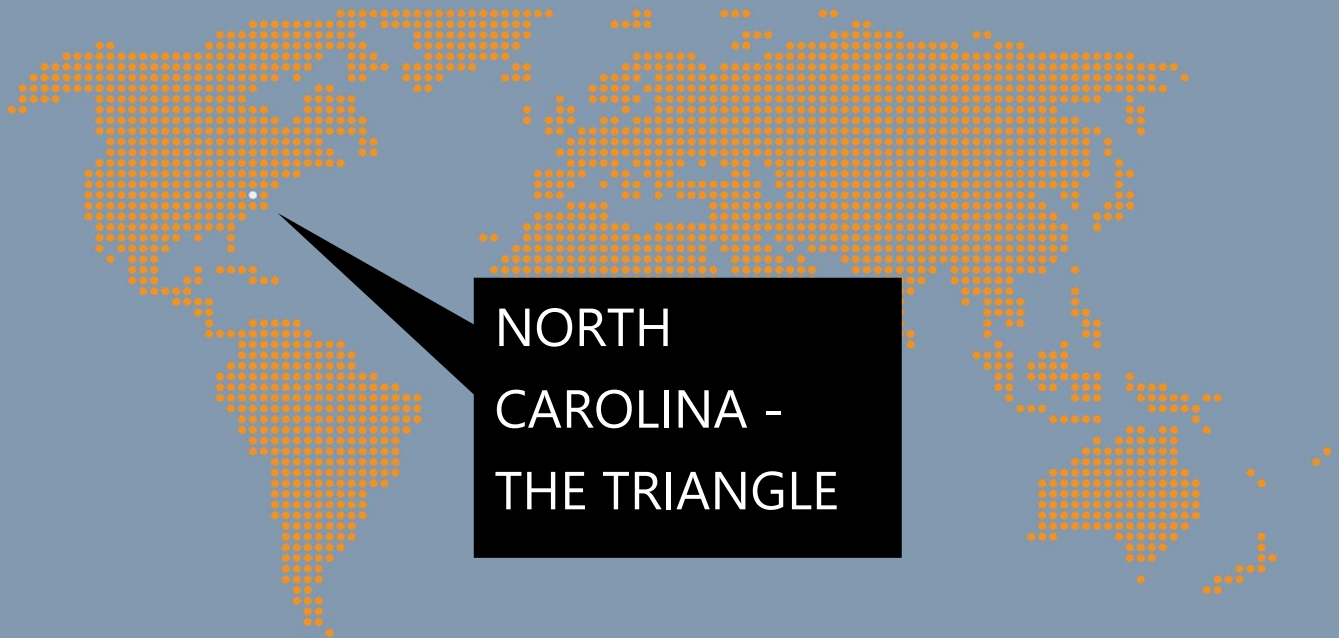




CORRIDORS AND TECH REGIONS: INTERNATIONAL CASE STUDIES



NORTH CAROLINA - THE TRIANGLE

NORTH CAROLINA – THE TRIANGLE (USA) > *BOLD AMBITIONS MATCHED BY SUBSTANTIAL COLLABORATIVE ACTIONS*

- > **Transformation into leading global tech region.** Since the late 1950s, the economy of North Carolina's Research Triangle has been transformed from one dependent on agriculture and textiles to one driven by knowledge-based jobs in technology, telecommunications, and pharmaceuticals.
- > **Founded in collaboration to deliver the USA's biggest technology research and science park.** The Triangle is home to the Research Triangle Park (RTP). Founded in 1959, this cross-boundary 7,000-acre science park is the largest and leading high technology research and science park in North America.
- > **High ranking for business friendly, high tech and as a place to live.** Eighth of 125 global regions (World Knowledge Competitive Index); First place in the US to live and work (Employment Review); First place for business climate (Site Selection); First place for biotechnology (Milken Institute); First place for High-Tech Region (Silicon Valley Leadership Group); First place for Best Place for Business & Careers (Forbes); First place for Best Place to Live in the U.S. (Msnbc.com); First place for Pro-Business State (Pollina Corporate Real Estate Inc.)
- > **Bold, ambitious strategy achieved and delivered through effective cross-boundary collaboration.** A major collaborative venture was formed between the three universities, around the development of a major new asset – a science park. Initiatives of scale and scope were developed, such as the Council for Entrepreneurial Development – serving the Triangle 'region'
- > **Use of physical solutions to stimulate greater university-business interaction.** The Centennial Campus created space and premises for co-location and co-production between researchers, students, universities and business. The key aim was to erode divisions between the university and business.
- > **Collaborative regional delivery bodies including a regional partnership and public transport authority.** The Research Triangle Regional Partnership (RTRP) is a business-driven, public-private partnership whose 2004 strategy delivered 110,000 new jobs. GoTriangle, the public transport authority delivers a range of flexible public transport solutions and is planning a 17.1-mile light rail route.



NORTH CAROLINA – THE TRIANGLE (USA) > *BOLD AMBITIONS MATCHED BY SUBSTANTIAL COLLABORATIVE ACTIONS*

INTRODUCTION

Introduction

TRANSFORMATION FROM AGRICULTURE AND TEXTILES INTO ONE OF THE USA'S LEADING TECH REGIONS

Since the late 1950s, the economy of North Carolina's Research Triangle has been transformed from one dependent on agriculture and textiles to one driven by knowledge-based jobs in technology, telecommunications, and pharmaceuticals. At the region's centre is the 7,000-acre Research Triangle Park, one of the nation's largest and most prominent research and development campuses. Founded in 1959 through a partnership of local governments, universities, and business leaders, Research Triangle Park has catalysed the region's rapid growth and hastened its amalgamation into a single metropolitan area.

About the area

The Research Triangle, also known as 'The Triangle', is a region in North Carolina, anchored by North Carolina State University, Duke University, University of North Carolina at Chapel Hill, the cities of Raleigh and Durham, and the towns of Cary and Chapel Hill. The region, officially named the 'Raleigh–Durham–Cary–Chapel Hill' combined statistical area, comprises the Raleigh–Cary and Durham–Chapel Hill metropolitan areas and the Dunn, Henderson, Oxford, and Sanford Micropolitan Statistical Areas. The Research Triangle had a population of 2.4 million in 2015 and 44.3 per cent of the population have college degrees – much higher than the national average of 36.5 per cent. Although the name is now used to refer to the geographic region, 'the Triangle' originally referred to the three universities, whose research facilities have historically served as a major attraction for businesses located in the region.

HOME TO THE RESEARCH TRIANGLE PARK – THE LARGEST AND LEADING HIGH TECHNOLOGY RESEARCH AND SCIENCE PARK IN NORTH AMERICA

The Triangle is home to the Research Triangle Park (RTP). Founded in 1959, this cross-boundary 7,000-acre namesake for the entire Triangle region is two miles wide and eight miles long – the largest and leading high technology research and science park in North America.

TRANSFORMING A STAGNATING ECONOMY IN THE 1950S

In the 1950s, the economy of North Carolina was stagnating. It had the third lowest per capita income in the US, an economy tied to three failing industries (tobacco, textiles and furniture), the prevalence of low-wage manufacturing jobs, and a pronounced brain drain, resulting in only 3.3 per cent employment in high-technology industries, compared to 10.3 per cent across the US at that time.



A COLLABORATIVE, CROSS-BOUNDARY INITIATIVE: NORTH CAROLINA'S RESEARCH TRIANGLE PARK (RTP)

The establishment of North Carolina's Research Triangle Park in 1959 was aimed at reversing the brain drain of graduates from the area's top research universities by creating an expansive campus where social scientists could conduct their academic pursuits close to their local universities. At each corner of the science park was a major university – University of North Carolina at Chapel Hill (Orange County), North Carolina State University in Raleigh (Wake County), and Duke University in Durham (Durham County). The RTP brought the three universities together to encourage greater cooperation and coordination. Regular cross-pollination of personnel among the universities led to a reduction in destructive rivalries and a sharing of best practices.

RTP ONE OF THE USA'S THREE CELEBRATED HIGH TECH CLUSTERS

The RTP "is the only one of the three celebrated high-tech clusters [the others being Silicon Valley and Route 128] that was conceived of before it existed, and the only one where government and academia were equal partners with private industry during the initial development phase¹." "[I]n RTP, we see a centrally planned rather than organic process driven by established firms rather than start-ups²."

UNIQUE IN TERMS OF THE SCALE OF BENEFITS OF A SCIENCE PARK

In 2004, a study by Scott Wallsten argued that, in general, science based research parks do not usually have a large positive effect on the economic growth of an area. One of the few exceptions specifically mentioned in this report was the RTP, which has had a substantial impact on the economic growth of the Research Triangle.

- > From the late 1980s to 2005, the Durham-Chapel Hill Metropolitan Statistical Area (MSA) and Raleigh-Carey MSA experienced per capita personal **income growth** that far exceeded North Carolina as a whole and the national average. While not all of this growth can be solely attributed to the establishment and growth of RTP, residents of the Research Triangle area greatly benefited economically from the creation of approximately 40,000 high paying research and technology specific jobs.
- > In addition to jobs created within the RTP, the area has experienced a number of **direct and indirectly related economic benefits** including construction jobs, real estate tax yields, sales tax yields and income tax yields. And since 1970, more than 1,500 companies have been established in the Triangle Region as a direct result of supporting the work done by companies inside RTP and the three associated universities.
- > What has enabled much of this growth is a fundamental shift in the types of companies that were established within RTP. Prior to the existence of RTP, fewer than 15 per cent of the businesses in the counties around RTP (Orange, Wake, and Durham) were involved in '**new-line**' industries, i.e. electronics, communications, engineering and management services, chemicals, and business and education services. As RTP grew, so did the percentage of new-line businesses, from 30 per cent in 1966 to 51 per cent in 2005. Much of the economic growth success of RTP and the surrounding area has been attributed not only to the number of firms with RTP, but to the nature of the businesses that those companies are involved in, thus allowing them to compete on a global basis.

¹ Schalin Jay. An Accident of Planned Growth. Pope Center. Jan 2, 2011.

² Ibrahim Damien M. Building the Next Silicon Valley: The role of Angel Investors in Economic Development. University of Wisconsin Law School. Sep, 2008.



- > **Innovative activity** is also very high in the area. In 2013, the Metropolitan Policy Program at the Brookings Institute conducted a comprehensive analysis of patenting activity and trends on a national scale. It found that the Durham-Chapel Hill MSA (40th of 358 MSAs) and the Raleigh-Cary MSA (19th of 358) both ranked extremely high in terms of the average number of patents developed per year during the period from 2007 – 2011. Both MSAs were also in the top twenty MSAs in terms of patents per million residents for the period from 2007 – 2011.
- > By 2012, North Carolina also led all other states in job growth rates in the **biosciences**, recording a 23.5 percent increase in jobs since 2001. Total job gains in biotechnology during the period (12,000) were exceeded only by three much larger states, California, Texas, and Florida.

TIMING, UNIVERSITY PARTNERSHIPS, INDUSTRY CLUSTERING, AND COMMITMENT: THE FOUR PRIMARY FACTORS FOR SUCCESS

Much of the success of the RTP and its positive economic impact on the local area can be attributed to four primary factors, as set in Cirillo (2013):

- > **Timing:** the idea for the Park occurred during a period in which private industry, state and local government saw the immense potential for significant investments in advanced research and development;
- > **University Partnerships:** links with the three surrounding world-class universities allowed the RTP to build excellent working relationships with scientists and engineers and also employ the best and brightest graduates of these universities. The formal establishment of a permanent academic entity, the Triangle Universities Center for Advances Studies Inc (TUCASI), helped to play a significant role in cementing this relationship;
- > **Clustering:** the critical mass of diversified businesses with their highly skilled scientists and engineers has enabled RTP to form a knowledge-based cluster that has demonstrated the ability to leverage these skills in innovative and creative ways to sustain long-term economic sustainability and growth;
- > **Commitment:** there has been a long-term commitment on the part of both state and regional leadership that has allowed RTP to flourish.

Various indices rank the RTP region highly, including:

- Fourth ranking region of the USA (Public Policy Institute)
- Sixth US metro area (Beacon Hill Competitive Index)
- Sixth US region (Richard Florida Creative Index)
- Eighth of 125 global regions (World Knowledge Competitive Index)
- First place in the US to live and work (Employment Review)
- First place for business climate (Site Selection)
- First place for biotechnology (Milken Institute)
- First place for High-Tech Region (Silicon Valley Leadership Group)
- First place for Best Place for Business & Careers (Forbes)
- First place for Best Place to Live in the U.S. (Msnbc.com)
- First place for Pro-Business State (Pollina Corporate Real Estate Inc.)



Key industries and the knowledge-based economy

The first major firm to move into the research park was the Chemstrand Corporation, which relocated from Decatur, Alabama in May 1959. There was slow progress in attracting additional companies over the next five years.

In 1965, the arrival of IBM and the National Institutes of Environmental Sciences accelerated RTP's development and set the stage for an influx of highly-skilled workers. RTP's focus on microelectronics, biotechnology and data communications also attracted companies such as Nortel and Burroughs Wellcome in the 1970s while new research companies were founded.

In 1975, the Triangle Universities Center for Advances Studies Inc (TUCASI) was created – a 120-acre park within the park. TUCASI was specifically designed to foster an environment where faculty and students from the three associated universities could come together and collaborate with the RTP's scientists and engineers. In 1976, TUCASI won a competition to house the National Humanities Center and today encompasses a number of other world-class entities such as the Microelectronics Center of North Carolina, the North Carolina Biotechnology Center (NCBC), the National Institute for Statistical Sciences (NISS), the Statistical and Applied Mathematical Sciences Institute (SAMSI), the Borroughs-Wellcome Fund, and Sigma Xi.

COLLABORATION AND LEADERSHIP TO PRODUCE SIGNIFICANT INSTITUTIONS FOR ENTREPRENEURSHIP

In 1983, the creation of the Council for Entrepreneurial Development (CED) significantly accelerated the culture of entrepreneurship and a climate for innovation in the region. CED helped partner ideas with money through networking and educational forums, contributing to a major change in attitudes within the RTP and the associated universities and resulting in a stream of spin-off companies.

PHYSICAL CO-LOCATION OF RESEARCH AND ENTERPRISE

In the 1980s, the Centennial Campus was created approximately 15 miles (24 km) east of RTP. With almost 6,000 corporate employees, researchers and students working and interacting in the same buildings, the aim was to erode divisions between the university and business. The vision was of "a research and advanced technology community where university, industry and government partners interact in multidisciplinary programs directed toward the solution of contemporary problems."

In 1984, North Carolina's General Assembly established the North Carolina Biotechnology Center (NCBT), the world's first government-sponsored economic development organisation in the fledgling field of biotechnology. The establishment of the NCBT was the beginning of a phenomenally successful effort by the state to achieve a leading position in this field. The region is consistently ranked in the top three in the U.S. with concentration in life science companies. Some of these companies include GlaxoSmithKline, Biogen Idec, BASF, Merck & Co., Novo Nordisk, Novozymes, and Pfizer. Significantly, in contrast to other prominent life science states, few of North Carolina's biopharma manufacturers have local origins – nearly 85 percent are non-local' and many of them were actively recruited from Europe, Japan and other U.S. locations.

DIVERSE TECHNOLOGY AND RESEARCH ACTIVITIES AND BUSINESSES

Today, RTP is home to a combination of multi-national corporations, university derived businesses, and entrepreneurial financed start-ups working in the fields of agricultural biotechnology, biotechnology/life sciences,



clean and green technologies, information technology, materials sciences and engineering, business and professional services, and financial and insurance activities. More than 170 companies are located on the park.

RTP is also surrounded by a variety of other Durham business and corporate parks populated by pharmaceutical, microelectronic, biotechnology, telecommunications, and textile businesses, to name a few.

The sprawl of housing developments across the three cities that comprise 'the Triangle' make RTP a work destination for 39,000 full-time employees and 10,000 contract workers. Over the last decade or so, the downtown areas of nearby Raleigh and Durham began attracting young professionals back to the cities with redevelopment of old warehouses, mixed-use developments, and a revitalized arts, culture, and restaurant scene.

In 2004, an extensive research effort revealed eight clusters related to life sciences and technology in which the Research Triangle Region is a global leader or has the potential to be and that have high potential for future job creation: Agricultural biotechnology, Advanced medical care, Analytical instrumentation, Biological agents and infectious diseases, Informatics, Nanoscale technologies, Pervasive computing, and Pharmaceuticals. In recent years, new clusters have emerged in response to shifting consumer and global market conditions. They are: Advanced gaming and e-learning, Clean/green technologies, and Defense technologies.

MAJOR EMPLOYERS

American Airlines, BASF, Bayer, Blue Cross & Blue Shield of North Carolina, The Body Shop, Burt's Bees, Cisco Systems, Credit Suisse Group, Duke University, Durham Public Schools, DuPont, Eaton, Fidelity Investments, Environmental Protection Agency, General Electric, GlaxoSmithKline, IBM, LabCorp, Lenovo, Netapp, North Carolina state government (including University of NC system), Pfizer (Pfizer Poultry Health), Progress Energy, PNC (PNC Financial Services Group, Inc.), Qualcomm, Quintiles, Red Hat, Research Triangle Institute, SAS Institute, Sony Ericsson, Syngenta, Teleflex Medical, Toyota, United States Forest Service, Verizon, Wake County Public School System.



ENABLING ASSETS, INFRASTRUCTURE AND POLICIES

Enabling assets

The Research Triangle Region's key competitive assets are set out in 'The Shape of Things to Come: The Economic Development Strategy for the Research Triangle Region,' Research Triangle Regional Partnership (July 2009):

- > A critical mass of 'new economy' companies, including world-leading clusters in life sciences and technology and the nation's largest concentration of contract research organisations;
- > Research and development funding;
- > Internationally renowned research universities;
- > High quality of life that enables the region to attract and retain knowledge workers;
- > Worker training resources, including those from topflight community colleges;
- > Global reputation of the Research Triangle Park;
- > Relatively low cost of living and doing business compared to other technology regions;
- > Highly-educated work force.

Enabling infrastructure

THE TRIANGLE HAS ITS OWN PUBLIC TRANSPORTATION AUTHORITY WHICH DELIVERS A DIVERSE RANGE OF PUBLIC TRANSPORT SOLUTIONS

GoTriangle bus & shuttle service and the planned light rail service: The Research Triangle Regional Public Transportation Authority, known as 'GoTriangle' operates a regional bus and shuttle service, paratransit services, ride-matching, vanpools, provides commuter resources, and an emergency ride home program. 'GoTriangle' aims to improve the region's quality of life by connecting people and places with reliable, safe, and easy-to-use travel choices that reduce congestion and energy use, save money, and promote sustainability, healthier lifestyles, and a more environmentally responsible community. GoTriangle is governed by a thirteen-member Board of Trustees. Ten members are appointed by the region's principal municipalities and counties and three members are appointed by the North Carolina Secretary of Transportation.

GoTriangle is planning a 17.1-mile (27.5 km) Durham-Orange light rail line between the University of North Carolina at Chapel Hill and East Durham, traveling through Duke University and paralleling the North Carolina Railroad alignment through Durham. Estimated to cost \$1.5 to \$1.6 billion, funding is expected to be half federal and half local. The line is projected to begin construction in 2020 and be complete by 2026. End-to-end travel time will be 39 minutes.

The Triangle region has experienced extraordinary growth in recent years. Growth forecasts show population in the region increasing by 80 percent between 2010 and 2040. Within the Durham-Orange Corridor, the population is projected to double and the highest expected travel intensity (number of trips per acre) in the Triangle region is predominately located in this corridor. Even under current demands, the region's transportation system is



beginning to strain. Levels of congestion are increasing and are anticipated to worsen, which will lead to increased travel times and the continuation of automobile-oriented development patterns.

The region's rapid growth is also outpacing the ability to repair, replace and expand the existing roadway network. Considering financial and environmental issues, simply increasing highway capacity to meet these demands is no longer a viable option. Furthermore, the region's existing transit network is currently operating at close to maximum capacity including 84 buses per hour servicing UNC Hospitals and 46 buses per hour servicing Duke University and Durham Veterans Affairs (VA) Medical Centers.

NEW LIGHT RAIL INFRASTRUCTURE PLANNED

In order to maintain the high quality of life and attract new residents and businesses, the region needs a multi-modal transportation system, including improved high-quality transit service.

Light rail was chosen for the D-O Corridor because this technology will:

- > Connect residential, educational, and major employment centres throughout the corridor;
- > Serve the people in the D-O Corridor more cost-effectively in the long-term than other transportation options;
- > Efficiently serve a corridor with some of the highest projected trips per acre in the Triangle region;
- > Support land use patterns that require closely spaced stops, best served by vehicles that are able to accelerate quickly;
- > Provide solid anchors needed to shape land use along the corridor;
- > Provide high-frequency rail service shown to support transit-oriented development.

INTERNATIONAL AIRPORT THAT IS ALSO USED TO UNDERPIN INTERNATIONAL ECONOMIC SUCCESS

Raleigh–Durham International Airport: Raleigh–Durham International Airport (RDU) is the main airport serving Raleigh, Durham and the surrounding Research Triangle region. The airport covers almost 2,000 ha. It has three runways and two terminals. Terminal 2 opened in 2011 and handles the majority of airlines and passengers. The airport has had an average of 9 million passengers per year, serving around 350 operations per day and offering 38 direct flights both to national and international destinations.

The Raleigh-Durham Airport Authority is currently embarking on the preparation of an airport master plan study, Vision2040, to guide future development at Raleigh-Durham International Airport. It was launched in June 2015 and is due to conclude in late 2016. The Master Plan Study will define the future of the airport while ensuring that it continues to meet the growing demand in the Research Triangle Region and remains a driving economic force.

Enabling policies

The Research Triangle Regional Partnership (RTRP) is a business-driven, public-private partnership dedicated to keeping the Research Triangle Region economically competitive through business, government and educational collaboration. RTRP comprises economic development agencies across the region, who work with the North Carolina Department of Commerce and a wide range of partners to market the region for new investment and direct strategic efforts to ensure the region remains economically competitive.



RTRP's board of directors comprises representatives from each of the counties and The Research Triangle Park. The board advises and oversees RTRP initiatives. An Economic Development Advisory Committee of county economic developers and partners meet monthly to plan and implement strategic marketing efforts.

STRATEGY AND FORESIGHTING ACTIVITIES PREPARED THE TRIANGLE TO COMPETE GLOBALLY IN THE FUTURE

In 2003 and early 2004, the RTRP directed its first comprehensive regional economic development strategic planning effort following the findings of Dr Michael Porter's 2002 study, which predicted that future U.S. competitiveness will hinge on the capacity to foster "clusters of innovation in regions across the country." Porter concluded that the Research Triangle Region was one of the most economically competitive regions in the nation but required a new economic vision to remain so – one built on the knowledge-based economy sparked by the RTP and focused on building and attracting innovative and emerging industry clusters and expanding prosperity to a larger geographic area, including the more rural counties surrounding the urban core.

The result was a five-year strategy, 'Staying on Top: Winning the Job Wars of the Future'. Implemented during 2004-2009 and recognised by the U.S. Department of Commerce as the best regional competitiveness strategy in the country, the plan aimed to generate 100,000 new jobs and increase employment in all 13 counties of the Research Triangle Region. It called for:

- > Strengthening the region's existing clusters of innovation by improving collaboration among companies and organizations.
- > Diversifying the economy by recruiting a wider array of clusters and focusing on opportunities at the intersection of the strongest clusters.
- > Sparking creation of more home-grown businesses.
- > Identifying regional investments needed for competitive advantage.
- > Invigorating the economy across a broader geographic area.
- > Developing the region's capacity to meet its goals.

ECONOMIC STRATEGY DELIVERED 110,000 NEW JOBS

Results included:

- More than 110,000 new jobs created across the region and strong gains in targeted clusters, particularly life sciences and technology.
- Tight integration of university R&D and technology transfer with regional economic development
- Expanded community college courses and workforce training to support targeted clusters
- Expanded air service to priority destinations for businesses
- Public policy support for innovation, recruitment and infrastructure
- More venture capital and technical support for entrepreneurship
- A tax-advantaged network of business parks, called Triangle North, created in a rural part of the region and funded through a first-of-its-kind, cross-county tax-base sharing agreement

In 2008, RTRP launched planning for the next five-year plan to guide the region's economic development initiatives from 2009-2014. The result was a new regional economic development strategy, called 'The Shape of Things To Come'. The vision for the region remains the same: to be a world leader in intellectual capacity,



education and innovation, to enhance productivity and economic growth and achieve a superior quality of life for all citizens. It grows from the knowledge that the region's competitive advantage lies in the ability of its companies and people to innovate – to create the 'next best thing,' which results in new products, services, companies and jobs. 'The Shape of Things to Come' calls for three key strategies to continue growing the region's knowledge-based economy:

- > **Business Growth:** Attract, grow and support targeted industry clusters in all 13 counties.
- > **Product Development:** Preserve and enhance the region's competitive business climate, infrastructure and quality of life.
- > **Regional Collaboration:** Engage regional leaders and partner organisations in ensuring the region remains economically competitive.

As well as strategy development and action planning, RTRP offers a range of services to help companies grow and expand in the region and to help economic development partners meet the needs of businesses and prospects. RTRP also provides research assistance, technical services and other tactical support to maximize regional competitiveness.

CHALLENGES

KEY CHALLENGES INCLUDE GLOBAL COMPETITION AND PROVIDING THE PUBLIC SERVICES AND INFRASTRUCTURE TO DEAL WITH GROWTH

Walden (2014) states that the Triangle faces three vulnerabilities in its economic future:

- > **Concentration of new economy industries:** pharmaceuticals, telecommunications and technology confront potential challenges in the coming decades. Continued expansion of new economy industries is not inevitable – as demonstrated by the technology bust of the late 1990s. However, Triangle leaders have targeted fields such as biotechnology, biodefence, nanotechnology, informatics and pervasive computing as sectors in which to expand. The region is also becoming increasingly attractive as a centre for financial services.
- > **Competition:** At its establishment, the RTP represented a unique partnership between private sector R&D firms and universities. Some regions have since copied this relationship while many others have sought to implement the same strategy. The area may therefore need to work harder in the future to maintain its position. In particular, the developing biotechnology centre in the Greater Charlotte region will present competition for leadership in this field.
- > **Rapid population growth:** schools, roads and other infrastructure have become increasingly crowded and congested and water rationing has become common during dry summer months. A citizen's advisory committee in Wake County – the most populous in the Triangle – identified \$12bn in necessary spending for school construction and \$12bn for highway building to 2030. Many of the region's outer counties, such as Johnson and Chatham, are experiencing greater pressures because they lack the large commercial and industrial tax bases to support residential growth.



'The Shape of Things To Come' identified two further challenges for the region:

- **Intense global competition:** While the Research Triangle Region is one of the nation's leaders in biotechnology, at least 45 states and 27 countries now target biotechnology for recruitment. Global competition for jobs in computer and communication equipment has also resulted in manufacturing jobs transferring to lower-cost parts of the globe.
- **Fallout of economic recession:** The strategy launched during the global economic meltdown with many of the region's largest employers in core clusters of informatics, pervasive computing and pharmaceuticals announcing layoffs or bankruptcy.

As set out by the Triangle J Council of Governments and the Kerr-Tar Council of Governments (the regional councils serving the greater Triangle region) (2015), the Research Triangle region has struggled to recover from the recession and while its GDP and job growth are comparable to national averages, it is growing at less than half its pre-recession rate. Additionally, growth seems to be occurring unequally throughout the region and has been concentrated in the metropolitan areas of Raleigh-Cary and Durham. From 2009 to 2012, jobs and GDP in Wake County grew at a rate more than double the average for the rest of the region.

The Capital Area Friends of Transit has also identified population growth challenges for the Triangle:

- **Increased commuting times:** 31 per cent of Triangle residents work outside their county of residence (2006). Triangle commuters are spending more time commuting. From 1990 to 2000, the average commute time in the Raleigh-Durham-Chapel Hill metropolitan area increased 23 per cent. The number of workers who were able to reach their jobs in 20 minutes or less declined, while the percent of workers reporting one-way commutes of greater than 60 minutes increased.
- **Sprawling population:** Despite its rapid population growth, the Triangle's population density is lower than it was in 1980. With few natural barriers to development, it has spread into undeveloped land at a far more rapid pace than the increase in its population. As it has sprawled, it has followed a pattern of widely separated land uses for homes, shops, jobs, schools, and civic and cultural facilities, increasing the number and length of trips. This pattern has increased air and water pollution resulting in impaired health for citizens and negative environmental impacts. Sprawling, bedroom communities lack a robust local economy and tax base to pay for infrastructure, police, fire and schools. Sprawl has also destroyed farms, wildlife habitat and polluted waterways.

CHALLENGES OF EQUITY AND DISTRIBUTION OF BENEFITS OF GROWTH ARE ALSO EVIDENT IN THE TRIANGLE

The Triangle J Council of Governments and the Kerr-Tar Council of Governments 'Equitable Growth Profile' (2015) also sets out the challenges of the region's shifting demographics:

- **Lower levels of higher education for BME communities:** a growing segment of the Research Triangle's workforce lacks the education needed for the jobs of the future. By 2020, 42 percent of all jobs in North Carolina will require an associate's degree or higher by 2020. Today, only 33 per cent of the Black population and 37 percent of U.S.-born Latinos – the region's fastest-growing group – have that level of education.
- **The middle class is being squeezed:** Since 1990, middle-wage jobs in the region have not kept pace with population growth, and grew less than half the rate of low- and high-wage jobs. Additionally, a disproportionate share of middle-class job gains have been concentrated in urban areas.



- **Racial economic gaps:** Across a host of indicators including employment, wages, poverty, working poor rates, and access to high-opportunity occupations, BME communities fare worse in the Research Triangle labour market than their White counterparts, even after controlling for education. Poverty and the challenge of a growing number of people who are among the working poor are both on the rise in the region and are most severe for BME communities. One in three Latinos and one in five African Americans now live below the poverty level, compared to less than one in ten from the White population. The region's economy could have been about \$21.8 billion stronger in 2012 if there were no economic differences by race. Unless racial gaps are closed, the costs of inequity will grow as the Research Triangle becomes more diverse.
- **Disconnected youth:** the number of 'disconnected youth' who are neither in school nor working is on the rise. Across the region, 30,000 youth are currently disconnected, nearly 60 percent of whom are from Black and Latino populations.
- **An uneven geography of opportunity and prosperity:** While the Research Triangle is experiencing renewed growth, prosperity is not distributed evenly in the region. Many rural and inner city areas suffer from a lack of car access and limited transportation choices. Poverty is also highest in major cities and on the outer northeast edges of the region. Not coincidentally, BME communities are highly concentrated in these same outer fringes and inner boroughs.

LESSONS FOR THE LONDON-STANSTED-CAMBRIDGE CORRIDOR

There are several lessons which can be drawn from the Triangle's development.

Similar profile in terms of knowledge and tech based economy and growth, with very high rates of economic and population growth.

Similar challenges in terms of managing growth: With rapid population growth, schools, roads and other infrastructure have become increasingly crowded and congested and water rationing has become common during dry summer months. Some counties don't have the tax base or revenues to support residential growth. Increased commuting times are evident over the long-term, as is population sprawl. There is also an uneven geography of opportunity and prosperity, which draws parallels to the LSC Corridor.

Creation of a 'region' and local identity according to a defined strength: based upon university based research and commercial spin outs and entrepreneurship associated with this.

A major collaborative venture was formed between the three universities, around the development of a major new asset – a science park.

Initiatives of scale and scope were developed, such as the Council for Entrepreneurial Development – serving the Triangle 'region'

Use of physical solutions to stimulate greater university-business interaction. The Centennial Campus created space and premises for co-location and co-production between researchers, students, universities and business. The key aim was to erode divisions between the university and business.

Industry-based economic development organisations: The World's first government sponsored economic development organisation in biotechnology was established – the North Carolina Biotechnology Center (NCBT).

Science and tech business locations don't necessarily need to have a narrow industry/activity focus. The diversity of technology and knowledge based activities on the Research Triangle Park: Today, RTP is home to a



combination of multi-national corporations, university derived businesses, and entrepreneurial financed start-ups working in the fields of agricultural biotechnology, biotechnology/life sciences, clean and green technologies, information technology, materials sciences and engineering, business and professional services, and financial and insurance activities.

Models for delivering collaborative initiatives: The Research Triangle Regional Partnership (RTRP) is a business-driven, public-private partnership dedicated to keeping the Research Triangle Region economically competitive through business, government and educational collaboration. The strategy implemented by RTRP between 2004 and 2009 created more than 110,000 new jobs, tightly integrated university R&D and technology transfer; college courses and workforce training to support targeted industries; an expanded air service to priority destinations for business; and an increase in venture capital and technical support for entrepreneurship.

Foresight activities: The research triangle has constantly sought to identify where it has actual or potential global leadership and has put in place strategies and actions to maintain and realise this.

Delivering on transport needs critical for maintaining success. As mentioned, efforts were made to expand air services to priority destinations for business. There is a Research Triangle Regional Public Transportation Authority ('GoTriangle') which provides a flexible range of solutions (including bus and shuttle services, ride-matching, vanpools, etc). 'GoTriangle' aims to improve the region's quality of life by connecting people and places with reliable, safe, and easy-to-use travel choices that reduce congestion and energy use, save money, and promote sustainability, healthier lifestyles, and a more environmentally responsible community. A 17.1-mile light rail line is planned to begin construction in 2020 and be complete by 2026.

The overall impressions from this short case study of The Triangle are of bold ambitions matched by substantial collaborative actions that have often involved cross-boundary working.



References

'The Research University and the Development of High-Technology Centers in the United States', Smilor, O'Donnell, Stein and Welborn (2007)

'Birth of an Idea: The Creation of Research Triangle Park and Its Sustained Economic Impact on the Research Triangle Area', Christopher M. Cirillo (2013) <http://sites.duke.edu/urbaneconomics/?p=899>

'Best Practices in State and Regional Innovation Initiatives: Competing in the 21st Century. ANNEX B North Carolina's Research Triangle Park', Wessner (2013) <http://www.ncbi.nlm.nih.gov/books/NBK158811/>

'The Shape of Things to Come: The Economic Development Strategy for the Research Triangle Region,' Research Triangle Regional Partnership (July 2009) http://files.www.researchtriangle.org/resources/regional-resource-center/reports/the-shape-of-things-to-come/The_Shape_of_Things_to_Come_July_2009.pdf

Durham-Orange Light Rail Transit Project Draft Environmental Impact Statement/Draft Section 4(f) Evaluation <http://ourtransitfuture.com/deis/>

North Carolina in the Connected Age: Challenges and Opportunities in a Globalizing Economy (2014) By Michael L. Walden
https://books.google.co.uk/books?id=Lu7R7VGQh2UC&pg=PA121&lpg=PA121&dq=research+triangle+region+challenges&source=bl&ots=YLXobk1C9r&sig=Z2sLvoOgtQGLRH_Ff2bAeOwnOys&hl=en&sa=X&ved=0ahUKEwj9oKqh5pfKAhVH7A4KHaldAf44ChDoAQgeMAA#v=onepage&q=research%20triangle%20region%20challenges&f=false

Population Growth Challenges for the Triangle, Capital Area Friends of Transit
<http://www.capitalareafriendsoftransit.org/files/caftpopulationgrowth1.pdf>

Equitable Growth Profile of the Research Triangle Region (2015), PolicyLink
http://www.policylink.org/sites/default/files/Triangle_J_Summary_Final_31Mar2015.pdf

