNC. The optimal public sector actions needed to enhance a new generation of information technology research in North Carolina must be examined.

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A Call for New Research Investments in Information Technology

It is time for North Carolina to consider the next steps in focused funding of information technology. The North Carolina Board of Science and Technology proposes the creation of a task force that will pull together stakeholders from across North Carolina's public and private sectors, to plan for the next critical information technology research and development investments.

5 Rural Prosperity Task Force (2000) TELCO Agreement (Draft IV - 5/8/00). Preamble
6 Report of the North Carolina Board of Science and Technology to the North Carolina Public Utilities Commission - Public Hearing on Universal Services. Docket No. P-100 Sub 33-g. March 30, 1998
7 The North Carolina Information Highway was the first large-scale deployment of broadband connectivity in the world. August 1994
8 Connect NC, Claiming the Future, Rural Prosperity Task Force, The Digital Divide. Etc.

Vision 2030 Task Forces and Regional Initiatives -

Building a Competitive Framework

A "spirit of generosity" has long characterized the willingness of leaders in North Carolina to contribute their time and the benefit of their experience to efforts to enhance the status of the entire state. The Vision 2030 project continues this tradition. More than 150 individuals representing industry, education, non-profits and government, across all regions of North Carolina, actively participated in one or more of the five Vision 2030 task forces.

Over the course of four months and with supporting research and analysis provided by professional staffs, each task force drew on the perspectives and experience of its members in the development of recommendations and related action steps to enhance North Carolina's competitiveness in the New Economy. The ten priority recommendations contained in this report and a broader set of recommendations that will be available in August 2000 as a resource publication are the products of their deliberations.

The ten recommendations contained in this report do not map directly onto a particular task force. Common issues provided the basis for weaving the threads of specific task force suggestions into a melded tapestry that presents both a clear picture of the underlying need and a strong statement of the actions needed to address the need.

Recommendations one through nine speak to priority needs that encompass the entire state. Recommendation ten specifies an additional set of requests that target individual regions. These requests are not the product of the Vision 2030 task forces. Rather, they are the prioritized needs put forth by leaders within each region. Recommendation ten is particularly important to our efforts to bring a necessary balance to North Carolina's use of science and technology for the economic development of the entire state.

Vision 2030 Sponsors:

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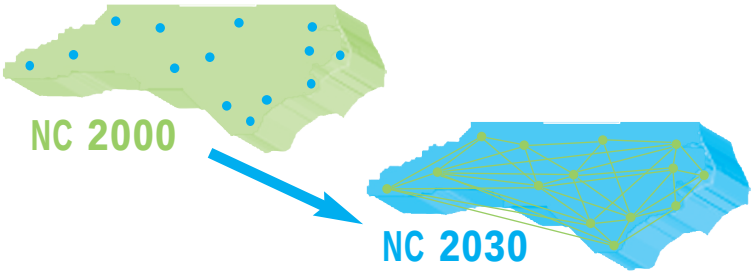
IBM
Lucent Technologies
National Institute of Environmental Health Sciences
Nortel Networks
NC Community College System
NC Department of Commerce
NC Department of Public Instruction
NC Association of Independent Colleges and Universities
NC Rural Economic Development Center
NC Technological Development Authority
SAS Institute
University of North Carolina System
Wachovia Corporation

RECOMMENDATION 1

Evolve North Carolina's science and technology-based economic development operations into a competitive configuration for the 21st century knowledge economy.



WHY

North Carolina has a long history of supporting innovative programs and public/private partnerships that sustain and encourage the development of high-growth, science and technology-based enterprises. Our last period of strong, targeted investment toward this goal was almost twenty years ago. Other states have learned from our successes and are moving forward aggressively to establish themselves as the location of choice for developing high-technology-based industries. North Carolina must renew its focus on science and technology and develop new public policy strategies that foster research, development, and innovation in all regions of the State. North Carolina also must create the statutory framework for 21st century electronic commerce.

HOW

- Broaden the focus of the General Assembly's Committees on Information Technology to include scientific issues and other technologies.

- Link the General Assembly's Science and Technology Committees with the State's research and development organizations and science and technology-based economic development organizations.[9]

- Amend G.S. 143B-434 to include the incorporation of North Carolina's existing science and technology-based economic development organizations (such as the NC Technological Development Authority, the NC Biotechnology Center, and the NC Board of Science and Technology) as members of the North Carolina Economic Development Board.[10]

- Create a study commission to examine:
  1. North Carolina's science and technology planning processes, resource allocations, and the creation of an agency or non-profit responsible for science and technology.

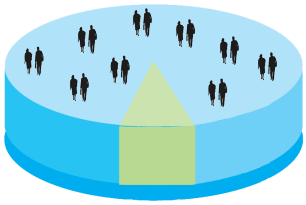
  2. Possible amendments to the Umstead Act to better foster innovation.

- Create a study commission or Joint Select Committee on Personal Information Privacy to investigate necessary protections.

- Enact legislation to protect the security of public networks within state government. [S.B. 1260, and H.B. 1558]

- Establish the legal framework necessary to conduct electronic commerce in North Carolina. A digital signatures bill such as the Uniform Electronic Transactions Act (UETA) should be considered.

89% of North Carolinians surveyed support state programs for research and development.[11]



WHO

North Carolina General Assembly with leadership from the House and Senate Information Technology Committees and the Joint Select Committee on Information Technology

MONEY

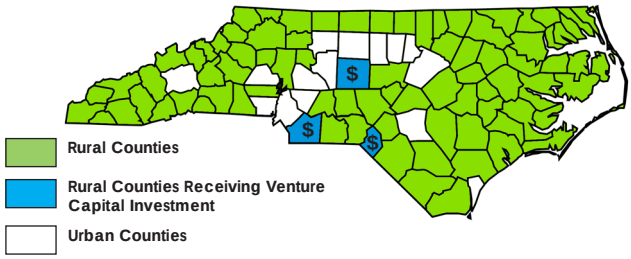
The cost for most of these recommendations would be minimal. We believe that the study commissions would be staffed out of the General Assembly and that Executive Branch agencies could provide in-kind support.

9 Supported by recommendations made by the Joint Select Committee on Information Technology Subcommittee on Research and Development Funding in their *Findings and Recommendations*, April 2000.
10 *Ibid.*
11 Public Perceptions of the Importance of Science and Technology to the North Carolina Economy.

RECOMMENDATION 2

Support the dynamic development of new companies, products, and services through innovative funding mechanisms.

"Rural Investment —
There are high-growth, innovative, entrepreneurial companies in 84 out of 85 of North Carolina's rural counties. Yet only 3 received venture financing between 1980 and 1995— The opportunity is tangible; the gap is crippling." [12]



WHY

Innovation is fueled by the infusion of capital at critical points during the development cycle of a technology or business. Providing incentives such as grants or matching funds to further develop internal and collaborative research will attract more companies, enhance innovation, and expand the economy of North Carolina. Similarly, funds provided to universities will enable them to develop technologies that are not yet marketable leading to increased technology licensing revenue. It will also encourage the formation of companies from university research projects, thereby creating jobs and returning to the university an equity stake in the companies it helped create.

HOW

- Create a "gap-fund" for technology development for university and community college technology development organizations to use to eliminate institution-specific "gaps" in research and development activities. These competitive funds could go directly to the universities and community colleges or be distributed via a third party (e.g. NC Technological Development Authority, NC Small Business and Technology Development Authority, or NC Biotechnology Center). These funds might be used to further develop technology invented in the university, file patent applications, or hire consultants to help with marketing and licensing.

- Provide matching funds and seed money to enhance partnerships and collaborative research. The goal of this is to attract more early-stage venture capital and to provide matching funds for researchers seeking federal support.

- Encourage the General Assembly, in collaboration with North Carolina's technology research and development organizations, to assure appropriate venture capital for entrepreneurial companies seeking early-stage investments.

- Provide tax incentives for the private sector to participate in collaborative ventures in research, teacher training, K-16 curriculum development, etc.

WHO

- North Carolina General Assembly
- University of North Carolina System
- North Carolina Community College System

"The ROI for research partnerships between small to medium-sized enterprises (SMEs) with universities is 33% higher than that of large firm/university partnerships. [13]

MONEY

- Gap Fund of $550,000 annually.
- Matching/Seed funds of $2,000,000 annually.

12 North Carolina Entrepreneurial Rural Growth Study, East Carolina University, 1998.
13 U.S. Small Business Administration

RECOMMENDATION 3

Establish a central resource center for the collection, analysis, and dissemination of data on North Carolina's economy.

WHY

A major impediment to designing and implementing technology policy is the lack of current and accurate information on innovation rates, R&D performance, and trends in technology-intensive industries. Rapid changes in the high-tech sector's business cycles compound this problem. As a result, most secondary sources of data on innovation, R&D, and technology suffer from significant time lags—as much as seven years for some indicators. No agency or organization in North Carolina presently monitors technology trends, although many assemble data on an ad hoc basis. **Efforts to market North Carolina as a high-tech state suffer from a dearth of consistent, accurate, and timely data.**

Establishing a central data center to aggregate economic data collection, analysis, and dissemination will provide a single reference point for North Carolina's citizens, researchers, and businesses to access reliable tracking data on North Carolina's economy. This economic data center would be similar to the NCECONet which is a clearinghouse for statewide weather and climate data and is another project the Board has supported.

HOW

Create a university-based nonprofit organization to:

- Update annually a publication that assembles all available information on the technology sector and knowledge infrastructure and make these data available to policy makers and the general public through a website.
- Identify a core set of technology issues facing the State and collect the information from relevant primary and secondary sources.

WHO

- North Carolina General Assembly
- University of North Carolina System
- North Carolina Department of Commerce
- Businesses and Industries of North Carolina

MONEY

Start-up funds of $350,000 annually that could gradually decrease after year 5.

NORTH CAROLINA ECONOMIC DATA CENTER

RECOMMENDATION 4

Design a globally competitive research and development tax credit.

WHY

Scientific and technological research is critical for a state's economic growth. Most states recognize the role of research and development as an economic engine for current and future prosperity. As a result, they have expanded and enhanced their direct investment in R&D and revised their R&D tax laws to serve as competitive tools for economic development. North Carolina lags behind many other states in the tax treatment of qualified research and development expenditures by companies. States such as California, Connecticut, Pennsylvania, Georgia and Massachusetts have R&D tax credits that are at least twice as beneficial as those in North Carolina.[14]

North Carolina needs an updated tax structure that encourages research and development for it to be on the competitive edge in science and technology-based economic development.

HOW

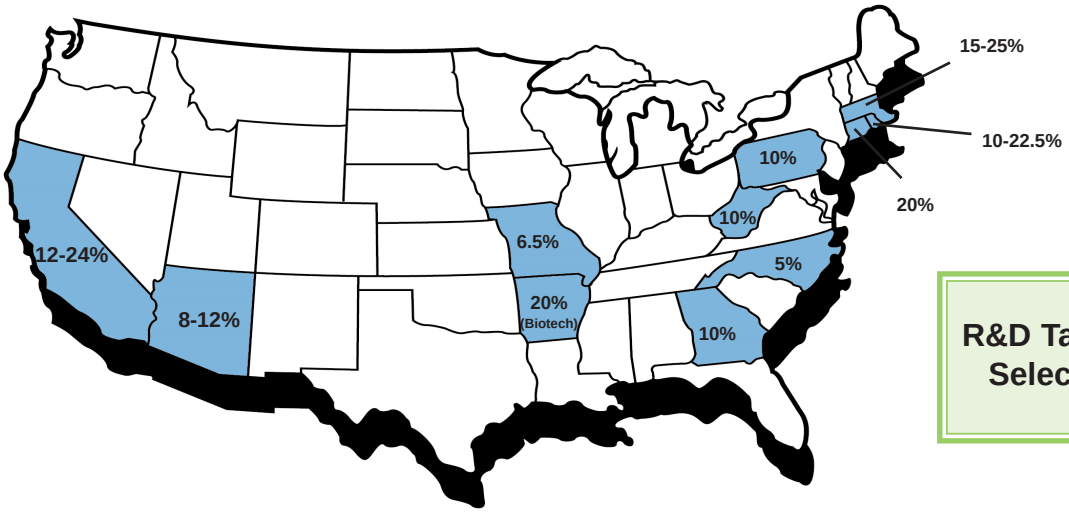
- Make the North Carolina R&D tax credit permanent and increase it from 5% to at least 10%. Apply the credit to all companies engaged in qualified R&D regardless of their industry classification. Permit companies to conduct an alternative flat-rate credit calculation to simplify the credit process for small and mid-size companies.
- Allow the R&D tax credit to accommodate the long-term lack of profitability that many young, high-growth companies experience initially when they are investing heavily in research and development activities. Lengthen the carry-forward period for this tax credit from 5 years to at least 15 years. Allow a company the right to sell its tax credits back to the State at 70 cents on the dollar when it has insufficient North Carolina tax liability to use its entitled tax credit in any taxable year.
- Permit companies that sponsor qualified research activities at North Carolina's universities to take an annual tax credit of 40% of the total amount of funds spent in these sponsored research activities.
- The North Carolina Department of Revenue should draft a fiscal note for this expanded R&D tax credit that utilizes dynamic modeling to determine the benefit of this credit to North Carolina's economy in addition to its cost.

WHO

- North Carolina General Assembly
- Governor of North Carolina
- North Carolina Department of Revenue

MONEY

Calculation of tax credit will come from the North Carolina Department of Revenue.



R&D Tax Credits in Selected States

14 A Joint Study of Research and Development Tax Incentives discusses the findings of a State of Virginia study by its Secretaries of Technology and Commerce and Trade. http://www.sotech.state.va.us/study00/HJR700.pdf
A Survey of State Initiatives and consists of information compiled by the Biotechnology Industry Organization about different states and their R&D tax programs. http://www.bio.org/govt/survey.html

RECOMMENDATION 5

Brand and market North Carolina globally as a high-tech state.

WHY

If North Carolina markets itself as a state where science and technology are recognized and rewarded, economic benefits will include an increase in trade, more grant funding, and a greater likelihood of high-tech industries relocating or expanding here. Global branding leads to more foreign direct investment including R&D investments, more trade, and more international scholars choosing to study here. Other states are applying resources toward global branding whereas, North Carolina has had to overcome its recent negative publicity from the natural disasters that have affected the State.

North Carolina has global brand recognition for certain products such as furniture and tobacco but these industries are on the decline. If North Carolina wants to brand itself as a high-tech state, it must extend this global recognition to high-technology industries such as biotechnology, communications, information technology, and value-added service industries such as banking.[15] Supporting the proliferation of Connected Communities is one way that North Carolina can demonstrate its commitment to high-technology in all areas of the State.

HOW

- Create a public/private partnership to heighten the image of North Carolina through:
  1. A strategic, coordinated, and integrated public relations, marketing, and communications campaign promoting North Carolina as a high-tech state that values, encourages, and invests in science and technology.

  2. Trade shows in industries where we would like to have global brand recognition such as optical switching or environmental technology that attract industry representatives from around the globe. This successful model, used by the North Carolina Biotechnology Center and the Council for Entrepreneurial Development at their annual Biotech Conference, should be expanded to other industry sectors.

- Develop a North Carolina Connected Communities Consortium (NCC^3)—a 501(c)(3) non-profit organization following the model of "VirginiaLink" to engage collaboration among manufacturing extension partnerships, economic development partnerships, community colleges, universities, public schools, and government.

WHO

This public/private partnership would be comprised of appropriate representatives from government, industry, education, regional economic development commissions, local governments, non-profit organizations, and professional associations.

MONEY

- The public/private partnership would be funded through a combination of funding from the State, private industry, universities, and non-profit organizations. We anticipate the budget could be close to $2,000,000 a year.

- NCC^3 would require start-up funding from the State of $1,000,000 a year with a strategy for state funds to sunset in five years and be replaced by private funds. It also would raise funds from its member organizations, foundations, private corporations, and federal grants.

15 Crossing the Chasm and Inside the Tornado, both by Geoffery Moore; Creating Value in the Networked Economy edited by Don Tapscott.; *At the Crossroads: North Carolina's Place in the Knowledge Economy*, page 36; World Class by Rosabeth Moss Kanter; Southern Growth Policies Board www.southern.org/main/mission.html; Aspen Institute www.aspeninar.org; *The International Orientations of the Michigan Public* (Appendix B) Sample of survey done in Michigan, International Orientations of the Michigan www.ippsr.msu.edu/soss/papers/99-44/; Virginia Economic Development Partnership www.yesva.com/; South Virginia Economic Development Partnership www.svedp.org/1aboutus.htm; South Carolina Department of Commerce Organizational Chart www.callsouthcarolina.com/OrgChart.htm; Team South Carolina: www.teamsc.com/; www.teamsc.com/teamsouthcarolina.htm

RECOMMENDATION 6

Erase the boundaries: Teach North Carolina's citizens to think, learn, and work in a borderless world.

WHY

All North Carolinians must be prepared to understand and deal with an increasingly global environment. This includes an understanding of foreign cultures, languages, and economic, political, and educational systems. The American workforce of the future no longer will be able to expect or demand that business, politics, or any other global interaction be done the "American Way". Consolidated economies in Western Europe and Asia will constitute major economic challenges.

Other states have taken a lead in creating a "global generation" ready to succeed in an increasingly cosmopolitan and global working environment. For example, in May of 1998, Wisconsin's Governor Tommy Thompson issued a plan developed by a public/private task force to internationalize the Wisconsin workforce.[16]

HOW

- Establish a public/private partnership to create a globally-minded workforce in North Carolina. This partnership will integrate all educational sectors, beginning in elementary school and continuing throughout a citizen's life through life-long learning opportunities.
- Programs, systems, and services must be put in place to assure that instructional personnel in North Carolina are trained to integrate international concepts into their instructional designs wherever appropriate.
- Give support to projects, programs, and curricula that encourage internationalization such as: NC/Japan Centers, NC Global Partnership, NC World Trade Center, NC Center for International Understanding, study abroad programs, Sister City and Sister State partnerships, and foreign language instruction.

Foreign companies provide 225,000 jobs in North Carolina (6.2% of workforce) —3rd highest in United States. [17]

WHO

- University of North Carolina System
- North Carolina Community College System
- North Carolina Department of Public Instruction
- North Carolina Department of Commerce
- International Corporations located in North Carolina

North Carolina's exports increased 67.8% between 1993 and 1999. [18]

MONEY

Funded through a mix of state appropriations and foundation, federal, and private funding sources.

16 How to Create a Global Generation in Wisconsin for the 21st Century, Governor's WITCO Task Force on International Education, 1998.
17 Bureau of Economic Analysis 1999 and the State New Economy Index, Progressive Policy Institute, 1999, p. 19.
18 Source: International Trade Administration

RECOMMENDATION 7

Ensure a world-class learning environment for our citizens: Invest in the current and future technology infrastructure of North Carolina's educational institutions.

WHY

If North Carolina is going to be economically competitive in the future, it is imperative that we invest in building and maintaining the resources necessary to educate our workforce in all areas of the State. This includes recruiting, training, and retaining teachers and others who work in science and technology fields. It also includes investing in the necessary technologies that allow connectivity: hardware, software, Internet access, and distance learning technologies. The North Carolina Information Highway is a world-class early deployment of a switched broadband network. It provides a great foundation to expand upon.

Governor Hunt has been a staunch supporter of education and ever-improving students' performance already demonstrates a return from his leadership. Nonetheless, North Carolina still has a long way to go. Without support for a strong and constant focus on student educational improvement through programs like *North Carolina's First in America,* our prospects for creating a competetive workforce do not look good.

WORK TO BE DONE

- **47th in U.S. in students per multimedia computer**
- **43rd in U.S. in percent of classrooms with internet access**
- **34th in U.S. in household Internet connections**
- **34th in U.S. in high school completion (18.6% of population do not have a high school diploma)**
- **28th in U.S. in science and engineering grad students**[19]

Although these statistics paint a mixed story for North Carolina, there are many successful models of educational innovation and reform in our state that we should support and replicate. For example, the North Carolina School of Science and Math and its Cybercampuses offer advanced courses to students in rural high schools using distance learning technologies.

HOW

- Commit recurring funding for teacher professional development in science and technology.
- Use financial incentives to recruit and retain quality science, mathematics, and technology teachers.
- Commit recurring funding to provide technology resources throughout the K-16 institutions including computer hardware and software, high-speed access to the Internet, distance- learning capabilities, and appropriate staff to maintain the technology.
- Develop more programs in elementary and middle schools to encourage students to prepare for careers in science and mathematics.
- Encourage the proliferation in North Carolina of specialized networking academies sponsored by private companies such as: Nortel, Cisco, IBM, Microsoft, and Oracle and non-profit corporations such as ExplorNet.

WHO

- North Carolina General Assembly
- University of North Carolina System
- North Carolina Community College System
- North Carolina Department of Public Instruction
- Foundations and Non-Profit Organizations
- Industry Leaders

MONEY

Whatever it takes!

19 Sources: Market Data Retrieval, 1999; Education Week on the Web, 1998; Matrix Information and Directory Services, Incorporated, 1999; National Center for Education Statistics, 1997; U.S. Bureau of the Census, 1998; National Science Foundation, 1997.

RECOMMENDATION 8

Teach, celebrate, and reward innovative thinking in K-16.
Elevate and promote innovation in education, business, and government.

WHY

Today's economy is driven by knowledge and powered by innovation. In this new economy the key to wealth and job creation depends largely upon which ideas, innovations, and technologies are embedded in our products and services as well as in our government and educational policies and practices. The unassailable message is that innovation is vital to competitive enterprises.

Innovation is the prime engine of future economic growth and prosperity. Concepts and methods to accelerate the generation of innovative ideas, products, and processes must be taught to all citizens of North Carolina. Publicly rewarding innovative activities will encourage others to innovate.

WHO

- Department of Public Instruction
- North Carolina Department of Community Colleges
- University of North Carolina System
- North Carolina Department of Cultural Resources
- North Carolina Progress Board
- North Carolina Citizens for Business and Industry
- North Carolina Board of Science and Technology

HOW

- Study, test, and incorporate into the State Curriculum effective models that enhance innovation in K-16.
- Through models such as the Baldrige Quality Awards, publicly recognize innovators in all areas and sectors of the State for their accomplishments. Honor innovators through new categories in the North Carolina Awards.

MONEY

Curriculum development could be funded through a National Science Foundation grant and through the ongoing curriculum development funds of our educational institutions.

RECOMMENDATION 9

Develop public awareness and education programs to address social and ethical issues related to progress in science and technology.

WHY

Innovations in science and technology are already challenging our social and ethical norms. Biological advances in areas such as cloning, genetic engineering, and stem cell research coupled with exponential growth in the ability to electronically acquire, process, and access personally-identifiable information will have unanticipated effects on our citizens. North Carolina's citizenry and leadership must be educated about the legal and ethical issues surrounding advances in science and technology. Our leadership needs to participate in an informed dialogue on these issues to assure that the benefits of technological advance are realized in a way that does not compromise our fundamental principles.

HOW

- Enhance science education significantly throughout K-12 with special emphasis at the elementary school level.
- Educate the public, media, and the legislature using individuals in scientific and technological fields who can articulate the social relevance of their work.
- Integrate social, ethical, and legal issues into the science and technology curriculum of the K-12, community college, and university systems.
- Hold ongoing public forums about health, biological, and information technology issues that include updates on new technologies and regulatory issues.
- Educate medical personnel through their professional societies regarding self-regulation on the release of personally-identifiable information.

Dolly and Her Surrogate Mother.

Source: *Scientific American*

WHO

- A public/private partnership between the North Carolina Association for Biomedical Research, the Mathematics and Science Education Network, the North Carolina Science Teachers Association, and other similar organizations.
- The North Carolina General Assembly
- North Carolina Department of Public Instruction
- University of North Carolina System
- North Carolina Community College System
- Foundations such as Burroughs-Wellcome and the Kenan Fund
- Non-profit organizations

MONEY

$250,000 a year public funding to be matched by $250,000 a year from private sources.

RECOMMENDATION 10

Endorse and promote regional science and technology-based economic development programs.

North Carolina's seven regional economic development partnerships and the North Carolina Board of Science and Technology conducted region-specific conferences related to the Vision 2030 Project. Each Partnership developed recommendations for initiatives to enhance the region's science and technology-based economic development programs. Their recommendations, along with an explanatory note, are noted below boxed in blue.

The North Carolina Board of Science and Technology is making an additional recommendation for each region based upon a synthesis of input from Vision 2030 Regional Conferences and Focus Group Meetings. The Board's recommendations are noted below boxed in green.

A more detailed description of these recommendations will be released in late summer 2000 in The Vision 2030 Project: Compilation of all Vision 2030 Recommendations.

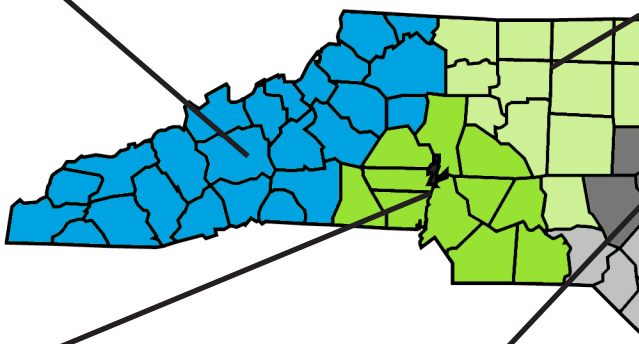
ADVANTAGEWEST

PROVIDE ENGINEERING AND INFORMATION TECHNOLOGY CURRICULA VIA DISTANCE LEARNING TECHNOLOGY TO WESTERN NORTH CAROLINA COMMUNITY COLLEGES, APPALACHIAN STATE UNIVERSITY, UNIVERSITY OF NORTH CAROLINA AT ASHEVILLE, AND WESTERN CAROLINA UNIVERSITY.

WHY- Access to the North Carolina State University School of Engineering and the University of North Carolina at Charlotte School of Information Technology to the western part of the State needs to be expanded to enhance the marketability of western North Carolina's workforce to science and technology-based industries.

SUPPORT THE WESTERN NORTH CAROLINA KNOWLEDGE COALITION

WHY- The western part of North Carolina has created a Knowledge Coalition with funds coming from a predominant federal source. Additional funds need to be solicited for this effort to create accessible education across the world wide web involving all of the educational institutions in the region.



CAROLINAS PARTNERSHIP

ENHANCE THE CAROLINAS PARTNERSHIP WEBSITE AND CREATE AN ECONOMIC DEVELOPMENT DATABASE.

WHY- The growth of the Internet as an economic development resource has exploded, becoming one of the most effective tools available for site selection and project development. Prospect leads originating from the Partnership's existing website have grown from less than one percent in 1997 to 21% in 1999. Upgrading the website will provide an interactive networking link to other non-profit and government groups throughout the Partnership region.

SUPPORT THE DEVELOPMENT OF A FINANCIAL SERVICES INSTITUTE IN CHARLOTTE

WHY- To support and maintain the Carolinas region's strong financial services industry, the State should support an initiative by the University of North Carolina-Charlotte and the Greater Charlotte Chamber of Commerce to create a financial services center.

RESEARCH TRIANGLE

DEVELOP 3 TO 5 MULTI-USE BUSINESS PARKS AT STRATEGICALLY PLACED RURAL LOCATIONS IN THE RESEARCH TRIANGLE REGION. THESE PARKS ULTIMATELY WOULD BECOME MINI-HUBS THAT WOULD FEED COMMERCIAL AND RESIDENTIAL GROWTH AROUND THE REGION'S RIM.

WHY- The development of mini-hubs would attract companies in science and technology-related industries, thus providing more opportunities to citizens of the Research Triangle region who have been left untouched by the technology prosperity experienced by the urban core.

CREATE A REGIONAL GENOMICS CONSORTIA

WHY- A Genomics Consortia should be developed that would include a partnership of researchers from NCSU, UNC-CH, Duke, NCCU, NC Biotechnology Center, NC Supercomputing Center, and the Research Triangle Institute. Such an effort will leverage existing expertise and reduce the cycle time in the development of genomics-based research and commercial products.

PIEDMONT TRIAD

Create IN-SYNC (Information Systems Center of North Carolina)

WHY- IN-SYNC will be a non-profit organization designed to develop partnerships among K-16 schools, government, business and economic development organizations. IN-SYNC will support technology applications, workforce development, education, and training. IN-SYNC is envisioned to be a reproducible model that will enable the Triad region to stay economically competitive in science and technology.

Support the Winston-Salem Based Emerging Technology Center

WHY- The Triad Region is to be commended for its many active efforts to build a more high-tech focused economy. This Center, already developed in Winston-Salem, needs strong state support.

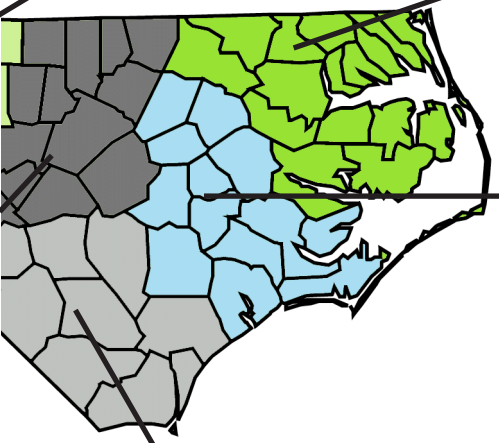
NORTH CAROLINA'S NORTHEAST

Provide high-speed, affordable, and reliable Internet access and interconnectivity throughout the region.

WHY- It is critical that broadband Internet access be made available in the Northeast region. Broadband access will drive future economic development in the region by enhancing educational opportunities and creating efficient access to information, people, and businesses.

Create a Technology Resources Center in the Northeastern Region

WHY- A regional Technology Resources Center would assist the coastal counties and area businesses with consultant technology resources for all economic sectors.



GLOBAL TRANSPARK

- **Improve the access and subsidize the cost of T1 lines in rural communities.**
- **Enhance the training and education of the workforce. Market the newly trained workforce to potential employers relocating or expanding in the region.**

WHY- To better enable the Global Transpark region to market istself to high-tech industries, technological infrastructure and technical education programs must be improved. Affordable connectivity and a technologically literate workforce will allow the Global Transpark region to broaden its industrial base to include more companies that rely on electronic data access making the region more competitive.

Create an Engineering School in Eastern North Carolina

WHY- Creation of a new engineering school at East Carolina University or UNC-Wilmington must be a top priority for eastern North Carolina if the region is to develop its engineering workforce to support high-tech industry.

NORTH CAROLINA'S SOUTHEAST

- **Appropriate funds to enhance the Southeast's technology infrastructure, including technology maintenance, computer upgrades, high-speed Internet connection, and purchase of new computer technology and software.**
- **Support professional development in technology for teachers, county developers and their staffs.**

WHY- The Southeast Partnership has demonstrated that the Internet is a great marketing tool but the region lacks the resources to keep its efforts moving forward. A computer training school has been created with the assistance of county developers and staff but most of its equipment is antiquated and in need of repair. The school lacks fast, affordable Internet service, and advanced technology.

Support the Creation of a Technology Development-Based Business Incubator

WHY- Growth in technology-based industry offers the best opportunity for job growth within the constraints of protecting the environment and capitalizing on the region's resources. Many of the essential ingredients for successfully nurturing and growing technology-based industries, including good communications systems with access to high speed data transfer, adequate transportation into and out of the region and an excellent living environment, are available in the region. By providing the infrastructure for biotechnology or information technology companies to prosper and grow, the region will be able to create job growth.

ACKNOWLEDGEMENTS

The North Carolina Board of Science and Technology thanks the following individuals and organizations for their active participation in the Vision 2030 process and in the development of the reports, recommendations and plans that are the products of this dynamic process.* The Board also thanks all of the more than 600 local leaders who attended the seven Regional 2030 Conferences. Their views and suggestions are reflected in the recommendations presented in this report and in a more comprehensive resource document that is to follow. The Board is particularly grateful to the organizations and firms that provided the financial support that made the Vision 2030 project possible.

Conveners

Governor James B. Hunt Jr.
LM Baker, Jr., Wachovia Corporation
President Molly Corbett Broad, University of North Carolina
Secretary Rick Carlisle, North Carolina Department of Commerce
Edward Dolby, Bank of America
Barry W. Eveland, IBM
Jim Goodmon, Capitol Broadcasting Co., Inc.
James H. Goodnight, SAS Institute
Billy Ray Hall, North Carolina Rural Economic Development Center
Robert A. Ingram,Glaxo Wellcome
President Martin Lancaster, North Carolina Community College System
Kenneth Olden, NIEHS
J. Billie Ray, Jr., BellSouth
Senator Eric Miller Reeves, North Carolina Senate
Representative Drew Saunders, North Carolina House of Representatives
Representative Joe Tolson, North Carolina House of Representatives
Superintendent Michael E. Ward, North Carolina Department of Public Instruction
F. Selby Wellman, Cisco Systems
A. Hope Williams, North Carolina Independent Colleges & Universities

Advisors

Chancellor John W. Bardo, Western Carolina University
Alan Blatecky, MCNC
David G. Brown, Wake Forest University
Norman R. Cohen, UNITEC
Doug Darr, North Carolina Biotechnology Center
Scott Daugherty, Small Business Technology Development Center
Thomas L. Feldbush, East Carolina University
President Emeritus William C. Friday, University of North Carolina System
Henry Fuchs, University of North Carolina at Chapel Hill
Bill Glaze, University of North Carolina at Chapel Hill
Andy Grubbs, Venture First
Edward W. Holmes, Duke University Medical Center
John D. Kasarda, University of North Carolina at Chapel Hill
Harry Leamy, University of North Carolina at Charlotte
Quentin Lindsey, Former Science Advisor to the Governor
Rich Linton, University of North Carolina System
Earl MacCormac, Duke University Medical Center
Louise McColl, McColl and Associates
Thomas J. Meyer, University of North Carolina at Chapel Hill
Charles Moreland, North Carolina State University
Katharine C. Neal, TechKnowledge
President Norman Oglesby, Tri-County Community College
Earnestine Psalmonds, North Carolina A&T State University
Michael A. Rappa, North Carolina State University
Robert S. Sullivan, Kenan-Flagler Business School, UNC-CH
John Summers, Brookmont Management, Ltd.
Robert Tyndall, University of North Carolina at Wilmington
Max Wallace, Cogent Neuroscience
Deborah Watts, Technology Development Group

Economic Development Partnerships

Dale Carroll, President, AdvantageWest North Carolina
Gordon Meyers, Chairman, AdvantageWest North Carolina
Michael Almond, President, Carolinas Partnership
Paul Chapman, Frormer Chairman, Carolinas Partnership
Carlos Evans, Chairman, Carolinas Partnership
David Barker, Chairman, North Carolina Global TransPark Region
Tom Greenwood, Executive Director, North Carolina Global TransPark Region
Charles Shaw, Chairman, North Carolina's Northeast Partnership
Rick Watson, President, North Carolina's Northeast Partnership
Don Kirkman, President, Piedmont Triad Partnership
Norman Samet, Former Chairman, Piedmont Triad Partnership
Fred Star, Chairman, Piedmont Triad Partnership
John Atkins, Former Chariman, Research Triangle Regional Partnership
Charles Hayes, President, Research Triangle Regional Partnership
Paul Butler, Director, North Carolina's Southeast
Henry Eugene Miller, Jr., Chariman, North Carolina's Southeast

Speakers

Everette I. Baucom, DuPont
Jonathon L. Benson, Medical Optical Imaging
Paul F. Briggs, Jr., Duke Power
President Molly Corbett Broad, University of North Carolina
Arthur Caplan, Center for Bioethics
Jack F.A.V. Cecil, Biltmore Farms
Terence Chong, Singapore National Science and Technology Board
David Cline, Carolinas Partnership
John Ciannamea, North Carolina Technology Development Authority
Jim Clayton, EDS
Norman Cohen, UNITEC
Moncie Daniels, Dare County Commissioner
Jean E. Davis, Wachovia Corporation
Stan Davis, Ernst & Young's Center for Business Innovation
Al Delia, East Carolina University
James D. Dixon, Bank of America Technology & Operations
Barry W. Eveland, IBM
Chancellor Marye Anne Fox, North Carolina State University
President Emeritus William C. Friday, University of North Carolina System
Greg Frisby, Frisby Technologies
Senator Linda Garrou, North Carolina Senate
Bill Louv, Glaxo Wellcome
James H. Goodnight, SAS Institute
Billy Ray Hall, North Carolina Rural Economic Development Center
Charles E. Hamner, Jr., North Carolina Biotechnology Center
Edward W. Holmes, Duke University Medical Center
Governor James B. Hunt, Jr., State of North Carolina
Patricia Ireland, CrossLogic Corporation
Thomas Kalil, Assistant to President Clinton for Economic Policy
President Martin Lancaster, North Carolina Community College System
President Max Lennon, Mars Hill College
Howard Newby, University of Southhampton
President Norman Oglesby, Tri-County Community College
Jane Smith Patterson, Office of the Governor
Alex (Sandy) Pentland, Massachusetts Institute of Technology
Earnestine Psalmonds, North Carolina A&T State University
Yuval Rabin, NetMind Technologies
Michael A. Rappa, North Carolina State University
J. Billie Ray, Jr., BellSouth
Kenneth G. Reece, Bank of America
Senator Eric M. Reeves, North Carolina Senate
David Rhind, City University of London
Richard J. Richardson, University of North Carolina at Chapel Hill
Jim Roberson, Research Triangle Foundation
Allen Roses, Glaxo Wellcome
Michael J. Sailor, University of California at San Diego
Representative Drew Saunders, North Carolina House of Representatives
Mark Siedlecki, Inside World
Robert S. Sullivan, Kenan-Flagler Business School, UNC-CH
Representative Joe Tolson, North Carolina House of Representatives
Ahmad Totonji, Internatiional Islamic Forum for Science, Tech. & Human Resources Development
Robert Tyndall, University of North Carolina at Wilmington
Max Wallace, Cogent Neuroscience
Superintendent Michael E. Ward, North Carolina Department of Public Instruction
F. Selby Wellman, Cisco Systems
Lieutenant Governor Dennis A. Wicker, State of North Carolina
A. Hope Williams, North Carolina Independent Colleges & Universities
Lee Yarbrough, Novo Nordisk BioChem North America
Tom Young, IMPulse NC, Inc

Researchers

Edward Feser, University of North Carolina at Chapel Hill
Mike Luger, Kenan Center - Office of Economic Development
Leslie Stewart, Kenan Center - Office of Economic Development
Deborah Watts, Technology Development Group
Ken Wilson, East Carolina University Survey Research Center

Task Force Chairs

Robert S. Sullivan, Innovation, Kenan Flagler Business School, UNC-CH
Ruben Carbonell, Knowledge and Technical Infrastructure, Kenan Institute for Engineering, Technology and Science
President Martin Lancaster, Science and Technology Workforce, North Carolina Community College System
Joan Michael, Science and Technology Workforce, North Carolina State University College of Education and Psychology
Mary U. Musacchia, Global Competitiveness, SAS Institute
Gordon Smith, Global Competitiveness, Shearson & Lehman
Karen Hoffman, Social and Ethical Issues, North Carolina Association for Biomedical Research
Secretary Betty McCain, Social and Ethical Issues, Department of Cultural Resources

* The listed participants in the Vision 2030 project do not necessarily support all of the Vision 2030 recommendations.

Task Force Participants

Holt Anderson, NCHICA
Stephen L. Athans, Forsyth Technical Community College
Ken Atkins, Wake County Economic Development
Malissa Bailey, North Carolina State University
Kelli Barham, North Carolina Department of Cultural Resources
Bonnie Beam, Western Carolina University
Rose Beci, North Carolina Biotechnology Center
Mark Bensen, Kenan Institute for Engineering, Technology and Science
Fred Benson, North Carolina Administrative Office of the Courts
Sarah Berenson, North Carolina State University
John Boehme, Wake Forest University
Todd R. Boyette, The Health Adventure, Inc.
Linda Bradley, North Carolina Department of Cultural Resources
Jeff Brittain, City of Hickory
Mary Sue D. Brown, Employment Security Commission
Wanda Bunch, Pitt Community College
Patrick Byker, Durham Chamber of Commerce
Aura Camacho Maas, Latin American Resource Center
Ruth Turner Camp, World Trade Center of North Carolina
Watts Carr, Consultant
Parker Chesson, Employment Security Commission
McNeil Chestnut, Office of the Attorney General
Keith Clark, Concurrent Technologies Corporation
Tim Clapp, North Carolina State University
Jim Clinton, Southern Growth Policies Board
Julie B. Cole, Wake Forest University
Herb Crenshaw, BellSouth
Alice Crisp, Blue Ridge Community College
Mark Crowell, North Carolina State University
Tony Crumbley, Charlotte Chamber of Commerce
Moncie Daniels, Dare County Commission
Doug Darr, North Carolina Biotechnology Center
Scott Daugherty, Small Business Technology Development Center
Jim Davis, Craven Co. Economic Development
Roger Debo, North Carolina State University
Joseph M. DeSimone, University of North Carolina at Chapel Hill
Greg Dillingham, University of North Carolina at Asheville
Cuyler Dunbar, Catawba Valley Community College
Robert Entman, North Carolina State University
Theresa Esposto, University of North Carolina at Chapel Hill
Ken Eudy, Capital Strategies
Larry Fincher, North Carolina Center for Creative Retirement
Senator Virgina Foxx, North Carolina Senate
Paul Friday, Concurrent Technologies Corporation
Barbara Garlock, Health Data Institute
Ann Garrett, Office of Information Technology Services
Ed Gerler, North Carolina State University
John Gilligan, North Carolina State University
Bob Goodale, Mars Hill College
Crystal Harkey, Stanly Community College
Carl E. Harris, Franklin County Public Schools
Michele Hoyman, University of North Carolina at Chapel Hill
Patricia Ireland, CrossLogic Corporation
Cesar Jackson, North Carolina A & T State University
Edward Jackson, Fayetteville Technical Community College
Doug Jones, AB Tech
Sandra Jones, Pitt Community College
Betsy Justus, ACS Enterprise Solutions
Arlon Kemple, North Carolina Department of Cultural Resources
Allen Kimball, Warren County EDC
Barbara Kirby, North Carolina State University
Mary P. Kirk, Montgomery Community College
Michael Kocurek, North Carolina State University
Stephanie Kuck, World Trade Center of North Carolina
Edith Lang, North Carolina Community College System
David M. Lawrence, University of North Carolina Institute of Government
Cliff Layman, North Carolina Administrative Office of the Courts
Russ Lea, North Carolina State University
Quentin Lindsey, Former Science Advisor to the Governor
Rich Linton, University of North Carolina
Thomas V. Long, Maricultura, Inc.
Linda Lutz, Catawba Valley Community College
Lee Mandell, North Carolina League of Municipalities
Secretary Elaine Marshall, North Carolina Department of State
Nino Masnari, North Carolina State University
Brian Matthews, North Carolina State University
Suzanne Maupin, Duke University
Charles McClennahan, North Carolina School of the Arts
Robin McCree, Stanly Community College
Jennifer McCrory, North Carolina Department of Cultural Resources
Denny McGuire, Office of Information Technology Services
Philip S. McMullan, McMullan Consulting
Jeanne Meiggs, Resources for Educational Systems and Associates
Casey Miller, University of North Carolina at Chapel Hill
David Miller, Glaxo Wellcome
Roger Miller, University of North Carolina at Chapel Hill
Tom Miller, North Carolina State University
Doug Miskew, IBM
Mark A. Moore, Division of Archives and History
Nydia Morales, Martin Community College
Darryl D. Moss, City of Creedmoor
Pat Moss, Former Mayor Protem of Hickory
Joe Mullis, Fayetteville Technical Community College
Charles J. Murray, Office of the Attorney General
Joan Myers, NCEITA
Raj Narayan, Kenan Institute for Engineering, Technology and Science
Daniel K. Nelson, University of North Carolina at Chapel Hill
Jan Nichols, NC Equity
Secretary Muriel K. Offerman, North Carolina Department of Revenue
President Norman Oglesby, Tri-County Community College
David Olson, Division of Archives and History
John O'Neil, North Carolina State University
James Owen, Piedmont Community College
Mike Pelone, EDS Business Process Management
David Perry, Bladen Community College
Linda Phillips, Catawba Valley Community College
John Pijanowski, North Carolina State University
Amy Piniak, Office of Senator Marc Basnight
Lloyd Price, North Carolina Administrative Office of the Courts
Maria Rapoza, North Carolina Biotechnology Center
Don Reichard, Johnston Community College
James Roberson, Research Triangle Foundation
Donna Rosefield, North Carolina Department of Cultural Resources
Deborah Ross, ACLU
Timothy Sanford, University of North Carolina at Chapel Hill
Elaine Seaman, Pitt Community College
Marc Sedam, University of North Carolina at Chapel Hill
Richard R. Sharp, NIEHS
Ann Shaw, Randolph County Register of Deeds
Ed Shearin, Mars Hill College
Thomas Shown, North Carolina Department of Public Instruction
David Sink, Blue Ridge Community College
Ed Southern, Division of Archives and History
Tim Stephens, University of North Carolina at Chapel Hill
Barry Teater, North Carolina Biotechnology Center
Nancy Thompson, University of North Carolina at Chapel Hill
Bill Tucci, North Carolina Department of Public Instruction
Representative Russell Tucker, North Carolina House of Representatives
Robert Tyndall, University North Carolina at Wilmington
Michael J. Unruh, North Carolina Administrative Office of the Courts
Andrew A. Vanore, Jr., North Carolina Department of Justice
Bob Waddell, Pitt Community College
Kenneth Walend, Macintosh Help, etc.
Representative Trudi Walend, North Carolina House of Representatives
John Walser, Lexington City Council
Larry Watson, North Carolina State University
Jeanne Whisnant, Mayland Community College
Ben White, Wake Technical Community College
Katherine White , Office of Information Technology Services
Rita Wilkins, AdvantageWest Partnership
A. Hope Williams, North Carolina Independent Colleges & Universities
Mitchell Williams, Western Carolina University
Saundra Wall Williams, North Carolina State University
Thomas Williams, North Carolina Business Committee for Education

North Carolina Board of Science and Technology Staff

Dyan Austin, Administrative Officer
Margie Boccieri, Associate Director
Trudy Guffey, Administrative Secretary
Patti Hensley, Webmaster
Sally Holloman, Receptionist
Michael Jones, Science and Mathematics Specialist
Barbara Levine, Director, ConnectNC
Jane Smith Patterson, Executive Director, Senior Advisor to the Governor for Science and Technology

North Carolina Board of Science and Technology Interns

Amy Harvell, North Carolina State University
Nora Leeland, North Carolina State University
Sarah Levinson, North Carolina State University
Heidi Lucas, North Carolina State University
Elizabeth Murphy, North Carolina State University
Elaine Suryakusuma, Duke University
Alyssa Terry, Campbell University
Mark Walters, University of North Carolina at Chapel Hill

North Carolina Board of Science and Technology

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Katie G. Dorsett, Department of Administration
Charles E. Hamner, North Carolina Biotechnology Center
John Harer, Duke University
Victoria Haynes, Research Triangle Institute
William R. Kress, MCNC
Charles Moreland, North Carolina State University
Freda Nicholson, Discovery Place, Inc.
Jane Smith Patterson, Office of the Governor
Earnestine Psalmonds, North Carolina A&T State University
Richard J. Richardson, University of North Carolina at Chapel Hill
Ravindra P. Sinha, Elizabeth City State University
Larry W. Watson, North Carolina State University
Lieutenant Governor Dennis Wicker

Vision 2030 Task Forces - Modeling a Competitive Future

Science and Technology Workforce issues embrace quality and quantity factors that challenge all public and private sectors. The task force recommendations focused on five issues: 1) professional development and quality training; 2) recruitment to careers in science and technology; 3) curriculum development in K-16; 4) collaboration among constituent institutions; and, 5) financial investment.
Chairs: Martin Lancaster - President, N.C. Community College System; Joan Michael - Dean, College of Education and Psychology, NCSU
Staff: Malissa Bailey, NCSU

Knowledge and Technical Infrastructure investment is critical to competitiveness in the New Economy. To enhance North Carolina's knowledge and technical infrastructure we need to: 1) increase the availability, affordability and usability of science and technology-based resources: and, 2) focus on innovative collaborative partnerships to increase the value and economic sustainability of the State's science and technology resources. To achieve these goals we should: 1) develop a state-level infrastructure organization for science and technology; 2) provide tax incentives for research and collaborations; 3) provide matching/seed funds for research; and, 4) targeted budget allocations.
Chair: Ruben Carbonell - Director, Kenan Institute for Engineering, Technology and Science, NCSU
Staff: Raj Narayan and Mark Bensen, Kenan Institute

Global Competitiveness is necessary for survival in the New Economy. North Carolina firms are competing in a global arena for markets, workers, and resources. Considerations of this task force touched on issues related to: 1) tax policy; 2) image; 3) infrastructure - education and transportation/utilities (including connectivity); 4) data access/analysis; and, 5) administration of science and technology policy.
Chairs: Mary U. Musacchia - SAS Institute; and Gordon Smith - Shearson and Lehman
Staff: Ruth Turner Camp, N.C. World Trade Center

Social and Ethical Issues frame both challenges and opportunities arising from science and technology. These issues need to be addressed in a proactive manner that enhances the understanding, inclusion, cooperation, and competitiveness of the State's citizenry. The task force focused on the implications of technological innovations on issues of personal privacy.
Chairs: Betty McCain - Secretary, N.C. Dept. of Cultural Resources and Karen Hoffman - President, N.C. Association for Biomedical Research
Staff: Mark Moore, N.C. Dept. of Cultural Resources

Innovation: The unassailable message is that innovations are vital and that environments, policies, and practices that support innovation will be among the most competitive. The Innovation task force recognized: 1) the inextricable links between innovation and entrepreneurship; 2) the need to reduce impediments and enhance the frequency and quality of both human and electronic networks; and 3) fiscal constraints that place a premium on leveraging the relationships and success of previous investments in science and technology. The Innovation task force focused its considerations on topics of: 1) technology transfer and commercialization; 2) capital formation targeting seed funds and support for sponsored research and development; 3) research and development tax credits; 4) enhanced infrastructure at the regional levels; and, 5) inculcating the importance of innovation through education at all levels.
Chair: Robert Sullivan - Dean, Kenan Flagler Business School, UNC-Chapel Hill
Staff: Deborah T. Watts, Technology Development Group

Vision 2030 Key Recommendations

June 2000

1. Evolve North Carolina's science and technology-based economic development operations into a competitive configuration for the 21st century knowledge economy.

2. Support the dynamic development of new companies, products, and services through innovative funding mechanisms.

3. Establish a central resource center for the collection, analysis, and dissemination of data on North Carolina's economy.

4. Design a globally competitive research and development tax credit.

5. Brand and market North Carolina globally as a high-tech state.

6. Erase the boundaries: Teach North Carolina's citizens to think, learn, and work in a borderless world.

7. Ensure a world-class learning environment for our citizens: Invest in the current and future technology infrastructure of North Carolina's educational institutions.

8. Teach, celebrate and reward innovative thinking in K-16. Elevate and promote innovation in education, business, and government.

9. Develop public awareness and education programs to address social and ethical issues related to progress in science and technology.

10. Endorse and promote regional science and technology-based economic development programs.

**It is not the strongest of the species that survive,
nor the most intelligent,
but the one most responsive to change.
- Charles Darwin**

Publications of the North Carolina **VISION 2030** Project

At The Crossroads:
North Carolina's Place in the Knowledge Economy of the Twenty-First Century
April 1998

Forces For Change -- An Economy in Transition
September 1999

Best Practices in Science and Technology-Based
Economic Development Policy: U.S. and Global
September 1999

North Carolina's Regions:
Transitioning to the Knowledge Economy --
Summary Proceedings of Regional Focus Group Meetings
September 1999

Public Perceptions of the Importance of Science and Technology
to the North Carolina Economy
September 1999

Tracking Innovation: North Carolina Innovation Index 2000
June 2000

High-Tech Clusters in North Carolina
June 2000

Vision 2030: Mapping the Vision
June 2000

VISION 2030 CONTACT INFORMATION

Phone: (919) 733-6500 • Fax: (919) 715-3775
E-mail: vision2030@gov.state.nc.us
www.governor.state.nc.us/govoffice/vision2030/
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