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Leadership, Partnerships, and Networks:
Navigating 50 years of Dynamic Growth in the Research Triangle Park

Executive Summary

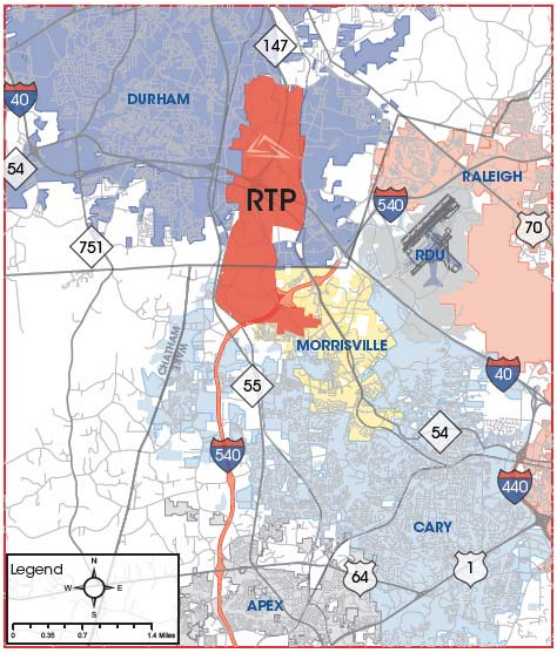
In 50 years, the Research Triangle Park (RTP) region of North Carolina transformed from an economically depressed area[1] into one known internationally for its economic dynamism and vibrant innovation. Founded in 1959, through a dynamic partnership between government, university, and business leaders, RTP continues to serve as a model for research, innovation, and economic development.

Learning from RTP's success, RTI International (RTI) has blended the lessons from RTP into an economic development approach to support break-through economies at a sub-national level across the world. This technical approach is not meant to replicate RTP, but to build essential characteristics of RTP into other regions, using their unique endowments to create vibrant and resilient economic environments.

This paper explores the characteristics and strategies that have made RTP dynamic over a sustained period of time, extracts lessons from that sustained dynamism, and briefly describes that technical approach to foster the same dynamism in other regions internationally.

Factors of Success

As one of the oldest and most successful science and technology parks (STPs)[2] in the world, RTP is considered to be among the most successful examples of planned regional economic development[3]. Established in 1959, RTP now sits on approximately 7,000 acres of land, having acquired land over the years to build on the 4,400 acre parcel that originally made up RTP. RTP's developed space has increased from only 200,000 square feet in 1960 to more than 22.5 million square feet in 2007. RTP houses more than 170 research and development (R&D) organizations – including such recognizable names as IBM, GlaxoSmithKline, and the National Institute of Environmental Health Sciences – and employs more than 42,000 full-time workers. These employees have combined annual salaries of over $2.7 billion. The average salary in RTP is $56,000 annually, nearly 45 percent higher than the regional and national average.



[1] As quoted in Weddle's "Research Triangle Park: Evolution and Renaissance," North Carolina's per capita income ranked 45th out of 50 U.S. states in 1950, and 48th in 1952.
[2] We use the terms "research park" and "science and technology park" interchangeably throughout this paper.
[3] Luger, Michael I. and Goldstein, Harvey A. *Technology in the Garden: Research Parks and Regional Economic Development.* University of North Carolina Press. 1991.

The benefits of RTP to the region, economic and otherwise, have been enormous, and the RTP region has been recognized as a dynamic and vibrant region through indicators such as availability of jobs, best place to begin a technology career, best area to do business, and quality of life. RTP's success is all the more impressive considering that half of all research park ventures fail outright and of those that survive, half convert to business parks. There are currently over 300 science and technology parks located in the industrialized countries of the United States (U.S.), Western Europe, and Japan. However, most research parks in the U.S. have employment of fewer than 200 persons[4].

In fact, a range of factors were initially stacked against RTP's success. The story of RTP began in the 1950's with a primarily rural area in the middle of North Carolina, dominated by tobacco, furniture and textiles – all declining, or soon to decline, industries; the region was beginning to feel pressure by the shift of the furniture industry to the northeast of the U.S, increasing competition in textiles from Asia, and a decline in tobacco employment[5]. At the time of RTP's founding, the region was not a large metropolitan area, it lacked a base of R&D and high-tech manufacturing, it had low-skilled and relatively low-education levels, and it had little tradition of entrepreneurial activity[6]. And while the state did have three strong research universities – Duke University in Durham, University of North Carolina in Chapel Hill, and North Carolina State University in Raleigh – anchoring the points of the centrally-located so-called "Triangle", there was little R&D occuring in the state and few quality job prospects for university graduates, leading to massive out-migration of the educated young workforce.

A number of defining traits have been cited in explaining RTP's – and by extension the region's – success, including RTP's links to research universities; the long-term commitment and leadership of political, business, and civic leaders; and the RTP region's strong supporting institutions.

University Links

RTP's links to research universities is perhaps the most important characteristic that has contributed to its long-term success. The original genesis of the RTP concept that was devised by a group of the state's government, business, and community leaders was based on the premise that the region's three research universities could attract companies to the area. Indeed, few places in the U.S. or the world have a conglomeration of faculty and facilities comparable to that found in the Triangle region[7]. RTP's three flagship universities – UNC-Chapel Hill, Duke, and North Carolina State - along with other universities, colleges, and community colleges in the region, provide a steady supply of trained scientists, engineers, and technicians to the region. In turn, the universities and community colleges have been substantially strengthened and their innovative capacity enhanced by the environment and interactions with the industrial and governmental research activities associated with RTP[8].

Hulsink and Dons explain a further distiction in the way the Triangle universities were organized to support RTP:

> These education and research assets, by themselves and working independent of one another, were not enough to generate RTP. The universities needed to, and in fact did, recognize that

[4] Luger and Goldstein.
[5] Link, Albert and Scott, John T. "The Growth of Research Triangle Park". *Small Business Economics,* 20, pp.167-175. 2003.
[6] Hulsink, W. and Dons, H. (eds.), *Pathways to High-tech Valleys and Research Triangles:Innovative Entrepreneurship, Knowledge Transfer and Cluster Formation in Europe and theUnited States*, 27-51.
[7] Hulsink and Dons, pg. 46.
[8] Weddle, Rick L. "Research Triangle Park: Evolution and Renaissance". Presented to the 2006 IASP World Conference. The Research Triangle Foundation of North Carolina. June 2006.

> they had to act as a unified research community, cooperating for the common good. What helped in this regard was the leadership of at least two of two of the state's governors – Governor Luther Hodges (1954-1961) and Governor Terry Sanford (1961-1965) – in the Park's early years. Governor Hodges played a critical role as an agenda setter and convener of common interests, and he provided the original impetus for the universities to inventory their in-house resources in an effort to assess their ability to attract research-based companies to the region. Once the RTP idea was off the ground, Governor Sanford played a key role in recruiting some of the initial big organizations, such as the National Institute of Environmental Health Sciences, to locate in the Park.

The Research Triangle Committee, which was commisioned in 1954 to conduct the feasibility study of RTP and now manages RTP as the Research Triangle Foundation (RTF), structured its early marketing of RTP based on the belief that the most effective way to convince prospective tenants to relocate to RTP was to leverage the research emerging from the three universities which form the Triangle. The Committee conducted the survey of research being done at all three universities, and aimed marketing toward companies that relied heavily on research and development. As such, and over time, the Committee was able to capture companies from five specific industries: pharmaceuticals, chemicals manufacturing, biotechnology, agricultural sciences, and a newly emerging information technology industry.

Fifty years later, not much has changed in the marketing approach being used to recruit new companies to RTP. The driving force behind the RTF marketing strategy is still the leveraging of cutting-edge research being conducted by the universities surrounding RTP. Ultimately, the strong university presence contributed to RTP's success by providing companies with access to skilled manpower and a vibrant intellectual environment (i.e., companies and workers are attracted to the intellectual environment of the university setting). According to a study conducted in 1999, RTP companies reported that they viewed access to university graduates as employees and university-related training for their employees as important. The companies also noted other benefits associated with the university relationships, such as access to cultural, social and recreational amenities; opportunities to subcontract; and use of faculty for consulting. Similarly, universities noted that they viewed RTP as an important source of jobs and internships for their graduates and professional training for their faculty[9].

Commitment of Community Leaders

The long-term commitment and leadership of political, business and civic leaders has also been a critical contribution to RTP's success. There was an almost five-year span between the first conversations about a research park and the establishment of the Research Triangle Foundation, the institution created to manage and lease RTP land. In that time, a combination of political will from a succession of forward-looking government actors, leadership from local entrepreneurs, and engagement of the local research universities created a sustained, shared vision and strategy for RTP. William Friday, former University of North Carolina President, described the creation of RTP as "the most significant economic and political manifestation of will in the state in the last century"[10].

Ultimately, when RTP's founders established the Park, they recognized that the benefits of their investment could take decades to come to fruition. They also recognized that many of the investments

[9] Hammer Siler George Associates. *The Research Triangle Park: the First Forty Years.* Hammer, Siler, George Associates, Silver Spring. 1999.
[10] Weddle, pg. 6.

they made would spur secondary and tertiary effects that would also strengthen the state and region. Throughout its existence, RTP's leadership, elected local leaders, and populace as a whole, have understood that the vision of RTP's success was a long-term one[11].

It was absolutely critical that the early RTP leaders built a strong base of public support during the years leading up to the formation of RTP. Ultimately, RTP was not considered to be financially viable until 7 years after its start-up. So broad and consistent support for the effort was key to its success (and it should be noted that many failed technology parks in the U.S. ran out of public support before they proved financially viable). Furthermore, public leaders were asked to contribute support, time, and money to RTP's development (i.e., to serve on boards, make donations) in addition to sustained support for the RTP infrastructure that required approved expenditures of public funds.

Equally important as this early leadership has been RTP's ability to sustain and extend that level of leadership commitment. In the 1970s and 1980s, government and industry attracted bioscience research centers that produced high innovation output and helped develop additional industry clusters. The leaders of these research centers encouraged resident scientists and engineers to collaborate with industry and, despite initial resistance, were ultimately successful.

By the late 1990s, however, rapid economic and population growth confronted the region with a host of educational and physical infrastructure issues, leading many to observe that prosperity was too narrowly focused in a few local clusters and question if innovation output was lagging because knowledge was not transferred effectively. The ensuing "Staying on Top" initiative grew from the findings of a 2001 "Clusters of Innovation" study by Harvard University economist Michael Porter concluding that the region required a "21st-century economic vision" to remain competitive. The study's findings and recommendations galvanized leaders in government agencies, businesses, and universities in central North Carolina. A 37-member task force of business and higher education leaders was convened by the Research Triangle Park Regional Partnership, a by now powerful and effective regional economic development public-private partnership institution. The task force used Porter's study and new research to create a vision and action plan for the region.

Called "Staying on Top: Winning the Job Wars of the Future," it was a five-year, $5 million action agenda to generate 100,000 new jobs and increase employment in all13 counties of the Research Triangle Region of North Carolina. (Historically, these 13 counties—each with its own economic development agency and strategy—essentially competed against one another for investment.) "Staying on Top" focuses collaboration around ten industry clusters: pharmaceuticals, biological agents and infectious diseases, agricultural biotechnology, pervasive computing, advanced medical care, analytical instrumentation, nano-scale technologies, informatics, vehicle component parts, and Logistics and distribution. They were chosen because the region is a world leader in research and development in each one, and for their potential to create significant numbers of new jobs in both rural and urban areas.

Former North Carolina Governor, James Hunt, who chaired the task force, commented that, "Today, we face intense global competition for new jobs and investment. There will be regions of the world that win—and regions that lose. We intend to win. We believe we can improve our chance for economic success through collaboration, education, innovation and action." [12]

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[11] Weddle, pg. 9.

[12] *Staying on Top* A Competitiveness Plan for the Research Triangle Region, North Carolina Research Triangle Regional Partnership, March 2004

Supporting Institutions

Another critical characteristic leading to RTP's success was the recognition on the part of RTP's early leaders that strong, independent institutions—each with its own focus and mandate; yet with strong relationships between them—would be needed to sustain RTP through the years. Over the years, RTP has managed to build a full network of institutions that foster innovation-led economic development in the region by focusing on critical activities such as investment promotion, cluster networking, value chain enhancement, and the incubation of new technology and businesses.

It is helpful to consider how these organizations emerged and evolved to support RTP. RTP began with its three core universities, its development entity (Research Triangle Foundation), and a research institute, RTI International, which left it with a government research focus. After attracting some large companies and government labs, RTP managed to expand its research base, but still lacked the kind of dynamism that later developed. The Microelectronics Center of North Carolina (since renamed MCNC) and North Carolina Biotechnology Center added focused sector initiatives, which helped to attract more companies to RTP. The Council for Entrepreneurial Development, other business incubators such as the First Flight Venture Center, and Centennial Campus have helped facilitate more direct interaction between industry and the universities, support more new company formation, and attract venture capital.

Here are brief descriptions of some of the most notable institutions that have contributed to RTP's knowledge ecoystem over the years:

Research Triangle Foundation (1959). As noted above, the Research Triangle Committee reorganized as the non-profit Research Triangle Park Foundation of North Carolina (RTF) in 1959 following a fundraising campaign undertaken by Archibald (Archie) Davis to help attract contributions to support RTP's establishment. The RTF is responsible for the overall management of RTP as well as ensuring that the regulations developed by RTP's founders to protect the natural environment and aesthetics of RTP are preserved.

Research Triangle Institute (now RTI International) (1959). In addition to forming the RTF, Archie Davis and the founding leaders set aside $500,000 to establish the Research Triangle Institute as the "cornerstone" and "anchor tenant" of RTP. The purpose of RTI was to do contract research for business, industry and government. It was intended to keep university faculty interested in RTP, as well as signal to the corporate community that the RTP leaders had enough faith in the park concept to establish the first organization at RTP. RTI sought to provide "industry in North Carolina and the South with research services not available; to encourage the use of research in the state and regional industry; and to extend the Triangle's position as a research center." Today it is the second largest non-profit research and development corporation in the U.S.

Triangle Universities Center for Advanced Studies, Inc. (TUCASI) (1974). TUCASI's purpose is "to assist in and facilitate the planning and execution of non-profit research and educational programs that utilize and enhance the productivity of the intellectual and physical resources of the University of North Carolina at Chapel Hill, Duke University, and North Carolina State University at Raleigh." In addition, TUCASI is the body that proposes how the RTF's assets are distributed to the universities and projects of their choice.

The RTF set aside a 120-acre campus for TUCASI to house organizations that could bring together faculty from the three universities and Park scientists. Today, the TUCASI campus is home to the National Humanities Center, MCNC – initially established as the Microelectronics Center of North Carolina, the North Carolina Biotechnology Center, the National Institute of Statistical Sciences, and the Burroughs Wellcome Fund. These groups reflect the universities' core values of innovation and collaboration for a common good.

MCNC (1980). The State of North Carolina contributed to RTP's and the region's development by building two research facilities: the Microelectronics Center of North Carolina (MCNC), and the North Carolina Biotechnology Center (see below). The initial cost of MCNC was $24 million and the organization was established as an independent, non-profit organization to advance education, innovation and economic development throughout North Carolina by delivering next-generation information technology services and by building partnerships among the academic, research, government and business communities. In its early years, MCNC worked to advance technology-led economic development and job creation through North Carolina. Today, MCNC sponsors new technology companies, in which it takes an equity stake.

North Carolina Biotechnology Center (1984). The Center was created by North Carolina General Assembly in 1984 to provide long-term economic and societal benefits to the state through the support and growth of biotechnology research, business, and education. Since its establishment, the Center has provided about $16 million in financial assistance to 92 early stage biotechnology companies and has invested more than $50 million in North Carolina universities to recruit 46 outstanding faculty members, purchase multi-user research equipment, and sponsor more than 450 research projects. Through its educational efforts, the Center has tripled enrollment in the biosciences at the state's six historically minority universities by granting $8 million in special appropriations to improve the institutions' biotechnology programs.

Council for Entrepreneurial Development (CED) (1984). The Council for Entrepreneurial Development was established in 1984 by a team of business leaders, entrepreneurs, and academicians to capitalize on the technological and educational strengths of the Triangle. CED is a non-profit organization which identifies, enables, and promotes high-growth, high-impact companies and works to accelerate the region's entrepreneurial culture. Headquartered in RTP, CED is the oldest and largest entrepreneurial support organization in the nation with more than 5,500 active members. CED provides know-how, networking, mentoring and capital formation resources to new and existing high-growth entrepreneurs through annual conferences, programs and web-based resources. CED has helped entrepreneurs, investors, service partners, researchers and public policy makers in diverse emerging industries and at all stages of development—from high-tech, production-based organizations to service companies; from one-person start-ups to 1,000-person businesses.

Centennial Campus (1984). Another outgrowth of RTP's success is the spread of university infrastructure to catalyze innovation and economic growth. In 1984, Centennial Campus was established on the grounds of North Carolina State University to provide a place where university, industry, and government partners can interact in multidisciplinary programs directed toward the solution of contemporary problems. Consisting of 1,334 acres, the campus provides office and lab space for more than 1600 corporate and government employees. To date, more than $620 million has been invested to create 2.7 million square feet of space in 25 major buildings. Centennial is touted as one of the leading examples of urban, "green door" research park developments.

First Flight Venture Center (1990). The First Flight Venture Center is an award-winning technology business incubator that offers approximately 15,000 square feet of leasable office and laboratory space for technology companies and research-based entrepreneurs. Services offered range from business development and structuring, to connections with "angel" investors and the provision of conference rooms, business equipment, receptionist services, and secretarial support.

Research Triangle Regional Partnership (1990). RTRP is a business-driven, public-private partnership dedicated to keeping the 13-county Research Triangle Region economically competitive through business, government and educational collaboration. It is dedicated to encouraging business, government and educational collaboaration, attracting new business investment, and supporting the key Triangle area business clusters in order to keep the multi-county region at large competitive.[13]

Applying the Lessons

Private sector growth and job creation take place locally—in towns and surrounding regions where businesses and markets function. In many countries, however, economic growth is typically centered in the capital city or in two or three additional urban centers. Investment and job creation beyond the center remain far less dynamic and often stagnant, with rising income disparities among regions and groups resulting in economic disenfranchisement, increased public dissatisfaction, and instability. This was certainly the case in the RTP region in the 1950s. The post-World War II economy was thriving in America. But its benefits had not extended to many parts of the country. The partnerships and initiatives described above changed all that in a nationally significant way. And learning from RTP's success, RTI International has blended the lessons from the RTP region's development into a comprehensive economic development approach to build regional economies at a sub-national level across the world. Just as happened in RTP, these regions must be transformed in order for good governance and economic growth to emerge, gaps between the rich and poor to be bridged, and economic opportunities for citizens to be realized. New investment opportunities, jobs, and increased incomes must reach all citizens so that they and their communities can emerge to compete.

The RTI approach is meant not to replicate RTP, but to apply and build many of the characteristics of RTP into other regions, using their particular endowments to create a vibrant and resilient economic environment. The approach, called Emerge to Compete (EtoC), codifies RTP's defining characteristics into a series of "building blocks":

- *Visionary Leadership and Policy*: Providing vision; championing, clarifying and streamlining legal, regulatory, and support frameworks to facilitate growth.
- *Institutions and Networks*: Mobilizing and linking public and private sector individuals, organizations, and associations.
- *Education and Human Capital*: Building effective education and training systems to increase productivity and standards of living.
- *Building Businesses*: Building entrepreneur, investor, and worker friendly environments to grow and attract businesses

[13] These summaries are extracted from Weddle's "Research Triangle Park: Evolution and Renaissance" and institution Web sites.

- *Physical Infrastructure*: Ensuring existence of adequate facilities and planning to support businesses and communities.

- *Value Chains and Clusters*: Identifying promising clusters and firms to build cooperation, linkages, and momentum.

- *Capital and Investment Finance:* Creating financial institutions/systems to finance business creation, support economic development.

- *Technology and Innovation:* Supporting creation of innovative businesses and special zones that promote use and creation of new technology for high-value economic growth.

RTI's EtoC model also defines a process for assessing a region's status in each of these building blocks, and another to measure performance and gauge progress. Finally, it fosters effective engagement among business and political leaders, higher education institutions and other stakeholders to create the sustained leadership, political will, and institutional capacity needed to successfully realize a concerted strategy for developing the building blocks in a given region. In order to do this with maximum use of knowledgeable practitioners, the approach seeks to draw on the expertise of the network of RTP organizations and economic development professionals who have been and continue to be key players in the growth of RTP.

In practice, this approach has been used for years by RTI in numerous sub-national economic development capacity-building assignments across the United States. Notable international examples are RTI's recently completed Economic Growth Strategy for the "first planned Palestinian community" of Rawabi—just outside the West Bank city of Ramallah (detailed in another paper submission to the IASP Conference)—and a market and competitive analysis of Minas Gerais, Brazil (to determine the feasibility of a research park).

Sustained Competitiveness and New Issues

In spite of RTP's success, it is clear that the importance of transportation corridors, hard infrastructure, and tax concessions has faded. The global economy is constantly evolving and will continue to challenge RTP's ability to remain an innovative and dynamic place. When we look to the future, amidst considerable uncertainty brought about by the current severe global recession, some economic realities seem clear. We are entering a time of corporate retrenchment and hyper-operating cost sensitivity which will add to ever-increasing global competition for new jobs and investment. That competition will be fierce, and there will be regions of the world that win, where standards of living will rise and jobs will be plentiful, and regions that lose.

RTI's EtoC approach is based on the belief that, in order to thrive and perhaps even survive, regions must constantly and proactively implement actions to improve and sustain the competitiveness and attractiveness of their economies. And they must stay at this work, constantly re-evaluating and benchmarking—even reinventing themselves if necessary—and creating the new networks, partnerships, and institutions to take action around new priorities.

More and more, a region's success and ability to lead in emerging industries and technologies will depend on access to ideas; ease of collaboration among firms, entrepreneurs, and researchers; a dynamic entrepreneurial environment; access to venture capital; and a culture of innovation. Below

are important lessons for science and technology parks, and the regions within which they function, drawn from the RTP experience:

- Strong leadership is a necessary part of the region's successful economic development strategy. It has played a fundamental role in building an innovative economy around RTP, but also provided a high degree of vision and cohesion at critical moments in RTP's history.

- Specialized support organizations with affiliated leadership structures permits economic development support expertise to be more directly targeted. The evolution, over RTP's 50-year history, of the Research Triangle Foundation, RTI International, Research Triangle Park Regional Partnership, Council for Entrepreneurial Development, First Flight Venture Center, and many more mission-focused institutions, has served to keep RTP strong and competitive and has allowed it to adapt to changing times.

- Universities and specialized research centers were and remain the driving force of innovation in the region. North Carolina State University, the University of North Carolina-Chapel Hill, and Duke University in Durham formed the pillars of the region's knowledge-based economy by providing world class research facilities as well as a critical mass of scientists, researchers, and technicians. Their research capabilities have helped develop a large number of clusters in the region and their students are a constant source of intellectual and entrepreneurial energy.

- The most successful and dynamic regions, in an increasingly interconnected and on-the-move-world, are those that become inherently multicultural and open to a range of people, cultures, ideas, and approaches. The Research Triangle Park region is a remarkably cosmopolitan place served by transportation systems that easily connect it with the world.

- Too often, highly successful places become highly expensive places to live, work, and raise a family. The RTP has managed to build a relaxed and affordable quality of life—and keep it that way.

Conclusion

That none of us knows the future is a truism we all live with. That is especially disconcerting in these economic times because it is impossible to know how global recession will impact innovation, new technology and knowledge ecosystems. But one thing seems certain. These times will change how the business of innovation, research and technology is pursued—calling for new partnerships, networks, and leadership in each of the world's STP regions. And those that embrace this reality will be those that attract the attention of business and government research communities. So what we think about in the months ahead, how we activate that thought process, and how well we implement the resulting strategies will be very important to the places we come from and to the world. It is very much a proposition of you and us, now, in these rooms at this conference…..