

USC Upstate: Information Technology, Economic Revitalization, and the Future of Upstate South Carolina

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Abstract

A rapidly changing area of South Carolina presents challenges and opportunities to a rapidly growing metropolitan university serving the region. Multiple and complex collaborative partnerships and innovative, responsive programs demonstrate the interdependent and dynamic relationship between campus and the economic future of the region. In particular, technology proved to be a driving force for many of these partnerships, inspiring the university to develop cutting-edge capacities in order to meet education and workforce needs.

The Upstate of South Carolina: A Study in Contrasts

The Upstate of South Carolina is comprised of 10 predominantly rural counties in the western-most portion of the state in the Appalachian Mountains and surrounding foothills to the east. The “Upstate” as it is most commonly called, is bordered on the south and east by the Interstate 85 corridor connecting the metropolitan centers of Charlotte, North Carolina, and Atlanta, Georgia. Today, this region is a sharp study in contrasting realities. Once the home of countless prospering textile mills and their surrounding communities, the landscape is now largely one of abandoned factories and impoverished communities occasionally interspersed with the facilities of modern companies. Although this area is rich in resources, the potential of these resources is largely unrealized due to underdevelopment. To many people around the nation, the terms “new economy” and “information age” are concepts far removed from daily life. To the residents of Upstate South Carolina, those terms form a very real boundary between a prosperous past and a very uncertain future.

A deeper look into the area reveals an even more anachronistic image. A number of companies have come to South Carolina for competitive wages, low-priced land, and substantial tax incentives. Companies such as BMW and Michelin North America have built world-class manufacturing facilities in Spartanburg. The International Center for Automotive Research was recently established in nearby Greenville. Healthcare in the region is among the best available. Spartanburg Regional Hospital is recognized as one of the most technologically advanced and highest quality hospitals in the nation. These and other entities are certainly points of pride, but do little to change the reality that this region is one of the most economically devastated areas of the country.

South Carolina has historically been one of the poorest states in the nation since the Civil War. Although it has succeeded in recent decades in closing the gap with the rest of the country, per capita income still ranks 42nd among all states at only 82 percent of the national average. Since 1970, nearly 400,000 people have migrated to South Carolina in search of jobs in what was in the past a fast-growing economy based largely on textile manufacturing. But primarily as a result of the post-NAFTA migration of jobs to offshore manufacturing plants, South Carolina suffered a net loss of more than 54,000 jobs since 1994. Rural counties such as those that comprise the Upstate have suffered the most. Textile and apparel manufacturing ranks with motor vehicles and electrical equipment and machinery as the three hardest hit American industries for job losses since the mid-1990s. South Carolina ranked third in the nation in job losses in the last three years, surpassed only by Massachusetts and Ohio. Today, the unemployment rate of upstate South Carolina hovers around a seasonal average of 8 percent, and an estimated 257,800 people constitute an available labor force in the 10-county Upstate region. This estimated available labor force is larger than the entire population of Spartanburg County, the second largest of the 10 Upstate counties.

The societal impacts of economic decline have been devastating as well, but signs of hope form yet another set of contrasts for the Upstate. More than 30,000 citizens of Spartanburg County, 12.3 percent of the population, live below the poverty level. Nearly a third of these are children. Four out of 10 students in Spartanburg County today qualify for the free or reduced lunch program, a strong indicator of the economic health of a region. More than a third of the students in public education drop out between the eighth grade and graduation, and less than seven out of 10 young adults in this area ever complete a high school diploma or equivalency. Average salaries for teachers in South Carolina typically rank in the lowest quartile of all states.

In spite of these sobering facts, South Carolina remains determined to grow and improve. The state still ranks 49th in the nation in SAT scores, but has shown the highest percentage rise in SAT scores in the nation the last four years. The dropout rate in public schools is unacceptably high but two-thirds of the students who do graduate from high school in Spartanburg County go on to enter higher education within the next year, higher than the average for the rest of the state. Nearby Greenville County has more engineers per capita than any city in the nation (though many are unemployed), primarily because of a heavy reliance on manufacturing. Productivity of South Carolina workers ranks third in the nation, and, although more than 100 international firms from 15 nations have located operations in Spartanburg County alone, unemployment for this county and the rest of the Upstate region remains well above the averages for South Carolina and the nation.

One of the greatest problems facing the Upstate region is the creation of new jobs through economic revitalization. One of the greatest impediments to that challenge is inadequate training and education of the workforce. Only 18.2 percent of the residents of Spartanburg County have attained a bachelor's degree or higher, a fact that turns away many high-tech companies seeking a place for relocation or expansion. The Upstate must do far more to expand the number of individuals capable of participating

in the businesses that comprise the New Economy. An adequately prepared workforce is one of the most important factors in the decision by new and existing businesses in determining where to locate. The lack of an adequately prepared workforce of sufficient size is one of the most serious problems confronting the Upstate.

A Fundamental Challenge for a Metropolitan University

The University of South Carolina Upstate is a senior comprehensive public university located along the Interstate 85 corridor in Spartanburg, South Carolina. As South Carolina's only metropolitan university, USC Upstate's mission acknowledges as its fundamental reason for being its relationship to the surrounding cities, their connecting corridors, and expanding populations.

USC Upstate is the fastest growing university in South Carolina but is the lowest funded institution in the state and has the lowest academic space. This fiscal reality has become manifest in inadequate classrooms and laboratories, faculty and support staff, and operational funding. These limitations represent serious limitations in the ability of USC Upstate to deliver excellent academic programs to the citizens of the Upstate.

The USC Upstate campus has traditionally been a local commuter campus with a central location in Spartanburg. This has represented a problem of accessibility for the widely dispersed and largely non-traditional population of students in the Upstate region. The South Carolina Technical College System has been very successful in providing two-year associate degree training to students at locations throughout the area including Spartanburg and Greenville, but access to four-year education has been limited, particularly with respect to public higher education. While graduates of two-year technical colleges are often well prepared for jobs in legacy manufacturing and distribution, there is a significant gap with respect to a population of workers with four-year and graduate training that are needed in many technology dependent businesses and healthcare institutions. Increasingly, high-tech companies that require more advanced and specialized educational programs than those provided by two-year technical schools are supplanting legacy manufacturing and distribution. The need for higher education is growing rapidly, particularly with respect to off-campus locations that significantly increase accessibility to underserved populations and non-traditional students. There is also a growing demand for direct delivery of four-year programs to the facilities of Upstate businesses such as BMW and Spartanburg Regional Healthcare System in order to meet the educational needs of the organizations and their employees. Existing programs in information management and systems, nursing, and others offered by USC Upstate cannot meet existing demand today because of limitations in faculty size, academic space, and location.

The university's metropolitan mission rests on a foundation of partnerships with the education, corporate and service organizations of the Upstate. Reflecting that heritage is the fact that USC Upstate was originally established in 1967, primarily to avert a

serious healthcare problem when Spartanburg General Hospital announced that it was being forced to phase out its diploma program for registered nurses. USC Upstate's faculty provides leadership in promoting the region's economic, social and cultural development through its teaching, professional service, basic and applied scholarship and research, and creative endeavors. The university strives to prepare its students to participate as responsible citizens in a diverse, global, and knowledge-based society, to pursue excellence in their chosen careers, and to continue learning throughout life. Pursuant to this mission, USC Upstate offers baccalaureate education to the citizens of Upstate South Carolina, as well as master's degrees in response to regional demand. USC Upstate is fully accredited to offer degree programs in the College of Arts and Sciences, the Schools of Business, Education and Nursing, and the graduate division. A broad range of major curricula are provided in arts and sciences and in professional fields of study required by the regional economy, including business, education, and nursing.

The student body of USC Upstate is diverse in background, age, race, ethnicity, educational experience and academic goals. Students from 71 nations are enrolled, illustrating both the strength of cultural diversity within the student body and the strong ties of the university with international companies in the area. As a testament to the contributions of USC Upstate to the region, 85 percent of all USC Upstate graduates remain in the Upstate to build their lives and careers. As the only public four-year university in the Upstate, and the only university in South Carolina with a metropolitan mission, the University of South Carolina Spartanburg is uniquely positioned and qualified to address the challenge of workforce preparation through active and engaged partnerships with the companies, government agencies, and educational providers in the region.

Strong Partnerships and Targeted Academic Programs

Strong partnerships with a variety of Upstate institutions, organizations, and agencies lie at the heart of the USC Upstate metropolitan mission. This relationship is manifest in a variety of ways, including inter-institutional articulation agreements with two-year institutions including Spartanburg Technical College and Greenville Technical College, as well as participation in the University Center of Greenville. UCG is a nonprofit consortium of seven higher education institutions dedicated to increasing access to educational opportunities for the citizens of the Greenville metropolitan area and the Upstate region of South Carolina. UCG is dedicated to serving the needs of working adults who want to pursue four-year or graduate-level degrees without leaving the area. Day and evening programs in business, computer science, criminal justice, education, information management and systems, and nursing provide a largely underserved and non-traditional student population the opportunity to prepare for jobs in the New Economy. Today, USC Upstate is far and away the largest provider of undergraduate degrees and has the highest student enrollment at the UCG.

USC Upstate is making significant progress in its metropolitan mission and is contributing to economic revitalization of the Upstate through highly successful educational programs and partnerships with the UCG, Spartanburg Technical College, Greenville Technical College, BMW, Spartanburg Regional Healthcare System, Greenville Hospital System, and the city of Spartanburg. For example, in 2003, USC Upstate, Spartanburg Technical College, and Spartanburg Regional Healthcare System formed a consortium to address the nursing shortage plaguing the region. This consortium was the result of a blue ribbon focus group of leaders from institutions and the community that resulted in a coordinated program for substantially expanding the pool of qualified nurses in the Upstate. Because of the collaboration between the USC Upstate and Spartanburg Tech, previously competitive programs in nursing education have been replaced by a seamless two-year to four-year academic program leading to the bachelor of science degree in nursing. This consortium doubles the number of nursing graduates with bachelor of science degrees each year from 60 to 120. A number of similar programs have been instituted, but far more remains to be done, particularly with regard to expanding access to four-year and graduate education in the Upstate. Through collaboration between USC Upstate and Spartanburg Regional Healthcare System aimed at improving the preparation of nursing students, it was learned that nursing graduates are significantly unprepared with regard to the use of information technology. Specifically, Spartanburg Regional is essentially a paperless operation that relies almost exclusively on the use of wireless laptop computers for nursing assessments, care plans, and documentation. Until this academic year, nursing students at USC Upstate had received almost no exposure to mobile technology as part of their coursework.

Another very significant development that recently occurred with respect to healthcare partnerships in South Carolina is the South Carolina Health Sciences Collaborative. This unprecedented initiative is a partnership between the University of South Carolina, Medical University of South Carolina, Palmetto Health, and Greenville Hospital System. Essentially, this partnership creates a health sciences corridor that extends from Charleston through Columbia and into the Upstate. The partnership will focus on health sciences research, economic development, and improving the health status of the citizens of the state. The collaboration is expected to advance the competitiveness of South Carolina in biomedical research and health sciences education, enhancing the ability to attract funding for research and development. Given recent developments and commitments, this could lead to at least \$160 million in sponsored programs and research over the next 10 years. The Upstate region will realize enormous benefit from the Health Sciences Collaborative through the achievement of Greenville Hospital of university medical center status. The establishment of a new 100,000-square-foot Health Sciences Research, Education, and Innovation Institute in Greenville will be a focal center of this collaborative in the Upstate. USC Upstate will continue to provide the foundation for academic programs and operational support in the Upstate through this collaborative and will participate with the other members to expanded delivery of educational opportunities across the state. An integral component of this initiative is information technology, which is essential to academic program delivery, research and development, and healthcare services.

A strong partnership has also been forged between Greenville Tech, BMW, and USC Upstate. Through close collaboration between these institutions it was learned that BMW requires a higher number of graduates from the USC Upstate Information Management and Systems program who are also better prepared in the management of technology as a specialization. In cooperation with Greenville Tech, USC Upstate will address this problem by increasing the number of students in this academic program to a greater number than could be addressed on the USC Upstate campus. Through the formation of a virtual learning community at the University Center of Greenville that is linked to the IM&S programs on the USC Upstate campus, a larger number of students can be trained, and the training specifically targeted to meet the demands of BMW and other high tech manufacturing companies.

In addition to currently offered academic programs, the university is also developing additional programs in response to the needs of the community. In particular, a baccalaureate program in engineering technology management and a graduate program in informatics are under development. Both of these programs are in response to the need for graduates adequately trained in information technology in order to meet the needs of current and prospective employers in the area. Targeted academic programs are one of the core services provided by a metropolitan university, and one USC Upstate is pursuing aggressively.

The Essential Role of Information Technology

USC Upstate has been very successful in building strong relationships with its partners and in developing targeted academic programs to meet the needs of a region attempting to reinvent itself in the New Millennium. But these achievements don't answer one of the most important questions: how to move beyond campus boundaries to deliver academic programs to the rural, remotely distributed citizens of the Upstate. Providing education and retraining to a workforce that is composed largely of non-traditional working adults requires offering academic programs with the greatest degree of flexibility and accessibility. The one agent capable of addressing this problem is information technology. Recognizing this, USC Upstate has established an information technology environment that is increasingly recognized as a model of excellence. The university's 2002-2007 Strategic Plan calls for "robust information technology" that is ubiquitous, pervasive, and integrated into all aspects of the programs and mission of the university.

The technology environment supporting teaching and learning on the USC Upstate campus is guided largely by the principles of excellence and relevance. Consequently, the campus technology infrastructure is based almost entirely on industry standards and best-in-class solutions. Elements of the USC Upstate technology environment have been cited by two national case studies for excellence in 2003 and 2004. The Advanced Digital Media Lab qualified as a finalist for the prestigious South Carolina Innovision Award in 2003. In addition, USC Upstate recently became the first education sector institution in the nation to implement Microsoft Exchange 2003 for email online collaboration, a very significant and nationally recognized achievement.

The issue of excellence in information technology is self-evident with respect to using the most powerful and transformative technologies available. The issue of relevance is just as crucial, but somewhat less evident. The Upstate of South Carolina is located on the I-85 economic corridor between Charlotte and Atlanta. This has direct implications for the region in a number of areas that involve attracting new business and industry. The competition for new business investment, particularly international investment, has become fierce. This competition involves many factors ranging from tax incentives to cultural attractions. Perhaps none of these competitive factors is more important than adequately trained workers. Today, adequate training for almost any type of work in the New Economy requires a strong grounding in information technology. More specifically, information technology that is relevant to the needs of the business.

A number of technology-intensive businesses have already located in the Greenville-Spartanburg region. These businesses require employees with relevant skills and experience in information technology. Many institutions offer academic programs that are more governed by academic tradition and faculty background than by the needs of the community. For example, a number of colleges and universities still consider COBOL a foundation class for computer science even though it is generations behind the predominant technologies in use today. As a metropolitan university, USC Upstate has a responsibility to provide students a technology-rich learning environment that will help them master essential skills and ultimately make them more competitive in their respective disciplines and careers. These individuals help fuel the economic engine of the Upstate.

Another issue related to excellence and relevance involves direct competition for USC Upstate as an educational institution. The University of North Carolina at Charlotte, Georgia Institute of Technology, and Clemson University represent strong competitors for USC Upstate in the arena of attracting partnerships with technology-dependent companies and government agencies. With the precipitous decline in public support for higher education, USC Upstate is increasingly dependent on enrollment and support from partners in order to survive. It is vitally important that USC Upstate rise to a standard of excellence in the use of information technology in order to compete successfully for students, faculty, partnerships, sponsorships, development grants, and funding for research.

One of the guiding strategic principles in planning the information technology architecture of the university has consistently been full extensibility to offsite locations. Because of this, the opportunity exists to extend the USC Upstate campus technology environment to off-campus locations and to utilize its full capabilities to offer academic programs to a larger population of Upstate residents. Through the use of fully interactive and collaborative technologies in real-time, faculty will now be able to teach courses to virtual learning communities of students in remote locations across the Upstate. The innovative use of new and emerging technologies and the innovative application of traditional technologies such as interactive videoconferencing will increase availability and accessibility to academic programs by overcoming the need for new buildings, additional faculty and staff positions, and extensive travel by faculty and students.

Virtual Learning Communities

The overarching goal of the university in supporting economic revitalization is expanding accessibility to public four-year higher education for the residents of the Upstate. One of the primary strategies for achieving this goal is the creation of real-time virtual learning communities across the region. This enables communities of learners to gather at locations near their homes and places of work, rather than being required to travel to central campuses. Conversely, faculty will be able to teach from any of the locations as desired or needed, increasing the cost efficiency and effectiveness of the instruction. Virtual learning classrooms connected through interactive and collaborative technologies significantly enhance the learning experience of off-campus students, and make the delivery of courses less costly than would otherwise be possible by faculty traveling to remote locations to teach small, isolated groups of students on an individual basis.

A precursor to the capability of virtual learning communities is a fully converged digital network between teaching locations. Converged networks are high-speed circuits over which voice, video, and data communication can occur simultaneously. Converged networks are much more cost effective than numerous dedicated circuits and support far more powerful technologies that are integrated together. An excellent example of this is the use of voice over IP and unified messaging, eliminating the need for long distance dialing and the requirement for separate voicemail systems. Instead, phones are directly attached to the network and all voice messages are handled through Microsoft Exchange in the same manner that email messages are handled, eliminating duplicate circuits and components while offering a far more powerful environment.

USC Upstate has worked to establish the strategic capability for a converged and unified digital communications system through completion of a campus technology infrastructure with these capacities. Nearly all parts of the USC Upstate campus network and computer system were replaced in 2003 through a grant from the State of South Carolina Commission on Higher Education. This renovation resulted in a high bandwidth campus fiber network infrastructure, enterprise directory services based on Microsoft 2003 Active Directory, a file sharing and electronic messaging architecture based on Microsoft Exchange 2003, a campus wireless network, network security and virus protection. The result is a fully managed and secured campus network offering the bandwidth and reliability necessary for academic program delivery. From remote locations, all students have accounts and can authenticate to a central network and collaborative computing environment to access academic programs, digital library resources, and online student support services.

The potential of interactive collaboration to support teaching and learning for remote learners is enormous. Specifically, virtual learning classrooms are being constructed that utilize fully interactive videoconferencing and online collaboration capabilities, enabling faculty to directly engage the physically separated groups of student cohorts comprising the learning communities. Through partnerships already established between the University of South Carolina Spartanburg, Spartanburg Technical College, Greenville Technical College, the University Center at Greenville, Spartanburg Regional Healthcare System, and numerous others, underserved populations of

students across the Upstate region are being provided with much greater access to baccalaureate and graduate training through the power of information technology.

Inside a Virtual Learning Classroom

A highly mobile faculty offering courses on a rotating basis at different locations requires seamless access to technology support including administrative systems, email and calendaring, FAX, video, file storage, voice services, technical support and assistance, and in short all the services they would normally have in their own offices on campus. A fundamental strategic planning axiom for the USC Upstate campus technology architecture has consistently been the requirement for full extensibility to other locations to support this need. As a result, virtually every aspect of the technology environment at USC Upstate can be provided to virtual learning classrooms in the facilities of our partner organizations including technical colleges, hospitals, and businesses. To illustrate the capability of a virtual learning classroom, consider the following.

Utilizing the technologies provided by this initiative, an instructor has access to nearly all technologies available on campus, with even individual user profiles and preferences preserved. For example, the instructor can compose a digital class presentation, store it on a USC Upstate file server, and travel to another campus to teach the class without the need to scrounge for CD's, synchronized laptops, or overhead transparencies before leaving. Upon arriving at the remote location, the instructor can initiate an interactive video session with other locations, logon to the USC Upstate network to access the University's Collaborative Learning Environment, and instruct a network-enabled video projector to retrieve and display the digital course content to all students simultaneously in support of an interactive lecture. Ad hoc illustrations done on a digital "smart board" are displayed simultaneously to the groups of students, and can be saved in digital form for later use. Through the use of the wireless handheld computers (Pocket-PC's) supported by central web-based software, the instructor can continuously assess comprehension in each learning community simultaneously and in real-time as instruction is occurring, helping to ensure the effectiveness of the instruction. Courses offered in this manner are also supported by mobile computer labs utilizing wireless laptop computers on portable recharging carts that can be used in various classrooms within a building complex. This eliminates the need for more expensive fixed computer labs and provides far greater flexibility to the instructor.

Similarly, students can retrieve course assignments and materials, work individually or collaboratively with other members of their learning community, and submit their work assignments electronically to faculty. This system includes full access to the collaborative computing environment that provides features including user accounts for all students through enterprise directory services, information sharing and email, web course management platforms such as WebCT and Blackboard, and web-enabled services and digital resources. Through individual account-based IP telephony and unified messaging, students at the off-campus locations are able to contact academic and administrative offices on the USC Upstate campus and receive email and

voicemail through a web interface on any networked computer.

The first installations of virtual learning classrooms are in partnership with the University Center of Greenville and provide students in at least four Upstate counties with much greater access to four-year public higher education. Academic programs directly tied to the needs of the region are offered in this way such as education, information management and systems, nursing, criminal justice, and others.

Closing Thoughts

The use of technology by a metropolitan university to deliver and support academic programs specifically targeted to workforce retraining and economic revitalization is not revolutionary. However, the value and innovation of this approach in the Upstate of South Carolina is revolutionary. Expanding access to education to help drive economic revitalization and improve the quality of life in a region so devastated by economic misfortune is part of the fundamental mission of a metropolitan university. This is a mission the University of South Carolina Upstate is pursuing aggressively, and through innovation and technology. The technology described that enables physically separated learning communities to share a high quality interactive learning experience is essential to expanding accessibility to public four-year education in this region, particularly in a far more effective and cost efficient manner than would otherwise be possible. Ultimately, the ability to create a more capable workforce and attract business and industry to the area in support of economic revitalization is vital to the quality of life of the residents in the area we serve. Every aspect of the model described in this project is replicable by other institutions that serve communities facing challenges similar to those currently confronting the Upstate of South Carolina.

Author Information

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