

Regions and Universities Together Can Foster a Creative Economy *Chronicle of Higher Education*

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In recent years, many people have wanted to make the research university more relevant to business and the economy. Advocates of a greater economic role believe that the university's most important contributions are the transfer of research to industry, the production of commercial inventions and patents, and the creation and spinoff of start-up companies.

A growing number of universities have bought into that approach — it makes their work more economically relevant, builds closer ties to industry, and creates new sources of financial support. Unfortunately, that view not only oversells the immediately commercial functions of the university, but it also misses the university's more far-reaching contributions to the emerging "creative economy." The evolving role of the university is shaped by deep changes in the nature of our economy and society.

In the past few decades, human creativity has replaced natural resources and physical capital as the predominant driver of economic growth. The creative sector — which includes science and technology; the arts, culture, and entertainment; and knowledge-based professions like law, finance, health care, and education — employs some 40 million Americans. It accounts for almost one-third of total employment and more than \$2-trillion dollars in wages and salaries, or as much as the manufacturing and service sectors combined. It has generated roughly 20 million new jobs between 1980 and 2004, and is projected to add another 10 million between 2004 and 2014.

The growth of the creative economy is propelled by three interrelated forces, which I call the three T's of economic development: technology, talent, and tolerance. Many experts have discussed the university's role in the first T, technology. But scholars, university leaders, and policy makers have neglected the economic and social effects of the university's role in contributing to the other two T's — in producing and attracting talent and in establishing an open and tolerant social climate.

I recently studied the effects of the university on each of those three T's across all 331 metropolitan regions in the nation, as defined by the U.S. Census in 2000. I worked with Gary J. Gates, a senior research fellow at the University of California at Los Angeles School of Law; Kevin Stolarick, a lecturer in information systems at Carnegie Mellon University; and Brian Knudsen, a Ph.D. student in public policy and management, also at Carnegie Mellon. Conducting a variety of statistical analyses, we examined indicators related to university research, innovation, and talent (students and faculty members) and compared those with measures of regional technology, talent, and tolerance. Our research showed that while the university serves as a

powerful creative hub, by itself it is a necessary but insufficient component of successful regional economic development.

We learned much about the dynamic between universities and their surrounding regions by evaluating each of the three T's:

Technology. Important economists including Joseph A. Schumpeter and Robert M. Solow have demonstrated the central role that technology plays in economic growth, and, according to our analysis, university technology is closely associated with regional technology. We found correlations between university technology — measured as patent applications, disclosures of inventions, licensing income, and business start-ups — and regional innovation, including a flourishing high-tech industry. That was especially true in large regions, those with more than a million residents.

But in many other regions, universities did not have that strong an effect on innovation. According to Michael S. Fogarty, a professor of urban studies and planning at Portland State University, new knowledge is created in many places, but relatively few of them actually absorb and apply those ideas. He has found a consistent pattern in the flow of patents that university scientists generate: They migrate from universities in cities in older industrial regions, like Detroit, Pittsburgh, and Cleveland, to those in high-technology regions, like the Boston, San Francisco, and New York metropolitan areas, where the new products based on those patents are actually produced.

The relationship between the university and the regional economy can be thought of in terms of a simple transmitter-receiver system, with the university transmitting a signal that the regional economy must be able to absorb — or, in the words of Wesley M. Cohen, a professor of economics and management at Duke University, and Daniel A. Levinthal, a professor of corporate management at the University of Pennsylvania, for which it must have an "absorptive capacity." Increasing the volume of the signal will not necessarily result in effective absorption or transmission if the region's receivers are turned off or not working properly.

Talent. The Nobel Prize-winning economist Robert E. Lucas Jr. long ago argued that economic growth stems from clusters of talented people, and Edward L. Glaeser, a professor of economics at Harvard University, has found a close association between human capital and economic growth. According to a recent study of the economic effects of universities by Harvey A. Goldstein, a professor in the department of city and regional planning at the University of North Carolina at Chapel Hill, and Joshua Drucker, a Ph.D. student in the same department, universities influence economic growth more through the production of human capital — through students and faculty members — than via research and development.

Besides producing talent, great universities, with their star faculty members and standout research departments, also have a magnetic effect in attracting talent. They help draw outside companies, venture capitalists, laboratories, and research institutes to locate nearby to take advantage of the institutions' talent and infrastructure. A leading expert on university-based innovation, Adam Jaffe, dean of arts and sciences and professor of economics at Brandeis University, has found that corporate research is more efficient when it is located in proximity to research universities. Similarly, our research suggests that the share of students in the population is also strongly associated with innovation — as measured by the level and growth of patents — and a strong regional high-tech industry.

Concern has been mounting in the United States and elsewhere over the so-called brain drain, or the movement of talented university graduates from one region or state to another. Many regions are trying to figure out ways to keep graduates from leaving or to lure them back when they get older. But no place retains all the people it educates, and the most successful regions both generate talent and attract it from other places. Numerous studies have shown that the availability of a strong pool of local talent can trump both good physical resources and low costs in attracting corporations to a region and growing the local economy.

To identify such regions, we developed a measure we call the "Brain Drain/Gain Index." We calculated it as the percent of the population age 25 and over with a B.A. degree or above, divided by the percent of the population age 18 to 34 attending college. A region with an index above 1.0 is a "brain gain" region, while one with an index below 1.0 is a "brain drain" region. Only 10 percent of the more than 300 metropolitan areas that we studied were net attractors of talent. Just 10 regions boast scores of 1.25 or above; another five score higher than 1.20; and eight score more than 1.15. In San Francisco, San Jose, Santa Fe, and Washington, college students make up more than 30 percent of the population, and more than 40 percent of the work force has a college degree.

A high score on the index is strongly associated with all sorts of positive outcomes: employment, population, and income growth; a vital high-tech industry; and regional innovation. That reflects a virtuous cycle whereby high levels of talent lead to more technology generation, innovation, and entrepreneurship, which then lead over time to higher rates of economic growth and more job generation, which in turn lead to higher rates of talent production, retention, and attraction.

Tolerance. Societies throughout history have tended to flourish when they are open to new people and ideas, while stagnating during periods of insularity and orthodoxy. Recent studies have shown that talented and creative people favor diversity and a wide variety of social and cultural options. Openness to ideas — to creativity — is crucial in both attracting talent and succeeding economically. Talented and creative people vote with their feet, and they tend to move away from communities where

their ideas and identities are not accepted. That is why regions with large numbers of high-tech engineers and entrepreneurs also tend to be havens for artists, musicians, and culturally creative people. Austin, Boston, and Seattle are cases in point.

Research universities do much to seed tolerance and diversity in a region. For example, some people have called the universities the Ellis Islands of our time, citing their ability to attract large numbers of foreign-born students. John Doerr, a Silicon Valley venture capitalist, has remarked that the United States should "staple a green card" to the diplomas of foreign-born engineering and science students who contribute significantly to the nation's innovative capability.

Until relatively recently, however, universities have been somewhat insulated environments, often intentionally separating themselves from their neighbors and the broader society. In a way, universities have operated like Greenwich Village and other old bohemian neighborhoods once did — as distinct communities where eccentricity and difference were readily accepted, even encouraged. With the rise of the creative economy, universities' role in the third T, tolerance, has become more important.

My colleagues and I conducted statistical analyses to gauge the relationship between the university and various measures of tolerance — including racial integration, foreign-born population, gay and lesbian population, and artistic and bohemian communities — in different regions. Communities with larger shares of college students were more tolerant, and big universities located in smaller regions had the greatest impact.

Finally, to get at the broader relationship between the university and regional creativity, we constructed a new measure we call the "University-Creativity Index." It compares a community's university size and strength to the percentage of its work force in the creative class. Regions with high scores have considerable synergy between university research capability and local economic development. While the regions that scored the highest on that particular index are all leading high-tech centers — Austin, Boston, San Diego, San Francisco, and San Jose — a variety of other regions also scored well.

Places where major state universities have campuses dominated the rankings for smaller and midsize regions. They include East Lansing, Mich. (Michigan State University); Ann Arbor, Mich. (University of Michigan); Madison, Wis. (University of Wisconsin); Provo, Utah (Brigham Young University); Gainesville, Fla. (University of Florida); Bryan-College Station, Texas (Texas A&M University); and Corvallis, Ore. (Oregon State University).

But what about older industrial regions that have experienced the decline of manufacturing industries but have strong universities on which to build? Regions like Albany and Syracuse, N.Y.; Dayton, Ohio; Des Moines, Iowa; Muncie, Ind.; Omaha

and Lincoln, Neb.; Portland, Me.; Spokane, Wash.; and Trenton, N.J., all score highly on the University-Creativity Index. That suggests that those regions have significant untapped potential for further growth and development.

Of the largest industrial regions, Chicago does quite well on the University-Creativity Index, but other large industrial regions — Baltimore, Philadelphia, Pittsburgh, and St. Louis — lag behind. The problem in those regions, according to our analysis, is not their research universities, which are quite strong, but rather that the regions are not capitalizing on the science, technology, and innovation coming out of those universities. Bluntly put, such regions lack the talent and tolerance to compete at the cutting edge. They need to work on their ability to absorb the signals that their universities are sending out.

Indeed, to be an effective contributor to regional creativity and economic growth, the university must be integrated into a broader creative ecosystem. Universities and their communities must collaborate to make that happen.

For their part, universities should go beyond establishing technology-transfer offices devoted to commercially relevant activity — often a small effort run out of just one part of the institution. Martin C. Jischke, president of Purdue University, has said that the research university must change its mission from the static categories of research, teaching, and service to the more-dynamic ones of discovery, learning, and engagement. While all are relevant, the last one is key: Universities must engage their surrounding communities more fully and do so through not just technology, but all three T's.

The strength of the university has always been the ability to mobilize the talent and creative energy of all its participants — faculty members, researchers, administrators, graduate and undergraduate students. When institutions draw upon the collective creative energy of thousands of people, new ideas are generated, and new talent is created on campuses and potentially in their communities, as well.

Many, if not most, students I have encountered over the past two decades would have exchanged time in the classroom for time engaged in learning by doing — working in a research laboratory, helping create a start-up company, participating in a theater or arts group, working at a nonprofit community organization. And many faculty members want to be similarly engaged. Universities must change how they grant promotion and tenure for faculty members and grade and evaluate students in ways that encourage such engaged activity throughout the institutions.

For example, in part because Savannah College of Art and Design was a new university and resources were scarce, students and faculty members helped renovate the old buildings that make up the campuses. Other universities should learn from the success that institution has achieved in building cutting-edge programs and

helping revitalize its surrounding neighborhood. In another region of the country, the University of Pennsylvania has made enormous strides in bridging the divide between itself and its community by building new and improved schools and other community assets, by supporting neighborhood upgrading projects, by buying goods and services from local businesses, and by making university services — health facilities, cultural activities, and many more — available to people outside the university.

Local and regional leaders must also play their roles. They should avoid the tendency to push off the responsibility for providing economic growth, cultural amenities, and local services to universities, some of which are becoming the biggest employers in their regions. Instead, local officials should follow the lead of Philadelphia, which is actively working with Penn and other universities in the area to encourage students to stay in the community after they graduate.

The city of Providence, under the leadership of its dynamic young mayor, David N. Cicilline, is also developing a model whereby local universities support neighborhood redevelopment. The Rhode Island School of Design has developed studio space and student housing in old industrial buildings. Representatives from Brown and Johnson & Wales Universities are also involved in the effort. In successful communities, the connection between those communities and their universities is more seamless than in other places. It is hard to tell where one begins and the other ends.

In most cases, however, communities and universities either ignore each other or engage in peaceful coexistence. To spur local development, communities and universities need to collaborate as partners across a host of issues, such as actively recruiting students into the labor market, working to help retain foreign students, and developing amenities that attract and retain young people.

The old model of a university pumping out research results and educated students, or even commercial innovations and start-up companies, is no longer sufficient for the era of creative-knowledge-based capitalism. Universities and their communities have taken the technology agenda seriously; now they must do the same with talent and tolerance. The places that don't will find the discoveries and talent they produce migrating away. Those that focus on all three T's will realize considerable advantage in generating innovations, attracting and retaining talent, and creating sustained prosperity.

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