

Seizing the Manufacturing Moment:

An Economic Growth Plan for the

Bluegrass Economic Advancement Movement

**Strategic Overview
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**A project of
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INTRODUCTION

The Bluegrass Economic Advancement Movement (BEAM) extends from the banks of the Ohio River in the Louisville metropolitan area to the Bluegrass area around Lexington, bringing together twenty-two counties to sharpen the leading edge of economic growth for the Commonwealth of Kentucky.

Louisville and Lexington, the major metropolitan areas that anchor the BEAM region, are distinctive and different places: the first a river city that grew into an industrial center and transformed at the end of the 20th Century into a world-class center for logistics with UPS Worldport; the second a college town that grew to become a university city, an emerging center for technology industry and knowledge work.

Although the economies of the Louisville and Lexington regions do not yet overlap extensively, their civic, business, and professional networks do, with connections through complementary industries and supply chains and networks of firms and professionals intertwined across both metros. Those links create the fabric of synergy that BEAM seeks to leverage to enhance the competitive position of both regions.

With a Gross Domestic Product of \$92 billion, BEAM is the engine that generates 53 percent of Kentucky's total economic output, encompassing much of its capital, technology and production base, its research, higher education and healthcare assets, and the hubs of its global transportation and communications networks. With a population approaching two million, it is home to 46 percent of all Kentucky residents and employs almost half of the state's workforce.¹

The center of gravity that will drive the next economy in the BEAM region lies at the intersection of production, technology and innovation, leveraging its strength as a world-class logistics center against the resurgence of manufacturing underway in America. As the BEAM region turns toward those opportunities, it is turning into a headwind, however, generated by three decades of global restructuring that have undercut the region's competitive position.

The BEAM region's significant cost advantages made it one of the nation's strongest manufacturing centers during the industrial era and then propelled its emergence as a logistics hub with United Parcel Service Inc.'s Worldport, creating a magnet for all types of firms for whom "just in time" is an imperative.

Over the last 30 years, Louisville's post-industrial performance was better than anticipated given its industry mix and trends in those sectors at the national level. Though manufacturing shed employment in the region during the 1980s, the decline was not as severe as in other parts of the country. Louisville's economy recovered in the 1990s in terms of jobs if not wages thanks to growth in the service sectors, and the Lexington region thrived with the arrival of Toyota Motor Manufacturing, Kentucky and growth in new technology sectors.

¹ Brooking's analysis of Moody's analytics, 2011.

In the first decade of the 21st Century, however, the Louisville region's competitiveness began another sharp decline as Louisville's economy shifted into less productive industries and productivity growth in many sectors did not keep pace with national productivity improvements.

Between 2000 and 2011, the region's overall employment, productivity and output growth lagged the nation, reflecting increasing concentrations of lower wage, less productive jobs across BEAM. This resulted in poor outcomes for its citizens -- median household incomes declined more than they did nationally, and poverty rates rose faster in both BEAM metros.

Much of this is a story about the region's largest industrial sector – manufacturing.² For three decades, the region's civic, elected, and business leaders considered the trajectory of manufacturing as an inevitable, and irreversible, downward spiral. But over the last two years, the emerging resurgence in U.S. manufacturing spurred significant new investments in plant and production in the region by major firms in the massive automotive and appliance sectors, pointing toward a new manufacturing era.

The manufacturing story in the BEAM region consists of more than one thread, however. The region is seeing the immediate benefits of the rebound in U.S. manufacturing in the major reinvestment underway – and that is both an extraordinary attraction success story and a positive development that could obfuscate the deeper, underlying story.

The fundamental restructuring underway in manufacturing holds significant implications for the BEAM region beyond the high-profile developments underway with some of its major employers. The manufacturing renaissance will be fueled by innovation but will also favor production of heavy items such as automobiles and appliances best produced within easy access to markets.

The BEAM region's ability to seize the moment in manufacturing depends on growing the higher-skilled workforce required by the global knowledge economy and pairing that workforce with expanded technological and innovation capacity to shift its key sectors and firms into more advanced activities that add greater value and move the region forward toward a stronger competitive position.

That challenge applies particularly to the region's unusually large footprint of 1,600 small- and mid-sized firms that account for 75 percent of the 100,000 jobs in manufacturing.

To compete in the 21st century, the BEAM region must assemble a strong package that will distinguish its mix of industries and higher-technology firms and sectors, skilled talent and human capital, strongly networked innovation systems, and world-class infrastructure for the rapid movement of goods around the globe.

² By economic output in 2011.

METROPOLITAN BUSINESS PLANNING: A TOOL FOR ECONOMIC TRANSFORMATION

To compete in the global economy, successful regions must identify their unique assets and build on them to enhance their productivity. The global economy is undergoing a dramatic transformation that favors metropolitan regions where assets concentrate and their dynamic interactions enable greater efficiency and productivity. Regions that identify a solid path to making that transformation – intentionally building on their unique assets – forge ahead to a stronger competitive position.

Metropolitan Business Planning³ addresses this need by adapting the discipline of private-sector business planning to the challenge of regional economic growth. It provides a framework through which business, civic and government stakeholders can analyze the assets, challenges and competitive position of their region objectively, identify mutually reinforcing strategies to capitalize on growth opportunities, and launch catalytic enterprises to change the region's economic trajectory.

To achieve these results, the Metropolitan Business Planning (MBP) approach differs from traditional economic development planning in several critical respects:

- It is ***fact-based and market-disciplined***. Rigorous market analysis leads to strategies tailored to the specific assets and opportunities in the region. The plan reflects extensive and vigorous economic analysis about what will work – not as a matter of opinion but as an empirical question that will lead to the right answers for the region.
- It is ***inclusive, collaborative and transparent***. A diverse set of informed leaders and economic development experts come together to create and implement the plan.
- It produces ***a shared roadmap*** for the region, aligning existing and new initiatives around a collective vision. By bringing coherence to fragmented programming across multiple dimensions of the economy, it creates common understanding and strategic direction.
- It creates ***a new institutional infrastructure for economic growth*** through a network of committed stakeholders acting collaboratively to transform the economy.

³ Development of this Plan was undertaken with the Brookings Institution Metropolitan Policy Program and RW Ventures, LLC as part of a national pilot project on Metropolitan Business Planning. See, Mark Muro and Robert Weissbourd, "Metropolitan Business Plans: A New Approach to Economic Growth" (Brookings Institution, 2011). Chapter II provides further background.

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- It represents an ***ongoing enterprise***, geared to action. More than a strategic plan, the MBP creates a portfolio of actionable strategies with an initial wave of initiatives ready for implementation.

The Metropolitan Business Plan creates a “north star” for the region, around which strategies and initiatives align. This draft of the MBP represents only the first iteration, laying the groundwork for what will become a continuous process of analysis, strategic revision, initiative design, implementation, adjustment and adaptation to new economic conditions. Metropolitan Business Planning establishes a new way of doing business in regional economic development geared to meeting the heightened demands of global competition in the new economy.

BEAM: A PARTNERSHIP CONVENED BY METROPOLITAN MAYORS

Convened by Mayor Greg Fischer in Louisville and Mayor Jim Gray in Lexington, public and private sector leaders in the BEAM region have come together to accelerate the transition toward a more competitive profile for the next economy.

Their common goal is to establish an on-going partnership and collaboration to implement linked strategies tailored to both regions and designed to increase innovation and entrepreneurship and pursue targeted investments to develop higher skills, next generation infrastructure and new approaches to civic governance at the regional level.

The partnership behind BEAM represents an innovation in itself: a coming together led by two metropolitan mayors, who, along with partners in industry and from across the higher education, economic development and civic sectors, recognize that the forces of global competition make competition between neighbors obsolete.

BEAM inaugurates a new era of partnership uniting the middle corridor of Kentucky where leaders are designing a roadmap to navigate the next phase of the transition to a new economy – positioning their region to make the whole greater than the sum of the partners, collaborating to compete in the next economy.

The Metropolitan Business Plan also inaugurates a new approach to economic development, comprehensive and integrated in its approach, rigorously researched, fact based and oriented to market-driven action. The Bluegrass Economic Advancement Movement will define a new profile for the region, strengthening its competitive position for the next economy. Because the two metropolitan regions do not function as one unified economy, it will focus largely on points of potential synergy and leverage between the two metropolitan regions with the goal of enhancing the competitive position of both.

BEAM originated with – and this plan is anchored in -- the emergence over the last two years of potential opportunities to renew both regions' historic strengths in manufacturing, taking advantage of the new era in manufacturing opening up in the United States. The overarching goal is to strengthen and leverage the region's robust advanced manufacturing sector and related strengths to capitalize on those opportunities to protect and create solid jobs and higher wages. The document provides an overview of the BEAM economy, followed by research and analysis focused on five market levers:

- Regional Concentrations, the industries and sectors that drive the regional economy
- Innovation
- Human Capital
- Spatial Efficiency
- Governance

ECONOMIC FRAMEWORK

THE NEW GLOBAL ECONOMY REQUIRES A NEW APPROACH TO ECONOMIC DEVELOPMENT⁴

The global economy is currently undergoing a fundamental transformation. Recent disruptive changes do not reflect downturns in a business cycle that will soon return to “normal.”⁵ Rather, a knowledge and technology based restructuring has changed the dynamics of productivity and economic growth, and increased the importance of metropolitan regions. This new environment requires a new approach to economic growth planning, focused on where particular regions are in the process of transformation and on five market levers that drive transformation and lead to inclusive prosperity in metropolitan regions.

CHARACTERISTICS OF THE NEW GLOBAL ECONOMY

The New Economy is Knowledge-based, Innovation-driven, Dynamic and Global

Economic growth increasingly relies on knowledge embedded in people and advanced technologies.⁶ Knowledge-based service sectors such as Scientific and Technical Services; Finance, Professional and Business Services) now make up nearly 75 percent of economic output in developed economies.⁷ Knowledge-based products and processes are proliferating across all industries, and entirely new sectors are emerging.⁸

This shift to a knowledge and advanced technology-based economy in turn engenders more continuous innovation in products, processes, business models and markets. Firms and

4 With respect to the economics which inform the Metropolitan Business Plan, both the discussion of the global economy, here, and of the market levers, below, are very high-level summaries which excerpt and draw heavily from much more extensive reviews of the relevant research and practice. See Mark Muro and Robert Weissbourd, “Metropolitan Business Plans: A New Approach to Economic Growth” (Brookings Institution, 2011); Gretchen Kosarko and Robert Weissbourd, “Economic Impacts of GO TO 2040” (Chicago Community Trust, 2011); Gretchen Kosarko, Robert Weissbourd, Harold Wolman, Andrea Sarzynski, Alice Levy, and Diana Hincapie, “Implementing Regionalism: Connecting Emerging Theory and Practice to Inform Economic Development” (Surdna Foundation, November 2011); and “A Plan for Economic Growth and Jobs” (World Business Chicago, 2012); and “Partnering for Prosperity” (Cook County, 2013).

5 Rather, in economic terms, this is Schumpeter’s “creative destruction” applied to regional economies – it is highly disruptive, but necessary, and leads to redeployment of assets into more productive activities. But it also means that a region cannot return to business as usual, and the conventional wisdom about what drives economic growth is not right any more.

6 These changes are often collectively referred to as the “knowledge economy,” which encompasses the increasing importance of information and knowledge resources (a) as inputs to production, (b) in the production and market process, and (c) as products and services. See discussion in Robert Weissbourd and Christopher Berry, *The Changing Dynamics of Urban America* (Chicago: CEOs for Cities, 2004), 254-287; Matthew Drennan, *The Information Economy and American Cities* (Baltimore: Johns Hopkins University Press, 2002); and J. Houghton and P. Sheehan, *A Primer on the Knowledge Economy* (Melbourne City, Australia: Center for Strategic Economic Studies, Victoria University, 2000).

7 McKinsey Global Institute, analysis of Global Insight and Economist data. U.S. GNP quintupled in 50 years, while its physical weight barely increased. “Greenspan Weighs Evidence and Finds a Lighter Economy,” *Wall Street Journal*, <<http://anasazi.umsl.edu/FIN455/NonLinear/GreenspanWeighs.htm>>).

8 See, “Big Data: The Next Frontier for Innovation, Competition, and Productivity,” McKinsey Global Institute, 2011.

industries emerge, develop, and redefine themselves based on changing market conditions at much faster speeds than in the past.⁹

As a result, the economy is more dynamic. Flexible production and fluid institutional networks enable rapid redeployment of assets to new products and markets and increased customization. Further, in terms of both demand and supply, the new marketplace is global.

Metropolitan Regions Drive the Global Economy

The new economy's premium on dynamic interactions among knowledge assets particularly favors metropolitan regions. Worldwide, economic assets are concentrated in metropolitan areas where their geographic proximity reduces transaction costs and increases innovation-producing interactions.¹⁰ This makes metropolitan economies disproportionately productive,¹¹ and, as a result, metropolitan regions are now the global economy's primary competitive units.¹²

Each region has its own unique combination of assets, market dynamics and institutional environments that shape its economic performance. These interactions create a "whole greater than the sum of the parts" – each of the key dimensions (for example, industry concentrations, workforce characteristics, infrastructure) succeeds or fails in the context of the whole. Strategies to impact the performance of the whole must be highly tailored to the individual region and mutually reinforcing. There are no "one-size-fits-all" solutions for promoting economic growth.¹³

9 Consider, for example, that the companies that made up the S&P index in the 1920s would remain on the list for an average of 65 years; by the late 1990s, the average firm spent only 10 years on the S&P 500. Manyika, Lund, and Auguste, "From the Ashes: The Most Dynamic Economies Rely on Creative Destruction to Grow" *Newsweek* (August 16, 2010). In addition, the places that dynamically redeploy their assets, as measured by business churn (generally, the combination of firm births and deaths per total number of firms), are more productive. See, e.g., Lucia Foster, John C. Haltiwanger, and C. J. Krizan, "Aggregate Productivity Growth: Lessons from Microeconomic Evidence," *New Developments in Productivity Analysis*, (NBER Books, 2001): 303-72; and Yeonwoo Lee and Donald Hicks, "Schumpeterian Churn Dynamics and Regional Productivity Performance," *International Business and Economics Research Journal* (Littleton, CO: Western Academic Press 2.1, 2003): 83-98.

10 From an economist's point of view, the reason for the very existence of cities, and their surrounding economic regions, is to reduce the transportation costs of goods, people and ideas. See Edward L. Glaeser, "Are Cities Dying?" (*Journal of Economic Perspectives* 12 (Spring 1998): 140). Skilled people and firms located in metropolitan areas have higher productivity and outputs than their peers located outside them. See Christopher Wheeler, "Cities and the Growth of Wages Among Young Workers: Evidence from the NLSY" (Working Paper 2005-055A, Federal Reserve Bank of St. Louis, 2005).

11 See Alan Berube, "MetroNation: How U.S. Metropolitan Areas Fuel American Prosperity" (Brookings Institution, 2007); and Clark, Feldman, and Gertler, eds., *The Oxford Handbook of Economic Geography* (OUP, 2000).

12 In the context of the global economy, regions are large enough to compete in international markets and small enough to provide the agglomeration benefits that flow from geographic proximity of human capital, firms and related institutions. See, Manuel Pastor Jr. et al., *Regions That Work: How Cities and Suburbs Can Grow Together* (University of Minnesota Press, 2000); Pierre-Paul Proulx, "Cities, Regions, and Economic Integration in North America," in *North American Linkages: Opportunities and Challenges for Canada*, ed. Richard Harris (University of Calgary Press, 2003); and Peter Calthorpe and William Fulton, *The Regional City* (Washington, D.C.: Island Press, 2001).

13 Deliberate, tailored strategies are particularly important in the knowledge economy because the growth trajectories of regional economies are diverging. In the past, underperforming regions tended to "catch up" with their higher-performing peers over time. In the new global economy, this dynamic has changed. Concentrated

All areas of a region – its neighborhoods and its populations – are inextricably linked. Regions that develop and deploy more of their human, land, and business assets do better in the long run. Long term, economic growth – across all five dimensions – must be inclusive to be sustainable.¹⁴

A NEW APPROACH TO ECONOMIC GROWTH

The transformative nature of the new economy holds major implications for the practice of regional economic development. Traditional strategies are no longer enough to move the needle on growth. Regions must take a new approach, moving away from consumption-driven growth (e.g., retail, housing), and from deal-by-deal attraction strategies competing primarily based on low costs.¹⁵

Instead, the focus shifts to the creation of production-driven economies that compete by adding value, building on specialized assets, knowledge and skills, unique strengths and opportunities. To do this, regions concentrate on increasing the productivity of their people and assets. Successful regions develop and implement comprehensive, integrated and inclusive strategies across the five market levers (discussed below) that determine productivity.

This new approach requires creating new institutional capacity that works across the public, private and civic sectors and across political boundaries. These new institutions must engage in objective analysis, confronting hard truths about the region’s assets and liabilities, and discarding conventional wisdom when it no longer fits market realities.

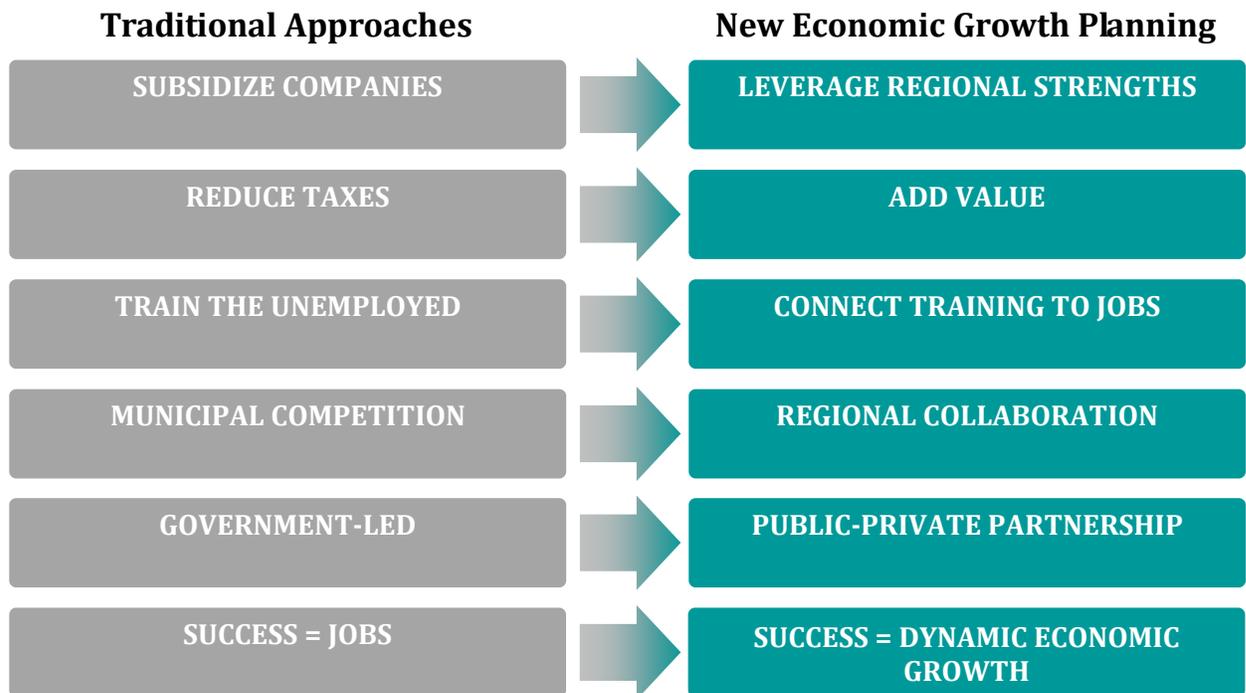
knowledge assets drive a self-reinforcing growth cycle, and as a result, high-performing regions tend to pull further ahead of their competitors. Small changes in direction can make a big difference. New growth theory, in particular, holds that concentrations of knowledge factors – such as high human capital, information technologies and information sector firms – build upon themselves. This process results in increasing rather than diminishing returns, so that the places that get ahead tend to keep getting further ahead. See generally Joseph Cortright, “New Growth Theory, Technology and Learning: A Practitioner’s Guide,” *Reviews of Economic Development Literature and Practice* 4 (2001), especially 10-12; and Weissbourd and Berry 2004.

14 See discussion in Weissbourd and Berry, 2004: 50-51, 56, 60; For additional empirical evidence of the relationship between inequality and economic growth, see, e.g., Gregory Acs, “Examining Income Inequality in America’s Largest Metros,” *MetroTrends*, (Washington, D.C.: The Urban Institute, 2012); Andrew G. Berg and Jonathan D. Ostry, “Inequality and Unsustainable Growth: Two Sides of the Same Coin?,” (Washington, D.C.: International Monetary Fund, 2011); Thorvaldur Gylfason and Gylfi Zoega, “Education, Social Equality and Economic Growth: A View of the Landscape,” (CESifo Economic Studies 49, 4, 2003): 557 – 579. See also, e.g., Heather Boushey and Adam S. Hersh, “The American Middle Class, Income Inequality, and the Strength of Our Economy,” (Center for American Progress, May 2012).

15 Individual firm attraction instead plays an important role as a tactic aimed at attracting targeted firms that fit strategies tailored to the assets of the region – such as targeting firms to fill out a strong local cluster. In these circumstances the offering to attract the targeted firm is also different – less focused on direct financial incentives (cost reduction) and more on adding value through infrastructure, human capital and other programs that improve the region for the entire industry and make the firms and region “stickier” – less likely to leave for the next lower-cost location.

Their leaders must evaluate and deeply understand the dynamics of the region and its unique strengths and weaknesses and deliberately create linked enterprises that will work together to transform those dynamics by fostering the rich, dynamic networks that drive innovation and growth. They continually monitor and adjust their actions, creating new plans based on objective metrics of market performance and impact.

In short, regions must deliberately make transformative investments tailored to move them forward on their unique path to prosperity.



FIVE MARKET LEVERS TO ENHANCE PRODUCTIVITY

Metropolitan economies grow by increasing the total value of goods and services produced by firms in the region. Firm creation, growth, and location dynamics arise from regional characteristics that determine the efficiency and productivity of firms and markets. In the new global economy, five market levers account for the efficiency and productivity of regional economies.¹⁶ These provide the framework for understanding a region’s economic assets, challenges and opportunities and for the market analysis that follows. They are briefly summarized here and further described in each section.

- **Enhance industry clusters and concentrations.** Firms are more productive when interacting in “clusters” of related firms, business functions, and institutions.

¹⁶ See notes above for sources providing detailed literature review, derivation and explanation of these market levers.

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- **Develop and deploy human capital aligned with jobs.** The knowledge economy places a premium on higher levels of human capital and on labor markets that enable strategically targeted and efficient training, retraining, and deployment of workers whose skills align with changing job requirements.
 - **Foster innovation and entrepreneurship.** Continuous innovation is the core driver of increasing economic productivity.
 - **Improve spatial efficiency.** The economic benefits of concentrating assets in regions – such as reduced transportation costs for goods, people and ideas, shared labor pools, and the spillover of knowledge across firms and talent pools – flow most easily from densely populated and well-connected concentrations of businesses, suppliers, workers and consumers.
 - **Create effective public and civic institutions.** Government shapes and enables market activity, provides critical public goods, and, along with civic- and private-sector institutions, creates the networks and environments that support dynamic and flexible economies.

MARKET ANALYSIS

TOP-LINE PERFORMANCE

The 13-county Louisville Metropolitan Area is the 42nd largest metropolitan region in the United States with a population of 1.3 million and economic output totaling \$48.7 billion, which places it in the middle among the hundred largest metro regions in the country.

The six-county Lexington Metropolitan Area ranks 106th in size among the top metros with 479,244 residents and economic output totaling \$19.6 billion in 2011.

Over the last three decades, employment and output growth in the BEAM region have not kept pace with the nation, and the productivity premium that distinguished it in 1980 has diminished or disappeared. For most of the last decade, wages and productivity all grew more slowly than across the nation, reducing median household incomes and increasing poverty levels in both BEAM metros by more than national increases.

During the three decades from 1980-2009, wage growth in the BEAM region was significantly lower than in the hundred largest metro regions, where wage increases averaged 34.4 percent. Lexington almost kept pace with that level, at 32 percent, but Louisville's older economic profile and mix of industries limited its total growth in average wages over three decades to 19.2 percent.

More recently, from 2000 to 2012, the region's overall employment, total economic output and productivity (output per worker), all lagged behind the national rates. Those trends reflected, at least in part, increasing concentrations of lower wage and less productive jobs.

Household incomes also declined in both metropolitan areas, as they did nationally, although the loss was slightly less in the Louisville areas than in the Lexington region, as shown in the accompanying chart.

Between 2000 and 2011, poverty rates increased in the regions' core counties. Fayette County's rate rose 5 percent to 17.9 percent and Jefferson County's rose 3.3 percent to 15.7 percent in Jefferson County in 2011 – significantly more than the 1.9 percent increase that occurred across the nation,¹⁷ where the average in 2011 was 14.3 percent.

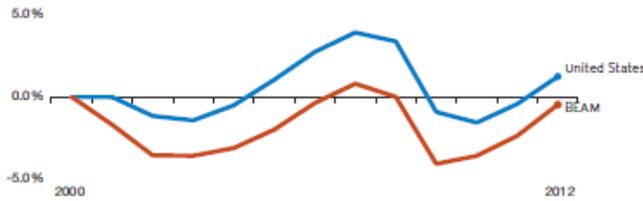
As it emerges from the Great Recession, however, Louisville is posting some of the best rebound metrics in the nation. And between 2011 and 2012, Kentucky's net job growth was 2.6 percent, which is the second highest rate of improvement in the nation.¹⁸

¹⁷ U.S. Census Bureau, 2000 Decennial Census and U.S. Census Bureau, American Community Survey, 2007-2011 5-year estimates. "Poverty Status in the past 12 months."

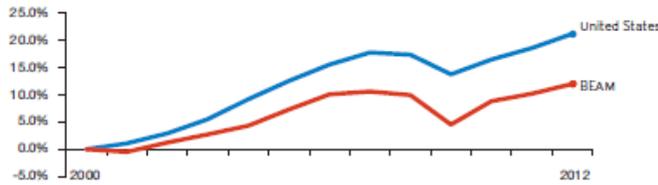
¹⁸ U.S. Bureau of Labor Statistics

THE OVERALL ECONOMIC PERFORMANCE OF THE BEAM REGION LAGS THAT OF THE NATION

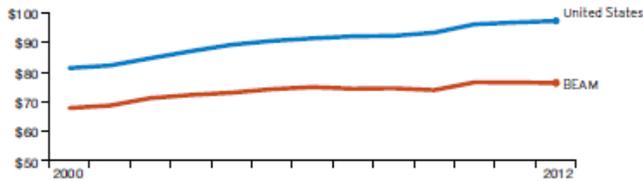
CHANGE IN EMPLOYMENT, 2000 TO 2012



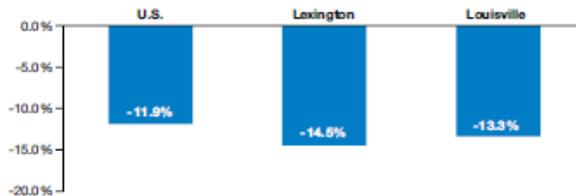
CHANGE IN ECONOMIC OUTPUT, 2000 TO 2012



CHANGE IN OUTPUT PER WORKER, 2000 TO 2012 (IN \$1,000S)



CHANGE IN HOUSEHOLD INCOME, 2000 TO 2012



Source: Brookings analysis of Moody's Analytics, U.S. Census, and American Community Survey data

BEAM REGIONAL CLUSTERS AND CONCENTRATIONS

Firms become more productive by geographically “clustering” with related firms, supply chains, supports and institutions. This concentration of economic activity reduces transaction costs, enables sharing of specialized labor pools and other inputs, and facilitates innovation through knowledge and technology exchange.

A region’s most promising industry clusters have a strong local presence (i.e., they are more concentrated than in other regions), are growing locally and nationally, exhibit a degree of

competitive advantage (e.g., highly productive or have the potential to be) and include unique institutional and other assets that make the cluster and region competitive.

To succeed in the new economy, these clusters of firms and industries develop informal, flexible and nimble economic networks that enable them to compete on customization, product quality, new process and technology development, and other high-value-added factors. They can no longer rely primarily on being low-cost, high-volume producers of commodity goods.

Across all clusters but particularly for manufacturing, the dramatic shift underway toward continuous technology innovation, higher skills, and an increased focus on exports represent especially critical factors that determine the region’s competitive position in the new economy.

The four industries outlined below, selected based on the BEAM region’s high employment and location quotient, produced thirty-five percent of the region’s total economic output in 2011 and include strong manufacturing sectors, such as automotive, electrical equipment and appliances, and primary materials, with unusually strong concentrations in the region and strong inter-dependencies and linkages.¹⁹ Logistics, transportation, and distribution and two non-manufacturing sectors – healthcare, and finance and insurance – represent the largest employment sectors, while emerging opportunities in technology repair and maintenance and business centers for other firms offer potential growth areas for the region.²⁰

THE BEAM REGION’S PRODUCTION ASSETS



Manufacturing

Among those four industries, manufacturing represents the largest single concentration and the bedrock of the BEAM regional economy, producing \$13.8 billion in goods, or about one-sixth of the region’s total economic output.

¹⁹ The level of concentration in the region compared to concentrations in other regions across the country, measured by Location Quotients, identify industries that are particularly strong or specialized within the region. Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region “unique” in comparison to the national average (definition courtesy of EMSI). The source for Location Quotient data throughout this report is from Moody’s Analytics.

²⁰ Healthcare has an LQ of 1.03 in the Louisville MSA and an LQ of .85 in the Lexington MSA.

Manufacturing employs more than a hundred thousand people, accounting for one out of every ten jobs in the region – a share of employment that is 20 percent greater than the national average for manufacturing employment.

Manufacturing impacts the overall performance of the region, driving innovation, environmental sustainability, and providing higher-quality jobs directly tied to the region’s overall prosperity. Manufacturing jobs exert a strong multiplier effect, stimulating growth in other sectors. One new job in automobile manufacturing, for example, generates an additional 2.6 new jobs in other sectors of the economy.²¹

The manufacturing industry also plays a leading role in the region’s strong export presence, accounting for almost three-quarters of all exports from the BEAM region in 2010, a far larger share of the region’s total exports than is typical in the U.S. economy.²²

Over the last two years, manufacturing output and job growth across the country exceeded the rate of growth in other sectors, adding about half a million jobs, the highest 30-month employment growth rate that U.S. manufacturing has experienced since the third quarter of 1985.²³ Those national trends had even more positive impact in the Bluegrass Region, where manufacturing employment grew an average of 5.1 percent from the beginning of 2010 through June of 2012 — the fastest rate of growth for the sector since the mid 1990s.^{24, 25}

Employment growth is due in part to recent investments by the region’s OEMS – original equipment manufacturers – that have totaled nearly \$2 billion thus far. But the region’s manufacturing’s resurgence extends beyond OEMs to its large numbers of small and medium-sized firms: more than 1,600 of them, many locally owned and providing three-quarters of all manufacturing employment in the region, or about 75,000 jobs.

Productivity in the manufacturing sector remains higher than in other sectors of the BEAM economy and drives the region’s overall rate of productivity improvement. However, over the last three decades, manufacturing productivity in the BEAM region improved at a rate that was only a third of the national average for productivity improvement, eroding one of the region’s traditional advantages. Globally, manufacturing is poised for a new industrial revolution. Breakthroughs in production technology are enabling manufacturers to more flexibly respond to shifting market demands quickly and cheaply. These technologies are enabling more places to

²¹ Paul Coomes’ analysis of IMPLAN version 3 model of BEAM region, using 2010 economic data.

²² Emilia Istrate and Nicholas Marchio, “Export Nation 2012: How U.S. Metropolitan Areas are Driving National Growth,” Brookings, 2012. The region’s largest manufacturing export industries include transportation equipment manufacturing (dominated by the automotive industry) with \$2.9 billion in exports in 2010, machinery manufacturing with \$943 million in exports, chemicals with \$830 million in exports, electrical equipment manufacturing, which includes household appliances, with \$704 million in 2010 exports, and primary metals manufacturing with \$448 million in 2010 exports.

²³ Brookings’ analysis of Moody’s analytics, 2011.

²⁴ Brookings’ analysis of Moody’s analytics, 2011. Data for the 22-county Bluegrass Region are not available.

²⁵ Brookings’ analysis of Moody’s analytics, 2011.

participate in the global economy than ever before, leading to a convergence of developed and emerging economies that is rapidly changing the geography of production.

The question for the BEAM region is what role it will seek to play in that next generation of manufacturing and what competitive position it will stake out – both offensively to seize the opportunities presented and defensively to protect its strong base of manufacturing firms and jobs.

Manufacturing fuels the BEAM regional economy through several areas of production

	Employment Location Quotient (2011)	Regional Employment (2011)
Automotive		
Motor vehicle parts	3.82	12,410
Motor vehicles	6.17	7,401
Motor vehicle body and trailers	1.18	1,015
Electrical Equipment and Appliances		
Ventilation, heating, air-conditioning, and commercial refrigeration equipment	2.37	2,246
Household appliances	9.28	3,886
Electrical equipment	1.51	1,525
Primary Materials		
Plastics products	1.38	5,134
Forging and stamping	2.23	1,545
Food and Beverage		
Beverage manufacturing	2.32	2,850
Food manufacturing ²⁶	0.75	7,975

Automotive²⁷

Toyota Motor Manufacturing Kentucky and Ford Motor Company anchor the region’s vast network of suppliers, producers, and connecting transportation firms that make up the automotive cluster.²⁸ But it also includes large numbers of smaller firms working with plastics, fabricated metals, and electrical components to make dashboards and other equipment installed in automobiles, seats, audio equipment, glass and mirrors, as well as firms that move all those parts, components, and finished products to the assembly line “just in time” and then out to the world for distribution.

Ford Motor Company reopened its Louisville Assembly Plant only recently, after investing \$600 million to create one of the world’s most technologically advanced and flexible production

²⁶ Louisville’s food manufacturing LQ: 1.03; Lexington’s food manufacturing LQ .34

²⁷ NAICS 3361, 3362, 3363

²⁸ Ford Motor Company operates the Louisville Assembly Plant and Kentucky Truck Plant in Louisville.

plants and adding 3,100 new jobs under a two-tier wage structure negotiated with the United Auto Workers²⁹ to bring production back to the United States.³⁰ Toyota Motors Manufacturing Kentucky is investing \$360 million to produce the Lexus ES 350, creating 750 new jobs.³¹

With more than 1,025,000 light vehicles produced in Kentucky, the state ranks fourth in the nation for total production in that class of vehicles, increasing its share of total U.S. production from fifth place since 2011. One in every ten light vehicles produced in the United States last year rolled off the assembly line in a Kentucky factory.³²

The production of vehicles, vehicle bodies and trailers, and vehicle parts form the pillars of the region's automotive manufacturing cluster. In 2011, these sub-sectors employed almost 21,000 workers and produced \$1.7 billion in output, an increase of 138 percent since 1980. Between 1980 and 2011, the BEAM region captured a growing share of the market for auto and auto part manufacturing, increasing employment in motor vehicle parts manufacturing by 91 percent even as employment in that area nationally declined by 77 percent. Motor vehicle parts manufacturers in the BEAM region are 7.5 percent more productive than the national average for that sector.

In addition to the new plants and production coming online in the BEAM region, there also are emerging or potential strengths related to alternative fuel development. Hitachi has made a series of substantial investments in Kentucky to produce lithium-ion battery packs.³³ The state of Kentucky invested in the development of technological capability for producing the next generation of lithium-ion batteries at the U.S. Department of Energy's newly established Argonne National Laboratory battery manufacturing research center in Lexington. Most recently, Ford Motor Company joined two other leading automobile manufacturers in announcing their intention to develop a common fuel cell system that is expected to lead to production of one of the world's first affordable, mass-market fuel cell electric vehicles as early as 2017.³⁴

²⁹ *Reuters*, "Ford celebrates upgraded Louisville assembly plant," June 13, 2012; Sirkin, Zinser, and Hohner, "Made in America, Again," 2011.

³⁰ *Courier Journal*, "Ford to add third Louisville Assembly shift in August," June 14, 2012.

³¹ Kentucky Association of Manufacturers, "Kentucky's Auto Manufacturers Produce More Than One Million Vehicles in 2012, Best Output Since 2007," January 23, 2013. <http://www.kam.us.com/communications/news-room/463-kentuckys-auto-manufacturers-produce-more-than-one-million-vehicles-in-2012-best-output-since-2007>

³² Kentucky Association of Manufacturers, "Kentucky's Auto Manufacturers Produce More Than One Million Vehicles in 2012, Best Output Since 2007," January 23, 2013. <http://www.kam.us.com/communications/news-room/463-kentuckys-auto-manufacturers-produce-more-than-one-million-vehicles-in-2012-best-output-since-2007>

³³ Greg Kocher, "Hitachi to create 60 jobs to assemble battery packs in Harrodsburg," *Herald Leader*, October, 18, 2011.

³⁴ Daimler AG, Ford Motor Company, and Nissan Motor Co. agreed in January 2013 to jointly develop a common fuel cell system to speed up availability of zero-emission technology and significantly reduce investment costs. The collaboration expected to lead to launch of world's first affordable, mass-market fuel cell electric vehicles as early as 2017 http://media.ford.com/article_display.cfm?article_id=37631

Electrical Equipment and Appliances³⁵

Household appliances, HVAC equipment, air filtration products and electric components dominate this regional concentration, employing almost 6,700 workers producing \$956 million in 2011. GE Appliance headquarters in Louisville and Trane Lexington anchor the subsector.

Last February, GE Appliance opened the first new assembly line at its sprawling Appliance Park south of downtown Louisville in more than half a century, in a building that had been largely unused for fourteen years and creating the most compelling, visible symbol of the potential for renewed competitive strength and growth in manufacturing. Within a few weeks, a second new assembly line opened to produce high-tech refrigerators, followed by another to produce stainless-steel dishwashers.

As part of its \$800 million retooling of Appliance Park, GE brought together all of the functions associated with manufacturing including design, engineering, quality control, production, and product development – returning jobs that had been lost to offshoring and, perhaps of even greater importance, co-locating them with the higher-skilled functions that drive innovation, design, and high-tech production, adding 1,300 new jobs with the potential for more to come.³⁶

The region's household appliance and electrical equipment manufacturers outperformed their industry nationally by 32 percent and 14 percent, respectively, in 2011.

Increasing demand for energy efficient appliances underlies some new product designs and production changes at both GE and Trane Lexington, among other firms, and creates a potential emerging presence of clean technology expertise in the BEAM region.

Primary Materials³⁷

Plastics product manufacturing, forging and stamping exhibit strong concentrations in the BEAM region, employing more than 6,600 workers. The plastics industry provides a range of products such as trim and bumpers for the automotive industry as well as bottles and packaging for the food and beverage industries. Forging and stamping firms produce components for automotive and other transportation industries, aerospace, and energy sectors.

The primary materials concentration is important because of its linkages to several other important industries in the region. The fabricated metal sector, in particular, has grown as a result of the resurgence in the auto market and growth in machinery and equipment industries.³⁸ Firms in this regional concentration have opportunities in important national sectors including agriculture, transportation, medical, aerospace, and oil and gas. Trends that will

³⁵ NAICS 3334, 3352, 3353

³⁶ Jeff Immelt, "The CEO of General Electric on Sparking an American Manufacturing Renewal," *Harvard Business Review*, March 2012; Ed Crooks, "Lean cuts fat off GE's production line," *Financial Times*, April 2, 2012; Jeremy Lemer, "GE plans return to US-made products," *Financial Times*, October 18, 2010.

³⁷ NAICS 3261, 3321

³⁸ U.S. Industrial Outlook, MAPI, September 2012. www.mapi.net/system/files/EO-111_1.pdf

impact this set of industries include the development of advanced technologies and automation and the growing need for agility and flexibility to meet demand for reducing lead times for production.³⁹

In 2011, these two subsectors generated \$486 million in output, an increase of 188 percent since 1980 – during a period when both industries gained market share in a sector that declined nationally. Employment in forging and stamping increased 70.3 percent in the BEAM region over those decades, while it declined 69.8 percent nationally. In the plastics products subsector, employment in the region grew 67.7 percent while it declined 46.1 percent nationally.

Productivity improvement in these industries in the region has not kept pace with national rates of improvement, however. Between 1980 and 2011, the nation’s forging and stamping industries increased productivity by 123.3 percent while it increased only 9.6 percent in the BEAM region. While national productivity in the plastics industries increased 209.2 percent over those thirty years, in the BEAM region it increased at less than half that rate, or 105.8 percent.

Food and Beverage⁴⁰

The Food and Beverage cluster employed 10,825 workers in the region in 2011 producing a diverse range of products from tortillas and peanut butter to food flavorings and colorings, encompassing a wide range of firms in terms of size and location in the supply chain.

The number of firms engaged in Kentucky’s iconic bourbon distilling and production has grown exponentially over the last decade including the emergence of a specialized tourist industry built around stops along the “Bourbon Trail.”

The region is home to about a third of the nation’s total employment in distilleries, with 2,850 workers. Brown-Forman Corporation, one of Kentucky’s oldest manufacturing firms and an anchor for the sector, is among the top ten producers of spirits in the world, with business interests that reach far beyond bourbon.

Firms involved in food production are considerably more diversified than the beverage side, with larger employment numbers involved in baking and tortilla making (1,891 workers), animal slaughtering and processing (2,155 workers), and almost 2,000 more employed in firms that produce a wide range of other products.

Both food and beverage producers in the region have higher levels of productivity than the national averages for their fields -- 59.3 percent higher for food producers and 47 percent higher for beverage producers in 2011. However, these industries declined in size nationally and locally between 1980 and 2011, with a more significant contraction at the national level than in the region. Employment in food manufacturing declined by almost 20 percent in the region over

³⁹ “2012 State of the Industry: Metal Forming and Fabricating Machine Tools,” Fabricating and Metalworking Magazine. <http://www.fabricatingandmetalworking.com/2012/01/metal-forming-fabricating-machine-tools/2/>

⁴⁰ NAICS 311 and 3121

that period, while it shrank by almost 40 percent at the national level. Employment in beverage manufacturing in the region declined 18.3 percent over that period when the industry lost almost 60 percent of its employment base at the national level.

Other major players in the food and beverage industries include D.D. Williamson, a globally dominant firm involved in the production of food colorings – and, from a different angle that’s technically not a production sector, Yum! Brands Inc., which is headquartered in Louisville, and is the world’s largest restaurant company with revenues of nearly \$11 billion. It is considered a world leader in the opening of new markets around the world.

Other industries involved in this cluster include wood container and pallet manufacturing and plastic bottle and food packaging firms discussed above. The University of Louisville has created a specialized program around food processing that provides technical expertise to companies on topics such as food formulation and nutritional analysis and labeling.

Industry trends, including the emerging preference for locally grown or sourced food represent potential opportunities for this cluster. A recent report cited significant unmet demand for local foods in Louisville.⁴¹ Those trends and cultural shifts favoring healthy products, sustainability, and processed foods with health-promoting additives may present new opportunities for the cluster.

OTHER SIGNIFICANT REGIONAL CONCENTRATIONS

Logistics, Transportation and Distribution

The presence of United Parcel Service’s Worldport, the largest fully automated package-handling operation in the world, transformed Louisville and the broader BEAM region into a world-class center for logistics and transportation.

Handling approximately 1.6 million packages each day – and loading them onto more than 130 airplanes that take off and land overnight – Worldport spurred development of an extensive and growing network of firms drawn to the region specifically because of the ready access to overnight transportation to virtually every destination in the world.⁴²

In addition to its own extensive economic reach, the logistics, transportation and distribution network in the region is a key player and a vital support system for the region’s manufacturing sectors, moving raw materials to plants across the region and finished goods around the globe. Firms in these sectors employ nearly 83,000 workers, including those at UPS, which is the Louisville region’s largest employer, although many of its jobs are part-time positions sorting packages at Worldport.

⁴¹ Karp Resources, “The Louisville Local Food Demand Analysis,” December 2012.
<http://jefferson.ca.uky.edu/sites/jefferson.ca.uky.edu/files/122861902-Demand-Study.pdf>

⁴² UPS Worldport Facts, <http://pressroom.ups.com/Fact+Sheets/UPS+Worldport+Facts>

Other firms in this cluster are engaged in transportation and warehousing, as well as couriers and messengers, and warehousing and storage. In addition, wholesale businesses that store and move materials for all types of industries in the region employed another 38,643 workers in the logistics and transportation cluster in 2011.

UPS actively engages in the development and expansion of the logistics cluster, working to attract supply chain companies such as Best Buy Co. Inc.⁴³, Café Press Inc., and Geek Squad City, the computer repair center that employs a thousand people in overnight technology repairs in Bullitt County south of Louisville.

The largest share of the economic spinoff from Worldport consists of “pick and pack” warehouses including Amazon Fulfillment Centers Inc., and Gilt Groupe, which located in the region for proximity to Worldport. These firms are members of the electronic shopping and mail-order houses subsector, which is experiencing significant growth nationally and in the region, where it has quadrupled in size over the last three decades, generating 1,316, primarily lower-skill and lower-wage jobs.

At the higher end of the logistics value chain – and potentially of future significance – lies the template created by Geek Squad: opportunities to leverage the presence of UPS Worldport to grow firms and higher-skilled jobs engaged in the rapid turnaround of repairs for electronic devices and other technologies.

Healthcare, Finance and Insurance

Though manufacturing sectors represent the largest concentration in the region in terms of economic output, the clinical healthcare sector is its largest employer with almost 120,000 workers in 2011 – and has been the largest and most consistent driver of job growth in the region for more than a decade, as it has been in many regions of the country.

Healthcare comprises all forms of patient care – hospitals, clinics and specialty services – as well as health and life sciences. Since healthcare delivery (with the exception of medical travel) is not a tradable sector, as an economic engine it circulates resources within the region rather than bringing resources in from other parts of the world. Regional strength in patient care supports the research that in turn leads to the aspects of health and life sciences that are tradable beyond the region. For more than a decade, the region has focused on seeding and growing those aspects of health and life sciences: medical research and devices and biotechnology.

Overall, healthcare spending accounted for \$6.2 billion of the region’s total economic activity in 2011. With a location quotient slightly over 1.0 in Louisville and slightly under that in Lexington, clinical healthcare services represents a strong regional concentration equivalent to what is found in most metropolitan regions across the country.

⁴³ Best Buy Co Inc. DC #1376

Three dimensions of healthcare-related activities do distinguish the region. One is the recently recognized concentration of firms engaged in some aspect of emerging fields related to care of the elderly and aging, including the presence of the corporate headquarters of Kindred Healthcare Inc., a Fortune 500 company that operates a national network of long-term care hospitals. When Signature Healthcare LLC relocated to the region, it committed funds to establish the International Center for Long Term Care and Innovation in partnership with the University of Louisville. The center will provide entrepreneurs working in fields related to innovation in aging care with start-up funding and support with the goal of establishing the Louisville region as a global hub for innovation in this fast-growing field.⁴⁴ Potential synergies in this area extend to medical research centers at both the University of Louisville and the University of Kentucky and, potentially, with firms involved in employee benefits, health insurance, and exploring new approaches to health and wellness.

The region has noteworthy strengths in certain aspects of clinical care as well, including its early prominence in the development of artificial hearts and limb transplants. Earlier this year, the University of Kentucky's Markey Cancer Center in Lexington earned designation as a comprehensive cancer center from the National Cancer Institute (NCI), which will bring significant new funding opportunities for research and access to the latest clinical trials. Having an NCI-designated cancer center will significantly boost research in the BEAM region, adding top-tier designation to on-going efforts to build research capacity and improve clinical care.

The third major strength in the region related to healthcare lies in subsectors related to health insurance, employee benefits, and wellness. Humana Inc., which employs 11,000 workers at its corporate headquarters in Louisville, anchors the region's insurance concentration, which also exhibits notable strength in firms involved in other aspects of employee benefits and management. New areas of innovation under development in related fields include the development of new approaches to wellness care and prevention to better manage the cost of healthcare.

The finance and insurance industry employed almost 43,000 workers in 2011 and was slightly more concentrated in the region than across the nation. A strong credit intermediation service sector⁴⁵ employs 4,141 workers in Louisville firms involved in arranging loans and other financial transactions and managing pensions and insurance plans.⁴⁶

⁴⁴ Greater Louisville Inc., "Louisville stakes claim as world center for 'Lifelong Wellness and Aging Care,'" http://www.greaterlouisville.com/eFYI/2011/March.aspx#art_1531

⁴⁵ NAICS 5223, Activities Related to Credit Intermediation, LQ 2.16

⁴⁶ Bank of America employs almost 1,100 workers; Citicorp Credit Services employs 424, and Lending Tree employs 228 workers. First Source Solutions in Louisville manages pensions and insurance plans for other firms.

EMERGING OPPORTUNITIES

Technology Repair and Maintenance

The presence of UPS Worldport has spurred growth in the repair and maintenance subsector, including a notable concentration in the repair of electronic equipment and specialized precision instruments, which employed 2,467 workers in 2011 and was three times as concentrated in the region as nationally (LQ 3.02).⁴⁷

Firms engaged in this field typically employ higher-skilled workers to repair complex, electronic components. It has experienced significant growth in the region over the last three decades expanding economic output more than 220 percent. Geek Squad City in Bullitt County south of Louisville employs half the workers in this field in the region. Flextronics Global Services employs 435 workers repairing devices with high security requirements such as cell phones, and debit and credit card machines. At the other extreme in terms of product scale, Lockheed Martin in Lexington employs 1,705 workers refurbishing and repairing military helicopters and other aircraft.

As the prevalence of high technology and high-security devices grows, the market for rapid repair and turnaround will grow as well. Staking a claim for the region as a center that combines manufacturing skills and capacity with higher-skilled workers engaged in complex repairs, maintenance and return via the region's logistics systems offers the potential for growth.

Business Operations Centers

The data processing, hosting and related services subsector employs 4,374 workers in the BEAM region and has a strong location quotient of 2.45.⁴⁸ It includes firms managing pre-paid and loyalty card programs and performing call center functions for other firms.

A subsector of the finance and insurance industry – agencies, brokerages and other insurance related activities⁴⁹ - includes a number of firms engaged in employee health- and benefit-plan enrollment and management activities for other firms, employing 8,767 workers in 2011.⁵⁰

Taken together, firms that manage employee benefits for other firms or conduct high-end administrative functions could offer new opportunities for the BEAM region as professional firms headquartered in higher-cost regions relocate certain functions to lower-cost regions. In late 2012, Bingham McCutchen LLP, a major national law firm based in Boston, announced the relocation of a range of functions including potentially legal research and other higher-skill

⁴⁷ NAICS 8112

⁴⁸ NAICS 518

⁴⁹ NAICS 5242, 2011 employment LQ 1.29

⁵⁰ SHPS Inc. in Louisville, specializes in health plan design and administration, employing about 600 workers. ZirMed, also in Louisville, is a home-grown firm that provides internet-based health care information technology services, including patient information verification, insurance claim management and medical code compliance. Trover Solutions, a medical bill audit management firm, employs 550 in Louisville.

“back office” activities to Lexington, relocating at least 250 jobs.

Exports

The BEAM region’s manufacturing strengths, coupled with its prominence as a global logistics hub, cause it to rank among the most export-intensive metropolitan economies in the country. That prominence primarily results from the presence of large multinational manufacturing companies, or OEMs, in the region. Both metropolitan economies export more of their economic output than the U.S. average of 11.4 percent.

From 2003 to 2010, the BEAM region’s export value grew 28.6 percent, which equates to an annualized growth rate of 3.7 percent.⁵¹ Seventy-seven percent of the BEAM region’s exports are product goods, while 23 percent are services. In 2012, Kentucky’s exports set a new all-time annual record, with \$22 billion in sales of Kentucky-made products and services. This represents 10 percent growth from 2011, more than double the U.S. average growth rate of 4.5 percent.⁵²

Assessment

Major new investments in plant and production in the region by leading firms, bringing manufacturing back that had been off-shored, set the stage for the next generation of “making things” in the BEAM region. Over the last two years, its resurgence in the BEAM region has been stronger than in other regions across the United States.

While no one anticipates that manufacturing employment or wages will return to their peak levels, the resurgence in manufacturing currently underway in the United States holds significant promise for a new “Manufacturing Moment” for the BEAM region – and also the risk that if the region is not positioned to seize that moment, its manufacturing base could erode as the fundamental restructuring underway in the global economy continues to unfold.

Traditionally, manufacturing in the BEAM region has been dominated by assembly, material and goods handling, but just as the major global firms in the region are retooling and redesigning their plants, production lines, and products, so there are opportunities in the resurgence of manufacturing to change the region’s traditional mix of industries to expand into higher-value functions and more technology- and innovation-driven aspects of production.

That potential represents not only a compelling opportunity for the region but also an imperative to protect and grow its industrial assets.

The recovery of manufacturing is nascent, however, and vulnerable to ongoing, rapidly changing global forces that will shape the next industrial revolution – one that will require on-going

⁵¹ Export Nation: Profile for Louisville MSA,” The Brookings Institution
http://www.brookings.edu/~media/Files/rc/reports/2010/0726_exports/0726_exports_profiles/LouisvilleKY.pdf

⁵² Commonwealth of Kentucky, Cabinet for Economic Development, “Kentucky Exports Set All-Time Annual Record for 2012,” February 13, 2013.

innovation, technology development, agility and ever-higher levels of productivity. In the next economy, industries must distinguish themselves based on product quality, design and other value-added factors, rather than relying solely on cutting costs to compete and survive.

The development of new technologies and production processes could address lagging productivity rates in some areas of the BEAM region’s manufacturing sectors, especially among the 1,600 small and medium sized firms vital to the region’s overall economic strength.

The vast supply chains made up of these smaller firms support the presence of major corporate leaders like Toyota, Ford, and GE in the region – and they confront even greater competitive pressures than their big customers. After decades of ever-tightening requirements to cut costs, manufacturing firms operate on very lean margins, often with little capacity and few resources to invest in innovation or technology.

Both metropolitan regions in BEAM export larger shares of goods and services than is typical among regions across the U.S. – again largely as a result of the region’s strength as a manufacturing center. Its world-class logistics network and infrastructure play a key role in export strength.

Expanding consumer demand for energy-efficient products, the rapidly evolving market in healthcare coverage and employee benefits, and the growing universe of personal and business technology, all represent potential areas of growth and innovation aligned with strengths in the BEAM regional economy – as does the magnetic force of UPS Worldport to broaden the mix of industries and clusters involved in higher technology and knowledge-intensive industries.

The challenge is to open the door to new products and services related to the “just in time” formulation such as the and delivery of personalized pharmaceuticals, medical devices, and other biotechnology products and devices.

The broad range of firms involved in some aspect of employee health- and benefit-management across the region and Lexington’s recent success in attracting higher-level administrative and shared service functions for a major professional firm establishes a potential new niche for the region.

Other Cluster Organizations and Activities

- Greater Louisville Inc., the metro chamber of commerce, sponsors cluster-based membership groups for firms in several strong regional sectors, including manufacturing and logistics.
- One Southern Indiana’s Metro Manufacturing Alliance, a group of 214 manufacturers from the Greater Louisville region, convenes monthly to discuss common challenges.
- Greater Louisville Health Enterprises Network is a non-profit network of 188 member companies focused on the economic development of the region’s health-related industry, from hospitals and health services companies to medical device manufacturers and leading

health law firms.

- The “Dream It Do It” marketing campaign developed by the National Association of Manufacturers tries to promote a clear understanding of advanced, high-tech manufacturing and its contribution to innovation, productivity, economic growth, wealth building, and high quality careers; Kentucky’s first Dream It Do It campaign will roll out in Georgetown, with support from the Kentucky Association of Manufacturers.

INNOVATION AND ENTREPRENEURSHIP

Heightened global competition and the pace of change that characterize the knowledge economy make continuous innovation imperative.⁵³

The term innovation is defined here very broadly, encompassing new ideas, new technologies, new products, production processes, markets and business models. This definition also spans all stages of the innovation spectrum from basic research through concept testing, to business formation, and firm growth and development.⁵⁴

Innovation occurs primarily through three overlapping mechanisms: commercialization of research and development, within individual firms and clusters, and through entrepreneurial activity. The levels of innovation that occur in a region depend on several factors:

- An innovation culture that embraces risk taking, that is open, flexible, and adaptive;
- A strong ecosystem rich with interactions across sectors and networks that connect ideas, entrepreneurs, investors, and support systems;
- Deep grounding in the economic and industrial base of the region with effective links between academic R&D and local industry.

The BEAM region’s economic legacy arose from its mature manufacturing industries, mining, and agricultural sectors. In many of its strongest manufacturing sectors, the region is a

⁵³ Indeed, innovation is ultimately the source of all long term economic growth. Note that, in the shorter term, growth can also occur through increasing economic inputs, or importing someone else’s innovations. See Paul M. Romer, “Two Strategies for Economic Development: Using Ideas and Producing Ideas” (Proceedings of the World Bank Annual Conference on Development Economics, 1992). See, generally, Paul M. Romer, “Endogenous Technological Change” (Journal of Political Economy 98.5.2, 1990): S71-S101; Gene L. Grossman and Elhanan Helpman, *Innovation and Growth in the Global Economy* (Cambridge, MA: MIT Press, 1991); and Joseph A. Schumpeter, *Capitalism, Socialism, and Democracy*, 2d ed. (New York: Harper & Bros., 1947; rpt. New York: Harper & Row, 2010). For a review of empirical studies confirming the relationship between innovation and regional economic growth, see Jeremy Howells, “Innovation and Regional Economic Development: A Matter of Perspective?” (Research Policy 34.8, 2005): 1222-1223.

⁵⁴ While a linear model of the innovation process offers conceptual clarity, there is evidence that it is more iterative and open in practice. For example, multiple new product and/or process ideas might be generated during the invention stage, leading to separate innovation paths for each; unsuccessful proof-of-concept testing may send innovators back to the idea-generation stage; or market introduction might bring to light a shortcoming of the technology that returns innovators back to the applied R&D stage for additional development. See, for example, *Between Invention and Innovation: An Analysis of Funding for Early-Stage Technology Development* (Gaithersburg, MD: Economic Assessment Office, Advanced Technology Program, National Institute of Standards and Technology, November 2002); and Philip Cook and Olga Memedovic, *Strategies for Regional Innovation Systems: Learning Transfer and Applications* (Vienna: United Nations Industrial Development Organization, 2003).

significant center for assembly and production work, but the higher-order functions and more knowledge-intensive aspects of product design, innovation, and development occur elsewhere. And many manufacturers in the BEAM region – particularly older and smaller firms -- have competed more on low costs for labor and other resources and less on the higher-value techniques and technologies that now determine the region’s competitive position.

Although the push to develop a more innovative and entrepreneurial economy has gained substantial ground by some measures, because the region and the state began the journey to build capacity for innovation from a low baseline, they confront major challenges in the race to catch up with regions better positioned for the knowledge economy.

Recent investments and support for innovation at the state and local level have focused more on nurturing and supporting entrepreneurial activity and startups than on innovation within existing firms. The unanticipated resurgence of manufacturing offers new opportunities – and poses new threats -- to the 1,600 small and medium-sized firms that are a vital part of the region’s manufacturing base – and raises the ante on strengthening that aspect of the innovation ecosystem.

Basic Research

Kentucky ranks in the bottom quartile among the fifty states on research and development expenditures as a percentage of its Gross Domestic Product. Despite efforts and investments to catch up with its peers, it has remained at that low ranking for twenty years.⁵⁵

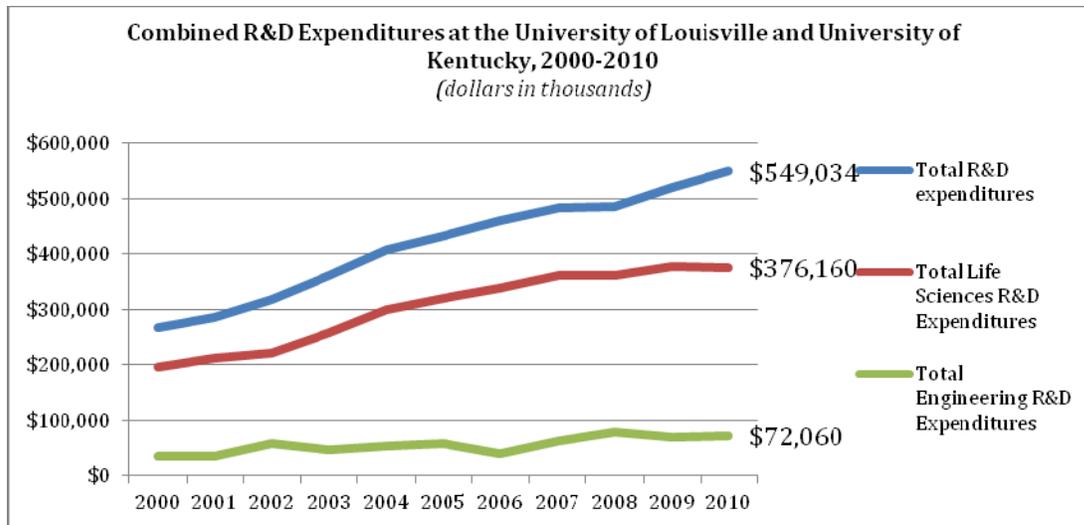
Over the last decade, working from the platform elevated by major state investments that matched private funds in the initiative that came to be known as “Bucks for Brains,” the University of Kentucky and the University of Louisville expanded their research bases from a combined total of \$266 million in 2000 to more than \$549 million at the end of the decade.⁵⁶

As the state’s premier research institution, the University of Kentucky operates from an R&D base that is almost twice as large as the University of Louisville. But the University of Louisville expanded its research base 195 percent over the last decade, a rate of growth that ranked it fourth in the nation for the largest percentage increase.⁵⁷

⁵⁵ National Science Foundation, author’s analysis of Table 8-39: R&D as a percentage of gross domestic product. Kentucky has remained in the fourth quartile from 1991 to 2008, the latest available data. Retrieved from <http://www.nsf.gov/statistics/seind12/c8/interactive/map.cfm?table=39&year=1991>, November 1, 2012

⁵⁶ In 1997, the Kentucky Postsecondary Education Improvement Act provided incentives for Kentucky universities to raise substantial funding to recruit top-level researchers across targeted areas of focus identified for each school. Nicknamed “Bucks for Brains,” the initiative spurred growth in patent applications, licenses and options, and the number of start-up companies emerging from university research and technology. The five priority areas targeted by the Kentucky Postsecondary Education Improvement Act are human health and development; biosciences; materials science and advanced manufacturing; information and communications technologies; and energy and environmental technologies. See “Ten-Year Anniversary Assessment of Kentucky’s Bucks for Brains Initiative” (2007) available at <http://www.cpe.ky.gov/news/reports/>

⁵⁷ University of Louisville, “Just the Facts,” <http://louisville.edu/institutionalresearch/institutional-research-planning/Just%20the%20Facts%202012.pdf>, Chronicle for Higher Education.



During that period, both universities attracted more than two-thirds of their research funding in life sciences – 67 percent at the University of Louisville and 69 percent at the University of Kentucky in 2010 – levels that were ten and twelve percentage points higher than the average share for that type of research among all research institutions that year, which was 57 percent.⁵⁸ Research and development investments in other important fields, particularly in engineering, came in slightly lower than the national average.⁵⁹

The level of research commissioned by industry at both universities is lower than the national average, with only 3 percent of research at the University of Kentucky and the University of Louisville commissioned by industry, compared to an average of 5 percent nationally.⁶⁰

Support for Entrepreneurs and Commercialization

In 2011, Kentucky tied California and Texas among the top eight states that saw the most significant increases in entrepreneurial activity over the last decade – experiencing an 11 point increase in the percentage of residents who started a business between 1996 and 2010.⁶¹

Those results flowed from development of an array of financial incentives, programs, and funding for entrepreneurs, coupled with the creation of a statewide network of Innovation and Commercialization Centers, and an expanding network of other resources and networks including Lexington’s Awesome Inc. and Louisville’s Venture Connectors.

Kentucky is one of only a few states that match Federal Small Business Innovation Research-Small Business Technology Transfer (SBIR-STTR) grants for innovators, entrepreneurs, and

⁵⁸ Author’s analysis of National Science Foundation data.

⁵⁹ Author’s analysis of National Science Foundation data; NSF ranks 697 institutions of higher education in the United States on expenditures of R&D funds by STEM field, among other measures.

⁶⁰ Author’s analysis of National Science Foundation data.

⁶¹ “Kauffman Index of Entrepreneurial Activity, 1996-2010,” March, 2011. Measured using data from the Current Population Survey.

technology-oriented small businesses that compete and win that highly sought-after funding.⁶² Since the adoption of the Kentucky Innovation Act in 2000, business schools at both major public universities in the BEAM region also have established specialized programs for entrepreneurs, including a nationally recognized MBA and PhD program at the University of Louisville.

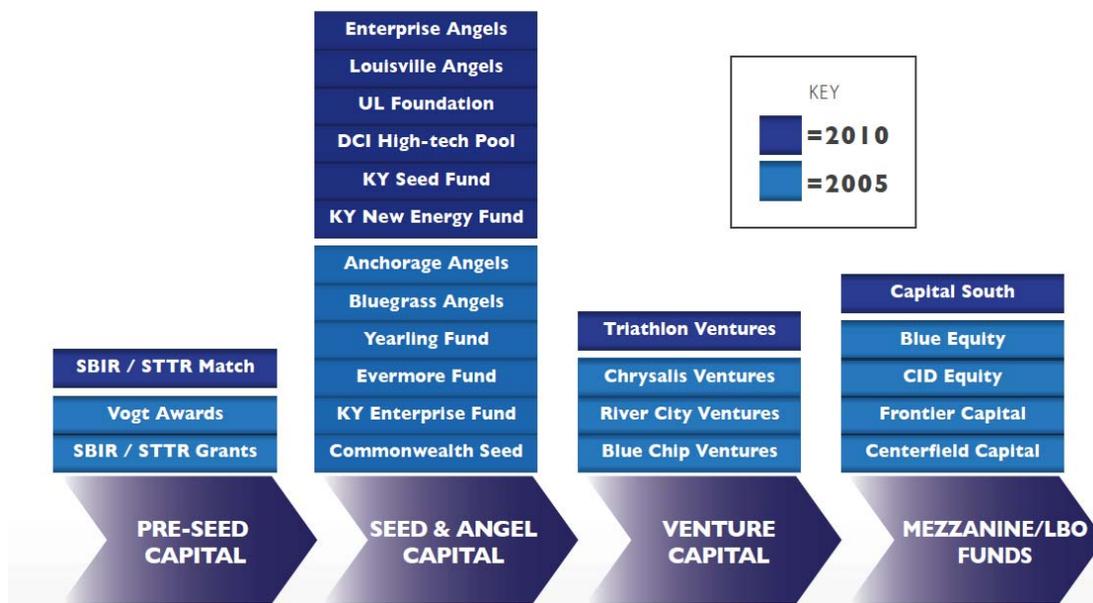
The Vogt Invention and Innovation awards in Louisville support early-stage innovators and entrepreneurs with annual cash grants and have adopted a new focus on hardware, which is defined as tangible product innovations, more closely aligning its focus with the region’s strength as a center for “makers.”

The number of seed and angel investment resources available in the region doubled between 2005 and 2010, with angel and institutional investors in the Louisville region increasing from nine in 2005 with an estimated \$368 million in capital to 24 with more than \$800 million under management by 2010.⁶³

Further along the capital spectrum, however, Kentucky firms attracted only seven cents in venture capital per \$1000 of the state’s Gross Domestic Product compared to an average of \$1.50 per \$1000 of state GDP across the United States.⁶⁴

Sources of Entrepreneurship Capital, 2005 vs. 2010

SOURCES OF CAPITAL 2005 VS. 2010



⁶² Matches up to \$150K for Phase I and up to \$500K Phase II SBIR-STTR.

⁶³ 2010 State of Entrepreneurship report, Greater Louisville Inc./EnterpriseCorp

⁶⁴ 2010 data from PricewaterhouseCoopers and National Venture Capital Association, special tabulations (2011) of MoneyTree™ Survey; Bureau of Economic Analysis, Gross Domestic Product data; United Nations Statistics Division. Retrieved from National Science Foundation,

<http://www.nsf.gov/statistics/seind12/c8/interactive/table.cfm?table=56>, November 1, 2012

Source: Greater Louisville Inc.'s EnterpriseCorp, 2010 State of Entrepreneurship

The Kentucky Science and Technology Corporation operates its Innovation and Commercialization Center (ICC) program focused on increasing investments in technology firms through Greater Louisville Inc.'s EnterpriseCorp and The Lexington Innovation and Commercialization Center at the Von Allmen Center for Entrepreneurship. In 2011, the ICC network assisted in the launch of 147 firms that added 750 new jobs in the region with an average salary of \$57,159.⁶⁵

Judged by patent activity, the level of innovation underway in Lexington rivals that of larger metropolitan regions. Between 2006 and 2010, firms in Lexington obtained 961 patents, a rate of activity that equates to 24.7 per thousand workers, which is the average among the hundred largest regions. Over the last decade, firms and inventors in the Louisville region filed 6.7 patent applications per thousand workers, a rate that placed it 74th among the hundred largest metros.^{66,67} In both regions, universities and large manufacturers apply for most patents issued, including Lexmark International Inc. and Toyota Motors in the Lexington region and GE and Clariant (formerly Süd_Chemie⁶⁸) in Louisville.⁶⁹

Rates of business dynamism also vary significantly between the two metros; in 2007, for every six new firms created in Lexington, one survives -- a rate that is in line with the national ratio of firm births to deaths.⁷⁰ In Louisville, the survival rate is lower: among every eleven firms born in 2007, only one survives.⁷¹

Innovation in Regional Clusters

Since the adoption of state policies designed to grow the university research base and build innovation capacity, the state, the regions and their leading universities have focused primarily on research and development related to biotechnology and healthcare.

The University of Kentucky's Coldstream Research Campus is attracting a growing roster of biotechnology and pharmaceutical companies as a result, and the University of Louisville is building similar infrastructure on its Shelbyville Road campus and in downtown Louisville where Nucleus, its development arm, is creating incubator and lab space dedicated for life sciences activities and firms.

⁶⁵ Kentucky Cabinet for Economic Development, Office of Commercialization and Innovation, Performance Report for July 1, 2010-June 30, 2011. <http://www.thinkkentucky.com/dci/pdfs/DCIAnnualReportNew.pdf>

⁶⁶ The U.S. Patent and Trademark Office courtesy of the Strumsky Patent Database, University of North Carolina at Charlotte

⁶⁷ U.S. Patent and Trademark Office, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utlh.htm

⁶⁸ In 2011, Süd_Chemie became part of Clariant.

⁶⁹ Author's analysis of data available from the United States Patent and Trademark Office, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cbsa_cls/index.html

⁷⁰ Small Business Administration

⁷¹ Small Business Administration

Louisville's emerging niche as home to the largest concentration of corporate headquarters for firms involved in long-term and aging care opens up a new frontier in the evolving work to grow and expand knowledge-based sectors by clustering firms and resources. The recent addition of the International Center for Long-Term Care Innovation, the nation's first business accelerator dedicated to products and services in this emerging cluster, complements existing research centers at both the University of Kentucky and the University of Louisville focused on age-related diseases.

In manufacturing, the dominant force over the last three decades has been to reduce costs to meet competitive pressures around the world, and the lagging rate of productivity improvement particularly in small and mid-sized firms in the BEAM region indicates a critical need to increase innovation. Although the University of Kentucky and the University of Louisville each sponsor some R&D centers related to specific aspects of manufacturing, their work is not primarily focused on regional firms.

Toyota has promoted the adoption of lean manufacturing across its supply chain, and the University of Kentucky hosts a Lean Systems Program based on the Toyota approach. The newly established Institute for Sustainable Manufacturing at the University of Kentucky is working to establish multidisciplinary collaboration around new production methods and materials.

The University of Louisville JB Speed School of Engineering School's Rapid Prototyping/Additive Manufacturing Center is considered a leader in additive manufacturing, a technology that may someday dramatically change the manufacturing paradigm. However, most of its work with more than 80 firms occurs outside region.

Two examples of university entities focused on specific sectors include Secat, Inc., a metallurgical research laboratory in Lexington, which leverages the expertise of the University of Kentucky's Center for Aluminum Technology for that sector. The recently opened Kentucky Argonne National Lab on the University of Kentucky's Cold Stream campus is involved in earlier-stage work on lithium-ion battery materials and manufacturing with the goal of establishing a specialized niche in battery technologies.

Assessment

Kentucky and its largest metro regions initiated an innovation agenda and a focus on building the innovation ecosystem more than a decade ago with the adoption of the Kentucky Innovation Act and parallel efforts along the same lines in Louisville and elsewhere.

The Act represented the first public strategy designed to seed and support entrepreneurial activity and took deliberate steps to develop innovation capacity. The first initiatives to develop investor networks, establish supports for entrepreneurial activity and infrastructure to incubate new businesses, followed.

The Kentucky Science and Technology Corporation (KSTC), a public-private partnership, has

carried the torch of innovation for 25 years. Its strategy update completed last year highlights the increasingly urgent need to strengthen science and technology infrastructure across the state, to train a workforce with higher skills in STEM fields, to foster innovation within firms, support start-ups and early stage firm development, and to facilitate commercialization activities driven by research to transform Kentucky's economy.⁷²

In manufacturing, the urgency of that agenda represents a relatively new development arising from both a threat and an opportunity: the opportunity presented by the resurgence in U.S. manufacturing underway and the threat posed by the potential for a new industrial revolution that will shift the playing field toward firms with continuous innovation baked into their culture and approach.

Kentucky has made some investments in innovation related to manufacturing through the Kentucky-Argonne Battery Manufacturing Research and Development Center. The Center opened in 2012 and has a heavy focus on the auto industry.

Major multi-national firms in the region are driving a potential resurgence in manufacturing jobs and production. To protect and grow its strong manufacturing sector, the BEAM region cannot depend solely on the large global firms like Ford, Toyota, and GE that currently are placing big bets on the region. Its potential to distinguish itself as a global center for advanced manufacturing depends to a great extent on its ability to expand the innovation agenda to manufacturers of all sizes and types -- and to engage many of its 1,600 small and medium-sized firms in the transition to a higher technology and more innovation-driven next generation of manufacturing.

While the roster of university research centers focused on some aspect or activity related to manufacturing sounds extensive, interviews with small and mid-size firms throughout the region revealed that companies view university resources as more oriented to academic pursuits than to commercial applications. However, GE announced a new partnership with the University of Kentucky to pursue innovation in appliances in addition to a new partnership with the University of Louisville to allow the University of Louisville and GE engineers to collaborate on research projects.

Other Innovation and Entrepreneurship Initiatives

- XRateHealth, a new business accelerator for health-related software firms in Louisville, will offer early-stage start-ups working space, seed funding, and mentoring.
- Velocity SI, another early-stage business accelerator in southern Indiana, will begin working with five companies this year.

⁷² 2012 Kentucky Science and Innovation Strategy, http://www.kstc.com/images/2010KSISStrategy/SI_Strategy_2-14-12.pdf

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- In 2013, Lexington’s Awesome Inc., an organization that offers collocated working space and support for start-up firms, launched its first full-scale accelerator focused on web and mobile startups.
 - iNet, an initiative at the University of Kentucky, offers an entrepreneurship curriculum and certificate available to all undergraduate and graduate students. It provides students interested in entrepreneurial activities connections to a network of mentors within the university and in the local entrepreneurial community.
 - Kentucky’s new MEP, The Advantage Kentucky Alliance, has a mission to strengthen manufacturing in Kentucky by accelerating its transformation toward innovation.

HUMAN CAPITAL

The characteristics of the new economy increase the importance of the role that human capital plays in economic growth. They also alter the labor market dynamics that efficiently produce and match supply and demand for talent. Making the transformation to the next economy in a region requires attention to the characteristics and levels of its human capital and labor market dynamics. Among the key factors are:

High levels of human capital and rich job pools. In the new economy, an increased emphasis on knowledge and application of technology drives demand for higher levels of talent across all sectors. In addition, the global nature of the labor market intensifies competition for top talent, compelling regions to emphasize the creation of the rich job pools that attract and retain the most highly skilled workers.

Job matching and worker mobility. In a dynamic economy, workers change jobs more frequently and job and skill requirements change at a more rapid pace. Targeted attention must be paid to particular segments of the labor market and jobs as skill mismatches and labor market disruption occur frequently, particularly during the early transition from the older economy to the new economy.

New labor market mechanisms are often needed to enable efficient movement of workers among occupations, firms, and industries. Workers need not only to upgrade their skills continually but also to be able to document their skills through recognized certifications, and also to find opportunities for deploying them. Employers need to be able to identify and assess candidates with the most relevant skills and experience efficiently, often on a short timeframe. Those changes in job markets require training and education systems to function at a new level of market focus and agility, modifying their programs to maintain alignment with market demand.

Inclusiveness and Opportunity. Given that inclusiveness is a driver of prosperity in the next economy, regions need to ensure that workers of all skill levels, socioeconomic groups, and geographic communities have opportunities to participate in and progress in the labor market. An inclusive economy exhibits numerous “on-ramps” for entering the workforce, accessible jobs and career ladders, and opportunities for continuous skill development and career change.

In the BEAM region, significant disparities between existing skill levels and the increasing demand for higher skills exist, with historically low education attainment rates in much of the state thwarting the transition to higher-technology and more knowledge-driven industries. Ironically, at the same time, the pace of growth in high-skill jobs and opportunities leaves more highly educated workers with fewer opportunities than can be found in regions more attuned to the knowledge economy.

Like many regions with a strong job base in production sectors, the BEAM region also is home to an aging workforce with approximately a third of its workers between the ages of 49 and 66 and moving toward retirement over the next decade.⁷³

The region has experienced a relatively high unemployment rate since the Great Recession layered on a deep tier of low-wage jobs in locally serving sectors that often consign workers to persistent under-employment or the need to hold multiple part-time jobs to make ends meet.

Poverty rates in both communities are increasing faster than national rates, which reflects the impact on the region's economic position that has occurred as the result of global restructuring. Poverty rates declined in the 1990s with the rise of the service sectors but rose again over the last decade, including increasing poverty rates in suburban areas of Louisville.

Those major challenges can only be addressed by building skills to support the region's growth into knowledge industries and a stronger competitive position for the next economy.

Human Capital Supply

As a university city, Lexington and its surrounding counties have high levels of educational attainment. Thirty four percent of the adult population holds a bachelor's degree or higher, ranking the region 13th on this measure among U.S. metros with populations of 250,000 or more.⁷⁴ The Louisville region's education attainment profile is lower with only 25 percent of adults in the 13-county Metropolitan Statistical Area holding a bachelor's degree or higher.⁷⁵ Over the last decade, the region has seen some improvement in education attainment, and it sustains a highly prominent and broad-based civic agenda that is focused on closing the education gap with its peer metros.⁷⁶ In both regions, education attainment levels differ significantly by race with attainment among African-Americans and other minorities substantially lower than among whites.

The Jefferson County Public Schools system in Louisville is one of the largest in the nation,

⁷³ Dr. Christopher Bollinger and Dr. Kenneth Troske, "Industry and Labor Characteristics and Projections: The BEAM and WIA Regions," University of Kentucky, Center for Business and Economic Research, January 10, 2012.

⁷⁴ American Community Survey, 2009-2011 3-year estimates.

⁷⁵ American Community Survey, 2009-2011 3-year estimates.

⁷⁶ American Community Survey, 2009-2011 3-year estimates.

enrolling more than 98,000 students with a high school graduation rate of 69.4 percent in 2012.⁷⁷ The Fayette County Public Schools in Lexington enroll more than 40,000 students and posted a graduation rate of 75.9 percent in 2012.⁷⁸ Many other, smaller, public and parochial school systems operate primarily at the county level across the BEAM region.

In Kentucky, 61 percent of high school graduates enter post-secondary school directly after graduation, a college-going rate that places the state 33rd among the fifty states.⁷⁹ However, retention in all of Kentucky's postsecondary institutions is a concern: nearly half -- 47.8 percent -- of students who enroll seeking a Bachelors Degree graduate within six years, a percentage significantly lower than the national average of 55.5 percent and places the state in the third quartile among states.⁸⁰

In STEM fields, Kentucky ranks 48th in natural science and engineering degrees as a proportion of higher education degrees awarded. At the undergraduate level, it ranks 45th for the proportion of BA degrees in those fields per thousand young adults age 18-24.⁸¹

As the state's flagship research university, the University of Kentucky enrolls the largest student population -- 28,000 -- of any postsecondary institution in the state, drawing students from across the Commonwealth, including large numbers from the Louisville region. It also boasts the highest graduation rate at almost 58 percent. The University of Louisville enrolls 22,000 students, and, as a former urban commuter school, has raised its graduation rate to 53.3 percent for the most recent enrollees.

The mandate for the Kentucky Community and Technical College System is a focus on training for workforce skills and credentials, and Kentucky is among the largest producers of postsecondary certificates on a per capita basis in the country, primarily awarding shorter-term credentials designed for skill upgrades, and training in specific fields.⁸² On a per capita basis, workers in Kentucky are earning certificate awards at almost twice the national average: 46.1 awards per capita, compared to 24.7 nationally.⁸³

⁷⁷ Kentucky Department of Education, Average Freshman Graduation Rate, 2012.

http://education.ky.gov/AA/Reports/Documents/AFGR_2012.pdf

⁷⁸ Kentucky Department of Education, Average Freshman Graduation Rate, 2012.

http://education.ky.gov/AA/Reports/Documents/AFGR_2012.pdf

⁷⁹ NCHEMS, College-Going Rates of High School Graduates - Directly from High School, 2008.

<http://www.higheredinfo.org/dbrowser/?year=2008&level=nation&mode=data&state=0&submeasure=63>

⁸⁰ NCHEMS, Six Year Graduation Rates of Bachelor's Degree Students, 2009 and Three Year Graduation Rates of Associate's Degree Students, 2009. Title IV Degree Granting institutions.

<http://www.higheredinfo.org/dbrowser/?level=nation&mode=map&state=0&submeasure=27>

⁸¹ National Science Foundation/National Science Board, "Science and Engineering Indicators, 2012," January 2012. Data is from 2009.

⁸² Complete College America/futureworks, Certificates Count: An Analysis of Sub-baccalaureate Certificates

⁸³ Complete College America/futureworks, Certificates Count: An Analysis of Sub-baccalaureate Certificates," December 2010, "Table 4: Certificates Awarded by State, per (10,000) population"

<http://www.completecollege.org/docs/Certificates%20Count%20FINAL%2012-05.pdf>

Among students who enroll seeking Associate Degrees, nearly a third -- 30.5 percent -- graduate within three years, a rate that is higher than the national average of 29 percent and places Kentucky in the second quartile among all states on this outcome measure.^{84,85}

The Bluegrass Community and Technical College in Lexington enrolled 14,210 full- and part-time students in 2011 and issued 3,694 awards, including associate degrees, certificates, and diplomas. Its sister school, Jefferson Community and Technical College in Louisville, enrolled 15,092 students in 2011 and issued 3,473 awards. Elizabethtown Community and Technical College in Hardin County enrolled 7,820 students and issued 1,837 awards in 2011.⁸⁶

Alignment of Supply with Demand and Labor Market Efficiency

Based on current economic projections, the healthcare and logistics sectors will experience the highest rates of employment growth through the end of this decade including nearly 20 percent more workers -- nearly 19,000 -- who hold a Bachelor's Degree.⁸⁷

In 2010, 23 percent of all degrees awarded in the BEAM region at all academic levels were in healthcare fields,⁸⁸ indicating that both students and educators perceive strong demand in those fields.

Only 2.6 percent of Kentucky workers are engaged in science and engineering occupations, however, one of the lowest rates of STEM employment in the nation where the average is 4 percent.⁸⁹ Other data indicate that Kentucky ranks 48th among the fifty states for the percentage of technology workers in its labor force; 46th for the percentage employed in science and engineering; and 39th for the percentage of engineers in the workforce.

The state's two largest metros have similar patterns of STEM employment: the Louisville region's job base includes approximately 38 STEM jobs per thousand workers, while Lexington has 47 -- both lower than the national average of 53 per thousand workers.⁹⁰

⁸⁴ NCHEMS, Six Year Graduation Rates of Bachelor's Degree Students, 2009 and Three Year Graduation Rates of Associate's Degree Students, 2009. Title IV Degree Granting institutions.

<http://www.higheredinfo.org/dbrowser/?level=nation&mode=map&state=0&submeasure=27>

⁸⁵ Complete College America/futureworks, Certificates Count: An Analysis of Sub-baccalaureate Certificates, page 12

⁸⁶ Kentucky Community and Technical College System, "Fast Facts, 2011,"

http://www.kctcs.edu/~media/System_Office/About/Factbook%2012/3_FAST_FACTS.ashx

⁸⁷ Dr. Christopher Bollinger and Dr. Kenneth Troske, "Industry and Labor Characteristics and Projections: The BEAM and WIA Regions," University of Kentucky, Center for Business and Economic Research, January 10, 2012.

⁸⁸ U.S. Department of Education, IPEDS; analysis by Dr. Paul Coomes, University of Louisville; "Industrial Strengths, Challenges in the BEAM Region," June 11, 2012 presentation to the BEAM board of directors. STEM degree award breakdown: 755 lower than AA degree; 831 AA degrees; 1,968 BA degrees; 505 Master's degrees; 183 post-graduate. 49 institutions of postsecondary education, including private and public, vocational through doctoral in the BEAM region. In academic year 2010, collectively the institutions awarded 36,483 degrees at all levels.

⁸⁹ Bureau of Labor Statistics, Occupational Employment and Wage Estimates and Local Area Unemployment Statistics. 2010 data. Retrieved from National Science Foundation, Table 8-33, <http://www.nsf.gov/statistics/seind12/c8/interactive/table.cfm?table=33>

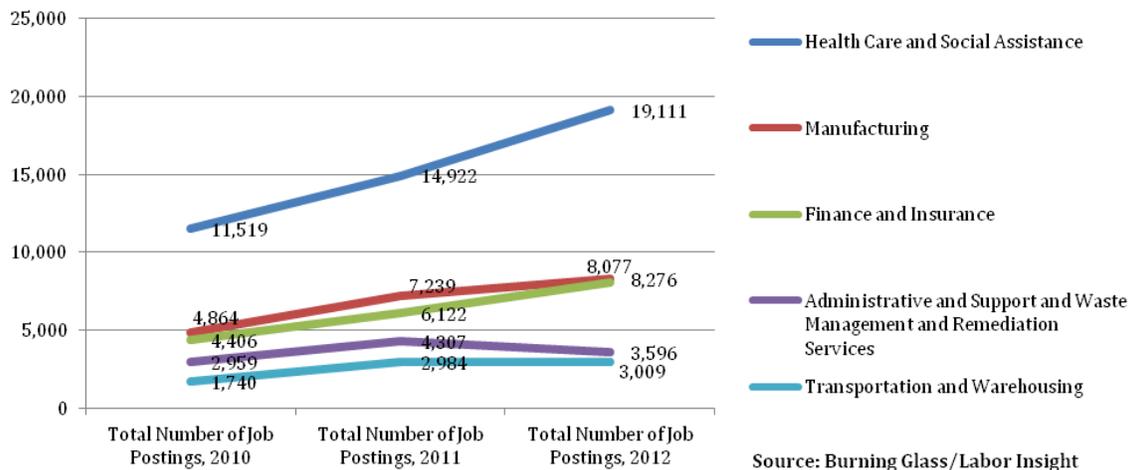
⁹⁰ Brookings analysis of Moody's Analytics data and BLS Occupational Employment Statistics, 2009

Positions in STEM-related fields that require education below the level of a Bachelor’s Degree are prevalent in every large metropolitan area and offer relatively higher wages compared to other positions in the area, according to a Brookings study. Concentrations of STEM jobs requiring lower education credentials are associated with lower income inequality and higher measures of innovation, the research showed. In most metropolitan areas examined by the Metropolitan Policy Program at Brookings, STEM jobs in this category of education requirement represented between 10 percent and 13 percent of total employment in the studied regions.⁹¹

The BEAM region confronts a growing human capital challenge that also represents a major opportunity in the looming need to replace an aging workforce – particularly in middle-skill jobs that form the backbone of the economy. The Toyota manufacturing plant, for example, along with its most experienced technical workers, are celebrating milestone anniversaries since the plant’s opening that also foreshadow an approaching wave of retirements.

An analysis of online job postings documented an increase in job openings in all of the region’s most highly concentrated and strategically important sectors. The number of job postings in manufacturing increased 66 percent over the last two years, for example, with the majority in firms involved in machinery, electrical equipment, computers and electronic products, and transportation equipment.

Job Postings by Industry, Louisville and Lexington MSA, 2010-2012

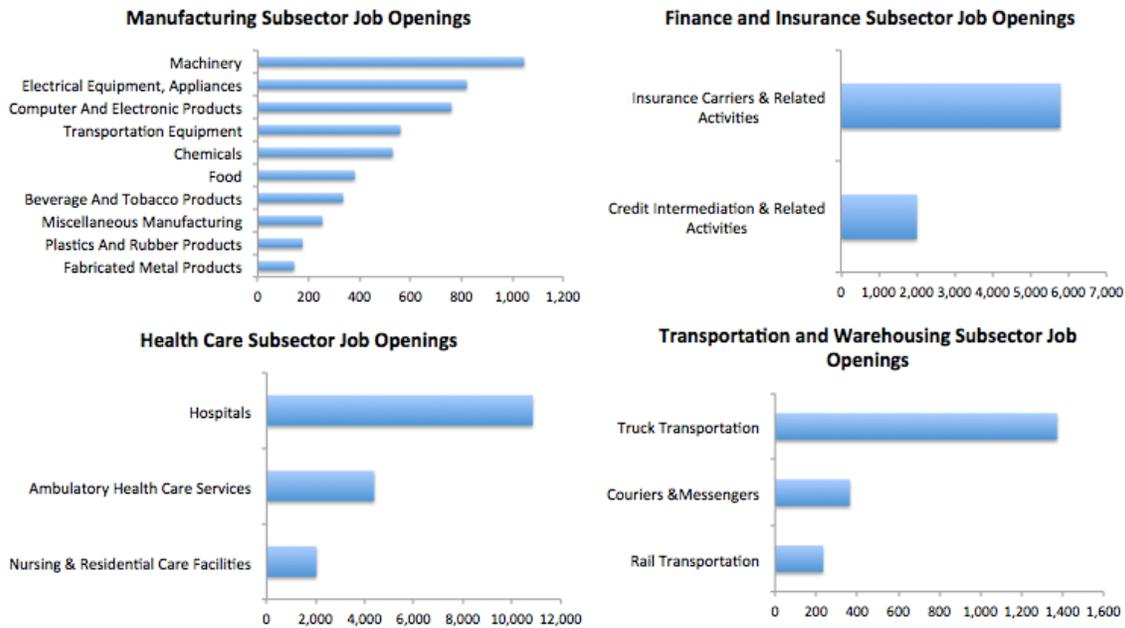


The most in-demand occupations during that period were in office and administrative support, with demand for healthcare practitioners and technicians, and sales. At the other end of the skill spectrum, data from online job postings also showed an increasing number of postings in two next economy occupations: management and computer and mathematical.

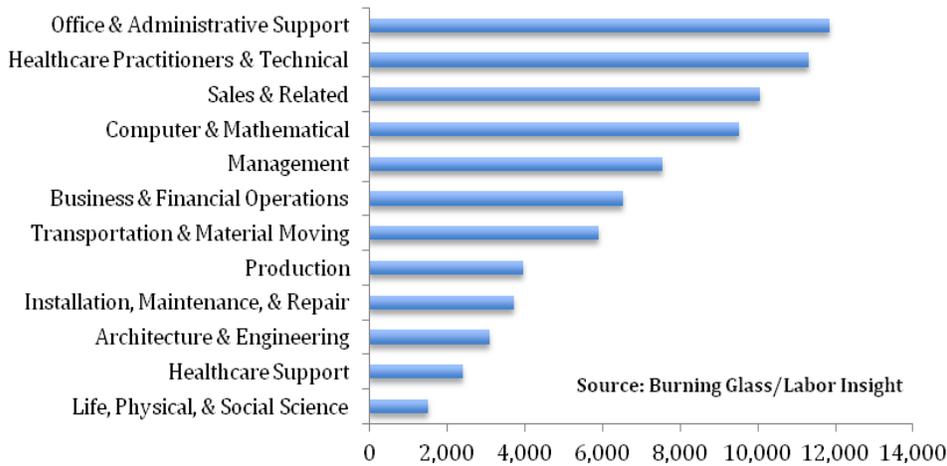
⁹¹ Jonathan Rothwell, “The Hidden Stem Economy,” June 2013, <http://www.brookings.edu/~media/research/files/reports/2013/06/10%20stem%20economy%20rothwell/thehiddenstemeconomy610.pdf>

Job Openings in Major Industry Subsectors, Louisville and Lexington MSA,

January 1 – December 31, 2012⁹²



Total Job Openings by Occupation, Louisville and Lexington MSAs, January 1, 2012-December 31, 2012



Public workforce systems that play a role in connecting labor supply with demand are structured differently in Louisville and Lexington. In the Louisville region, KentuckianaWorks is guided by a Workforce Investment Board appointed by the Mayor and reporting to him. It also manages federally funded working training programs activities in surrounding counties by contract and is part of a broader collaborative that spans three Workforce Investment Boards across 26

⁹² Burning Glass/Labor Insight

counties including several in Southern Indiana. In Lexington, Fayette is one of 17 largely rural counties for whom the public workforce development system falls under the Area Development District and not under the purview of the Mayor.

Job Structure and Opportunity Richness

In the BEAM region, the challenge with job structure and opportunity lies in too few jobs at the higher end of the skill spectrum, with the mix of jobs disproportionately weighted toward lower-wage, lower-skill production and service occupations.⁹³

Even in major sectors, operations located in the BEAM region tend to be more production and less management-oriented than is the case in other metros areas in the U.S., according to a 2012 study commissioned by BEAM.⁹⁴

BEAM Occupational Mix, 2011⁹⁵

Occupation	Percent of total occupations	Location Quotient
Office and Administrative Support	16.3%	0.98
Sales and Related	10.0%	0.94
Food Preparation and Serving Related Occupations	9.4%	1.08
Transportation and Material Moving Occupations	9.1%	1.36
Production Occupations	8.3%	1.28
Healthcare Practitioners and Technical Occupations	6.7%	1.15
Management Occupations	4.8%	0.99
Installation, Maintenance, and Repair Occupations	4.2%	1.08
Business and Financial Operations Occupations	3.9%	0.81
Construction and Extraction Occupations	3.5%	0.90
Healthcare Support Occupations	2.9%	0.93
Personal Care and Service Occupations	2.7%	0.97
Computer and Mathematical Occupations	2.2%	0.83

The mix of occupations within the region’s major automotive manufacturing sector illustrates the disparity: in the BEAM region, more than 60 percent of automotive workers hold production jobs compared to a workforce made up of about 40 percent production work that is a more typical mix in that sector across the U.S. In the BEAM region, fewer than 4 percent of workers in

⁹³ Dr. Christopher Bollinger and Dr. Kenneth Troske, “Industry and Labor Characteristics and Projections: The BEAM and WIA Regions,” University of Kentucky, Center for Business and Economic Research, January 10, 2012.

⁹⁴ Dr. Christopher Bollinger and Dr. Kenneth Troske, “Industry and Labor Characteristics and Projections: The BEAM and WIA Regions,” University of Kentucky, Center for Business and Economic Research, January 10, 2012.

⁹⁵ Brookings Analysis of Moody’s Analytics, 2011.

automotive hold managerial occupations, while those jobs more typically account for 8 percent of the automotive workforce in regions across the U.S.⁹⁶ Data on job postings that showed an uptick in management positions over the last two years could capture an emerging shift away from that traditional profile.

The growing food and beverage cluster represents an exception to the pattern, as do a number of more knowledge-based or technology-driven sectors. In the food and beverage sector, almost eight percent of workers hold management positions, which is higher than the six percent of managers for that sector nationally.⁹⁷

Current projections show that all of BEAM's manufacturing sectors will see low levels of job growth and higher skill requirements over the next decade, while its healthcare and logistics sectors will add significant numbers of new jobs, offering opportunities for lower-skilled, entry-level workers to earn credentials and establish careers.

Firms in the logistics/supply chain fields and in healthcare in the BEAM region offer opportunities for higher-skilled workers and managers and for career advancement at levels comparable to national rates for those fields.⁹⁸ Technical positions in healthcare have represented one of the most solid areas in which clearly defined career ladders support workers entering and then moving up to middle-skill careers.

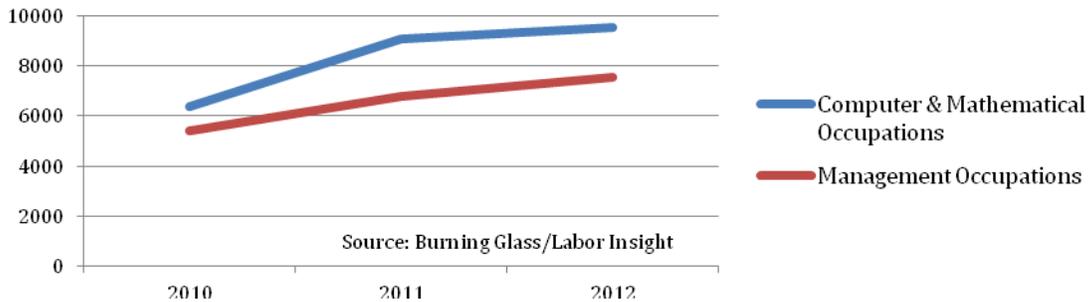
UPS Worldport, Louisville's largest employer, employs a large number of workers in part-time jobs, creating broad opportunities for entry-level workers but more limited opportunities for higher-skilled work, establishing careers, or advancement. Embracing that reality from the beginning of its expansion in Louisville, UPS and its public sector partners redefined its part-time positions to tailor them for students through the Metropolitan College Program, established as a partnership between Jefferson Community and Technical College, the University of Louisville and UPS. This program allows eligible Kentucky residents a tuition-free post-secondary education coupled with employment, and has produced several thousand degree holders over the years.

⁹⁶ Dr. Christopher Bollinger and Dr. Kenneth Troske, "Industry and Labor Characteristics and Projections: The BEAM and WIA Regions," University of Kentucky, Center for Business and Economic Research, January 10, 2012. p. 13

⁹⁷ Dr. Christopher Bollinger and Dr. Kenneth Troske, "Industry and Labor Characteristics and Projections: The BEAM and WIA Regions," University of Kentucky, Center for Business and Economic Research, January 10, 2012. p. 15

⁹⁸ Dr. Christopher Bollinger and Dr. Kenneth Troske, "Industry and Labor Characteristics and Projections: The BEAM and WIA Regions," University of Kentucky, Center for Business and Economic Research, January 10, 2012. p. 4

Job Postings in Computer/Math and Management Occupations, Louisville and Lexington MSAs, 2010-2012



Assessment

The BEAM region confronts a conundrum of the knowledge economy: its historically lower education attainment and skills, coupled with traditional strengths in mature industries, create the challenge of too many low-paying jobs that require increasing levels of skill and too few higher-wage/higher-skill jobs.

Demand for higher education credentials is increasing faster than the supply of educated workers – and there are significant mismatches between the fields of study most commonly undertaken and the skills and knowledge recognized as most critical for the region to compete in the knowledge economy.

The Commonwealth of Kentucky has sustained a commitment to raise education attainment for more than two decades, beginning with the adoption in 1990 of one of the first and most far-reaching reforms of elementary and secondary education. A second chapter followed at the end of the decade with major restructuring of the state’s postsecondary system, assigning more tightly focused missions and aspirational goals to each of the state’s universities and creating the community and technical college system as an independent agency. While the reforms have paid off, the state has not sustained the levels of funding originally provided under its reform efforts, particularly for postsecondary education.

The region is very competitive on the production of workforce credentials below the level of Associate Degree through the Kentucky Community and Technical College (KCTCS) system. In today’s technology-driven economy, demand for workers with increasingly technical, specialized skills and certifications requires greater sophistication, agility, and higher levels of performance from training providers and technical educators – and particularly close ties to employers in high-demand sectors. As part of its multi-year strategic plan, KCTCS has prioritized creating a standardized, rapid-response curriculum and program approval development process within their curriculum review. By fast-tracking curriculum and program approval, the system is

working to stay current with industry and workforce trends.⁹⁹

The dominance of enrollment in healthcare fields aligns with growth projections, but the predominant focus on those credentials and disciplines also indicates a lack of understanding of career opportunities in other areas of middle-skill jobs. Middle-skill jobs, which are defined as those that require some form of postsecondary training but not necessarily a four-year degree, will account for roughly half of all new jobs created nationally over this decade.

Beyond healthcare, employment and training in STEM fields remains low. Training resources and career awareness have not caught up with rapid changes in the region's all-important manufacturing sectors, where rapidly changing technologies and skill requirements offer the potential for middle-skill jobs in advanced manufacturing.

Low expectations for growth in manufacturing and other technical areas have discouraged the development and marketing of training in those fields, but Kentucky manufacturers identify workforce shortages and skill deficiencies as one of the most significant barriers to expanding operations and improving productivity in the region.

Effectively linking workers with employers who are hiring, and also delivering training that is closely tied to employer needs and job requirements presents an on-going challenge. The national Manufacturing Skills Standards Council has taken definitive steps to address these problems, developing common curricula around a series of "stackable" credentials – meaning they can be earned in sequence, leading to an Associates Degree – along with career pathways that allow workers to launch a career with initial credentials and then advance in it. That approach is only beginning to be tested and recognized among employers and workers, although it is gaining ground, in part as a result of the BEAM initiative and related activities.

The strong involvement by national manufacturing organizations in the development of training requirements and credentials specifically designed for advanced manufacturing also represents a fundamental shift in workforce training and development in the U.S. Strong evidence indicates that the most effective approaches follow that pattern: the establishment of sector-specific, employer-driven credentials that build both partnerships with employers engaged around their specific skill needs and credibility for the training itself. The development of that model for manufacturing in the Louisville region has occurred in conjunction with a broader strategy that encompasses other sectors through a partnership between KentuckianaWorks and other regional Workforce Investment Boards with the National Fund for Workforce Solutions¹⁰⁰

⁹⁹ KCTCS, Business Plan for Transforming KCTCS 2011, http://legacy.kctcs.edu/organization/board/meetings/201109/KCTCS_Business_Plan_2011.pdf

¹⁰⁰ WAVE3.com, "Metropolitan College Program pays off for area students," 2/27/12 <http://www.wave3.com/story/16977260/metropolitan-college-program-pays-off-for-area-students>

Other Initiatives Supporting Human Capital

In Louisville, the public-private partnership called 55,000 Degrees brings together the Mayor, university presidents, school superintendents, and civic and business leaders to pursue an ambitious agenda to increase the percentage of associates and bachelors degree holders in Louisville.

Employers in key sectors in the Louisville region also have pioneered major innovative approaches to addressing skilled labor shortages through extraordinary investments in education and training. Major healthcare providers, particularly Norton Healthcare, have created extensive initiatives to provide scholarships, mentoring, and other supports for students enrolled in nursing and healthcare technician programs in return for commitments to work within the system after graduation. With substantial financial support from state and local government, UPS transformed the challenge of securing an adequate workforce for its enormous overnight package-sorting operation by transforming those low-paid, part-time jobs into positions tailor-made for college students working their way through school. More than 2,600 Kentuckians have used that route to earn a degree through Metropolitan College, which also provides stipends for books and other expenses and intensive student support services, which are sorely lacking in the regular channels of the state's community colleges.

Those initiatives represent extraordinary interventions on the part of large employers to prime the pump of workforce development in creative ways, offering potential models for other major employers faced with critical skill shortages.

A second front on which major initiatives in Kentucky will change the workings of labor markets in the regions stems from the recent purchase of the Burning Glass data system, which provides access to real-time data on job postings and skill demands. The state's community and technical colleges, as well as its regional Workforce Development Boards, are beginning to utilize data gleaned by Burning Glass from thousands of job postings across the internet, providing unprecedented, accurate, and timely information on trends in the labor market.

In manufacturing, several important initiatives have developed over the last two years focused on providing workers with technical skills needed for advanced manufacturing positions and engaging a growing cadre of employers in shaping and guiding the training provided.

In partnership with Jefferson Community College, KentuckianaWorks, the workforce investment board for the Greater Louisville region, launched a Manufacturing Skills and Assessment Center last spring that provides specialized, basic credentials for workers interested in earning nationally recognized stackable credentials leading to an associate degree. More than two dozen employers are actively involved in guiding the center's development, including major employers such as GE, which also recently announced plans to build its own training center at Appliance Park.

Through an innovative arrangement between Toyota and the Bluegrass Community and Technical College, selected students can enroll in a two-year Advanced Manufacturing Technician Program (AMT) while also working as a paid intern at Toyota. In 2012, 24 students participated in the program, with plans underway to expand the program and offer it to Toyota suppliers and other manufacturers in the region.¹⁰¹ The AMT program was recognized at the National Career Pathways Network (NCPN) Annual Conference with a first place award for Career Pathways Partnership Excellence.¹⁰² The award recognizes “career guidance and advising, professional development for educators and employers, and the employer role in providing work-based learning opportunities for students.”

Kentucky recently became the 16th state to join the Battelle Memorial Institute’s STEMx Network, which is dedicated to disseminating STEM tools to teachers and students with the goal of expanding the number of STEM teachers and increasing student achievement.

AdvanceKentucky is a partnership among Kentucky Science and Technology Corporation (KSTC), Kentucky Department of Education and the National Math and Science Initiative (NMSI) and several other sponsors to increase participation in math and science college-level coursework for students at the high school level. Fifty percent of Kentucky’s public high schools are expected to be participating in the program by 2014. Many high schools within the BEAM region are already participating.¹⁰³

Finally, Project Lead the Way, a nationally recognized learning program with an engineering and biomedical focus, currently operates in nearly a hundred high schools and junior high schools in Kentucky, including about fifteen in Jefferson County.¹⁰⁴

¹⁰¹ “BCTC, Toyota program gives studentson-the-factory-floor training in Georgetown,” January 27, 2012.

<http://www.kyforward.com/2012/01/bctc-toyota-program-gives-students-on-the-factory-floor-training-in-georgetown/>

¹⁰² “Toyota’s Advanced Manufacturing Technician Program Receives National Honor,” August 27, 2013,

<http://www.toyotageorgetown.com/detailnews.asp?PRID=487>

¹⁰³ Advance Kentucky, “Proven Results,” <http://www.advancekentucky.com/our-program/proven-results>

¹⁰⁴ Project Lead the Way Kentucky, “Kentucky Schools in PLTW Engineering Program,”

<http://www.pltwky.org/files/2013/01/PTE.pdf>

SPATIAL EFFICIENCY: URBAN GROWTH FORM, BUILT ENVIRONMENT, AND INFRASTRUCTURE

The features of the next economy call for a next generation of economic place making: smart, targeted investment that combines economic activity and physical development to create environments that foster sustainable growth and reshape cities.

The region's economy is more efficient in terms of its use of land and resources, and its firms and people are also more productive, if firms, workers, and relevant institutions are located near one another or well connected. Dense, mixed-use communities with excellent transportation and virtual connections reduce transaction costs for employers, workers, and consumers. They also foster rich networks and economic interactions, and support the transition to a productive, sustainable and inclusive economy.

Achieving these outcomes entails:

- Aligning land use and economic regulation, incentives and activities to foster compact, well-connected urban forms.
- Reducing segregation and isolation of geographic areas or communities, including effectively connecting job and housing locations.
- Investing in next generation infrastructure for data, energy and a range of innovation districts.

Physically, Louisville and Lexington are very different cities and regions: Lexington is a smaller, historic and compact city dominated by its major citizen, the University of Kentucky. As a result of its pioneering urban services district limiting growth to a defined boundary, the iconic rolling fields of the Bluegrass, containing world-class horse farms, largely surround the city in rural areas and small towns.

Louisville, an older industrial river city, has expanded to the east for more than half a century, with suburbs now extending beyond Jefferson County into Oldham County on the northeast, and, more recently into Shelby County and other, rural counties north toward Cincinnati and east toward Frankfort and Lexington.

A key challenge for BEAM is to connect Louisville and Lexington strategically to create synergy and leverage their economic assets to spur growth while simultaneously respecting and preserving the unique characteristics and quality of place in each metropolitan area.

Lexington

In 1958, Fayette County became the first county in the nation to utilize a growth boundary to limit urban development within a designated area, reserving surrounding areas to protect the unique asset of the thoroughbred horse industry.¹⁰⁵

As a consequence, three-quarters of all jobs in Fayette County are located within ten miles of Lexington's center, a higher concentration than the national average.¹⁰⁶ And Fayette County is the dominant population center for its seven-county region, with more than half of workers employed in the county also residing there.¹⁰⁷ ¹⁰⁸ The remainder of Fayette County workers live in surrounding counties including Madison, Jessamine, and Scott.¹⁰⁹

Fayette County residents also commute to major job centers in other parts of Central Kentucky: 5,100 travel to Scott County where Toyota Manufacturing is located and almost 3,000 commute to Franklin County, the seat of state government.¹¹⁰ The majority of workers commute alone by car, with a mean travel time to work of 20 minutes.¹¹¹

On the whole, metropolitan Lexington can be characterized as a low-density region with only about half of its residents living at what is defined as an urban density,¹¹² compared to 80 percent in larger metro areas.¹¹³ Its housing stock is relatively affordable, with only a quarter of Lexington residents paying a third or more of their incomes for housing.¹¹⁴ However, a 2009 study found that the share of housing that is affordable to a broad cross-section of residents is declining, and there is significant unmet demand for housing at lower price points.¹¹⁵ The large numbers of students living in Lexington drives demand for rental housing and leads to a higher percentage of renters than homeowners in the community, although the University of Kentucky recently embarked on a major program to build more student housing.¹¹⁶

Downtown Lexington stands at the center of an "education triangle:" The 800-acre University of Kentucky campus is a five-minute walk from the city center; Transylvania University, a private college, lies just to the north; and Bluegrass Community and Technical College lies to the south,

¹⁰⁵ Brent W. Ambrose, "Urban Growth Controls and Affordable Housing: The Case of Lexington, Kentucky," University of Kentucky Center for Real Estate Studies, 2003.

¹⁰⁶ Elizabeth Kneebone, "Job Sprawl Revisited: The Changing Geography of Metropolitan Employment," Washington, DC: Brookings Institution, 2009.

¹⁰⁷ LFUCG Housing Market Study, Urban Collage EHI Consultants, July 1, 2009

http://media.kentucky.com/smedia/2009/10/19/17/housingmarketstudy.source.prod_affiliate.79.pdf slide 4.

¹⁰⁸ LFUCG Housing Market Study.

¹⁰⁹ LFUCG Housing Market Study.

¹¹⁰ Lexington-Fayette Urban County Government Department of Planning

¹¹¹ U.S. Census Bureau, 2007-2011 American Community Survey 5-year estimates.

¹¹² Defined as 1,000 people per square mile

¹¹³ The Brookings Institution, Metropolitan Business Planning (MBP) metrics provided to MBP sites.

¹¹⁴ Defined as percent of mortgaged homeowners spending 30 percent or more of household income on selected owner costs

¹¹⁵ LFUCG Housing Market Study.

¹¹⁶ LFUCG Housing Market Study.

adjacent to the University of Kentucky campus.

Two large-scale development projects in Lexington’s downtown are now underway or in the planning stages. The Rupp Arena Arts and Entertainment District plans to redevelop Rupp arena, home of the University of Kentucky basketball team, and convert the surrounding 46 acres currently primarily used for parking into an arts and entertainment destination. Beginning in the Rupp District and extending through the city’s downtown is the proposed Town Branch Commons project, which will unearth the creek around which Lexington was founded, creating parkland around it.

Louisville

Louisville’s 13-county region extends all the way south to Elizabethtown and includes five counties across the Ohio River in Southern Indiana. Like Fayette, Jefferson County dominates its region as a job center, with 78 percent of jobs in the region located within ten miles of Louisville’s center -- compared to an average of 55 percent in the U.S. as a whole.¹¹⁷

Western Louisville, the largest predominantly African-American community in the state, represents the heart of the original city of Louisville, with a strong concentration of manufacturing firms and a legacy of under-utilized and abandoned industrial buildings and land, including some environmentally contaminated from older industrial uses. The challenge of recycling and redeveloping vacant and abandoned properties is a major focus of a city initiative in partnership with the Bloomberg Foundation.

Over the last several years, warehousing and logistics centers have spread south from Louisville International Airport and UPS Worldport into Bullitt County. Over the last two decades, major job centers have also shifted away from the city center and extended into suburban areas at Riverport Industrial Park in the southwest, Bluegrass Industrial Park in the southeast, and suburban office parks and corporate campuses at the eastern edge of the county.

At the beginning of this century, Louisville adopted a new approach to land-use planning with the intent to “ensure more compact, mixed-use, better-designed and transportation-smart development for the denser urban communities expected to come.”¹¹⁸ But consultants working on “Vision Louisville,” a new long-range plan for the built environment, characterized Louisville as a city that “is not defined by its center or its periphery but by its patchwork nature.”

This pattern of development has isolated older portions of the city and particularly western Louisville from growing suburban job centers. The Transit Authority of River City (TARC), Louisville’s public bus system, serves 60 percent of the region’s residents but in 2009 effectively

¹¹⁷ Elizabeth Kneebone, “Job Sprawl Revisited: The Changing Geography of Metropolitan Employment,” Washington, DC: Brookings Institution, 2009.

¹¹⁸ Edward Bennett and Carolyn Gatz, “A Restoring Prosperity Case Study: Louisville, Kentucky,” The Brookings Institution, September 2008. Page 23.

reached only about a third of job locations and even fewer -- 27% -- of the lower-skilled jobs most likely held by workers without access to cars.¹¹⁹ Although ridership on public transportation in Louisville is increasing, most workers commute in single-occupancy vehicles and have a mean commute time of 23 minutes.¹²⁰

Among the nation's largest metro areas, Louisville is among the most affordable for housing, with only 27.5 percent of homeowners paying more than a third of their income for housing -- almost ten percentage points lower than in the largest metros.¹²¹ Over the last two decades, Louisville Metro government has undertaken the systematic redevelopment of its large public housing projects into well designed, new mixed-income communities that are nationally recognized for the dramatic transformation they brought to several distressed neighborhoods, including one in western Louisville and two -- including one currently under construction -- just to the east of downtown.

Over more than two decades, the city and its many partners undertook a dramatic redevelopment of its riverfront, where older industrial uses cut off access to the public. Today, the sweeping expanses of Waterfront Park line the riverbank stretching east and west from the center of the downtown area and, most recently, opening a refurbished railroad bridge that now provides a popular pedestrian walkway that links the Kentucky and Indiana sides of the Ohio River.

After prolonged debate over many years, the Ohio River Bridges Project is moving forward to construct new vehicle bridges across the Ohio River downtown and in the far east end of the county, as well as untangle the mishmash of highway junctions near the downtown area known as "Spaghetti Junction." The project, one of the largest infrastructure investments in the nation and in the community's history, is considered vital to support the region's logistics and transportation industries with adequate infrastructure.

Regional Infrastructure

Infrastructure is critical to support regional growth, job creation and economic development. Providing mobility of people and goods, and connecting the workforce with places of employment and education are key components for maintaining, growing and sustaining an economically strong region.

A separate report on the capacity of the region's infrastructure to support regional economic growth and, especially, manufacturing is available at www.louisvilleky.gov/BEAM and

¹¹⁹ Adie Tome, Alan Berube, Elizabeth Kneebone, and Robert Puentes, "Missed Opportunity: Transit and Jobs in Metropolitan America," The Brookings Institution, May 12, 2011.

¹²⁰ U.S. Census Bureau, 2007-2011 American Community Survey 5-year estimates.

¹²¹ U.S. Census Bureau, American Community Survey, 2009. Defined as percent of mortgaged homeowners spending 30 percent or more of household income on selected owner costs

www.lexingtonky.gov/BEAM. This report includes a review of public transportation, airports, energy, rail, solid waste, communications, water and wastewater, roads and bridges.

Assessment

The core counties at the heart of both of BEAM’s metropolitan regions retain their dominance as major job centers even as residential development has moved into surrounding counties. Both cities have invested significant attention and resources to revive their central cities and downtown areas and both have succeeded to a certain extent, with Lexington currently weighing major new investments in the downtown area.

Both cities are well designed to facilitate interactions among entrepreneurs and knowledge workers – and both communities have strong and growing networks attuned to that purpose.

An ongoing challenge for Lexington is to balance the desire to maintain its urban growth boundaries and the physical forms it has created while also securing sites appropriate for job growth and economic development. Louisville also confronts the challenge of securing land appropriate for new job development and also faces the on-going challenge of luring jobs and population back to new and emerging neighborhoods in its central areas.

Lack of efficient and well-connected public transportation and the decades of disinvestment in areas like western Louisville isolate some parts of the community particularly from suburban job centers.

Both metros are constrained by the lack of large parcels of land ready for redevelopment for industrial growth and expansion. In Lexington, the Urban Growth Boundary adds to this challenge – although widely regarded as critical to protecting the region’s assets and unique characteristics.

Significant Initiatives

- **Vision Louisville** is an initiative of Mayor Greg Fischer’s administration to engage the community in the creation of a 25-year plan for the built environment. It will be released later this year.
- **Sustainable Louisville** is a second planning effort underway in Metro Government to define a new agenda around sustainable practices.
- In Lexington, a comprehensive planning process to develop the **Rupp Arena Arts & Entertainment District** kicked off late last year and is moving forward.
- The Downtown Development Authority in Lexington is pursuing development of **Town Branch Commons** to restore an historic stream that flowed through the center of town and create a string of parks to revitalize an area of downtown and attract new residents.
- Projects funded through the Bloomberg Philanthropies include a major effort to **reduce the number of vacant and abandoned properties** in Louisville by 40 percent within three years and 67 percent in five years.

EFFECTIVE PUBLIC AND CIVIC INSTITUTIONS AND CULTURE

Success in the new economy requires a new form of governance that fosters open, adaptive, flexible institutional networks across the public, private, and civic sectors. These networks facilitate the ready entry of new people and firms and the development of relationships, deals and activities that drive economic progress.

The role of government is to facilitate and enable these economic activities by providing public goods of real value and efficient and effective government operations as well as through the levels of transparency and information sharing that foster open environments.

Economic success in this new environment also requires a new form of institutional capacity that is deliberate in developing targeted economic growth strategies, and engages leaders and a broad array of stakeholders across the public, private and civic sectors to execute them.

Louisville and Lexington both operate under countywide metropolitan governments that consolidate city and county functions. Their reach as job centers extends far beyond their boundaries, attracting workers from many other counties to job centers that include Ford, GE Appliances, Toyota, Trane, Lexmark, and other manufacturing plants and UPS Worldport.

Generating half of Kentucky's economic output, almost half of the state population, and employing more than half of its total workforce, the two metropolitan areas share the need to re-align state programs and policies to more effectively address the opportunities and challenges shaping the competitive prospects of these metropolitan regions. The partnership between Mayor Greg Fischer and Mayor Jim Gray behind BEAM represents a new level of collaboration between the two regions and is playing out across many realms, from the sharing of best practices in government operations, to collaboration around common interests with the state and business and civic partners.

Government Fragmentation

Streamlined metro governments in both Louisville and Lexington combine the functions of city and county government and provide the predominate elected leadership for their communities, although smaller cities around Louisville and surrounding municipal and county governments play important roles in shaping public policy and land-use and development patterns across the 22-county region that makes up BEAM.

Both Louisville and Lexington have invested lead responsibility for economic development in organizations led by the private sector. Greater Louisville Inc. and Commerce Lexington bring together public and private resources to create a unified voice on economic development and attraction.

At the regional level, three Area Development Districts, or ADDs, control transportation and infrastructure planning and some streams of federal funding. The Bluegrass ADD covers 17 counties, including Fayette. Kentuckiana Regional Planning and Development Agency, or KIPDA,

covers Jefferson and eight surrounding counties, including two in southern Indiana. The Lincoln Trail ADD covers eight counties south of Louisville including three that are in the BEAM region.

The Lincoln Trail and Bluegrass ADDs manage federally funded workforce training counties in their areas, where Fayette County is one among several more rural counties served by the ADD. In Jefferson County, KentuckianaWorks is an independent Workforce Investment Board reporting to the Mayor and also, by contract, providing workforce training programs in six counties surrounding Louisville.

Tax-Value Proposition

In Kentucky, 65% of state and local revenue collection occurs at the state level, making the state the primary driver of tax policy and government funding, a fact that distinguishes it among most of its peers.¹²²

The non-partisan Tax Foundation recently ranked Kentucky 24th among the fifty states in its State Business Tax Climate Index for 2013, placing it in the middle of the pack on comparative rates for both corporate and individual income taxes, 18th in terms of property taxes, and much lower – 48th among the 50 states – for its high cost of unemployment insurance.¹²³ Frequent criticism of its corporate income tax rates arises from the fact that it does not index corporate tax brackets for inflation and imposes an alternative minimum tax on corporations.

Among thirteen states designated as its peers, Kentucky has the second highest total for state and local expenditures for public welfare spending per capita, primarily reflecting high rates of poverty and low health indicators particularly in rural and Appalachian counties with low levels of economic opportunity.¹²⁴

Kentucky's spending per capita on elementary and secondary education placed it twelfth among the thirteen peer states 12 out of 13 peer states in 2009, although its increased investment from 2001 to 2009 was highest among those states.¹²⁵ Its investment in higher education on a per capita basis declined during that period, reducing its rank to sixth out of thirteen.¹²⁶

¹²² Dr. William Hoyt, Dr. William Fox, Michael Childress and James Saunoris, "Report to Governor's Blue Ribbon Commission on Tax Reform by Economic Consultants," University of Kentucky Center for Business and Economic Research, 2012. [http://cber.uky.edu/Downloads/KYTaxCommissionReportFinal\(9-19-12\).pdf](http://cber.uky.edu/Downloads/KYTaxCommissionReportFinal(9-19-12).pdf)

¹²³ #1 is best. The Tax Foundation, Table 1: 2013 State Business Tax Climate Index Ranks and Component Tax Ranks <http://taxfoundation.org/article/2013-state-business-tax-climate-index>

¹²⁴ Initial findings from the Governor's Blue Ribbon Commission on Tax Reform, reported in The Lane Report, "State, local expenditures for elementary, secondary education below average in Kentucky," November 7, 2012.

<http://www.lanereport.com/14948/2012/11/education-expenditures-below-average/> Competitor states are surrounding states and those with similar demographic and economic circumstances, as defined by the University of Kentucky's Center for Business and Economic Research (CBER): Georgia, Illinois, Missouri, Tennessee, Ohio, South Carolina, Alabama, Indiana, North Carolina, Virginia, Mississippi, and West Virginia.

¹²⁵ Hoyt, Fox, Childress and Saunoris. p. 103.

¹²⁶ Hoyt, Fox, Childress and Saunoris, p. 103.

Assessment

Both Lexington and Louisville took extraordinary steps to streamline their local governments and unify their communities many decades ago in the case of Lexington and more recently in Louisville, and both are committed to on-going efforts to streamline and simplify government to create an environment that is supportive of economic growth and prosperity

Both metros also have a strong tradition of collaboration across the public and private sectors, including assigning leadership for economic development to partnerships driven by the business community. That civic infrastructure has not been organized as extensively at the regional level, however. BEAM represents a new vehicle for spanning that broader region, establishing a platform or forum for crafting an on-going civic agenda and public-private partnership focused on economic competitiveness and advancement in both metro regions.

Both metros have invested substantial resources in the development of amenities and urban neighborhoods designed to attract younger workers and knowledge industries, taking deliberate steps over many years to create vibrant central areas and recreational opportunities. The need to continue on that path, redefining the region as attractive locations for next economy enterprises and activity, represents an ongoing challenge.

An important part of that agenda is to advocate for the ongoing evolution and realignment of state policies and programs in light of the increasing importance of metro regions as the drivers of economic growth. Particularly because of its dominance as a taxing authority, the state government plays a critical role in driving investment and implementation to create the infrastructure for the 21st Century economy – in terms of transportation but also in terms of human capital and workforce development, the innovation ecosystem, economic development, and quality of life amenities.

Securing adequate capital and other resources to invest in 21st Century skills, infrastructure, innovation ecosystem, and economic development poses significant challenges for both BEAM metropolitan regions, as it does across the country.

At the next level, the role of Area Development Districts in transportation planning and in workforce development for Lexington and surrounding counties also raises the question of whether the needs and priorities of large urban metros can be adequately represented in organizations primarily serving rural areas and smaller communities.

Significant Initiatives

For more than a decade, a consortium of philanthropic foundations in Louisville has sustained a broad civic agenda focused on raising education attainment, growing 21st Century jobs, and enhancing quality of place. The Greater Louisville Project tracks and reports progress against those critical goals for the next economy. It arose as an initiative to sustain the roadmap put forward in a 2002 report by The Brookings Institution, “Beyond Merger: A Competitive Agenda for the Regional City of Louisville.”

SEIZING THE MANUFACTURING MOMENT: A GROWTH AGENDA FOR THE BLUEGRASS ECONOMIC ADVANCEMENT MOVEMENT

In the context of those assets and challenges, the Board of the Bluegrass Economic Advancement Movement has devised a first set of priority strategies designed to move the region forward across multiple fronts, leveraging its shared assets and building synergy between the two metropolitan regions.

Promising initiatives are already underway, including Kentucky's recent investment in the Argonne-Kentucky Battery Manufacturing Research and Development Center in Lexington, the University of Louisville's planned Institute for Product Realization and Innovation, and the opening of the new STEAM high school on the University of Kentucky campus focused on problem-based learning in science, technology and other fields.

The Kentucky Community and Technical College System now issues more than twice the number of certificates and degrees it awarded only seven years ago and has embarked on a strategic plan that will increase industry involvement and accelerate curriculum development to address workforce needs.

Within industry, major employers are starting to recognize new national credentials established by the Manufacturing Skills Standards Council and make new investments, including a new training center recently announced by GE. The Kentucky Manufacturing Career Center launched last spring in Louisville has more than two dozen employers actively guiding development of the Center where workers earn "stackable" credentials that can lead to associate degrees.

BEAM strategies embrace and build on initiatives like those and others, bringing together critical partners, elevating the focus on manufacturing, and aligning efforts to create a comprehensive and coordinated approach.

Initiatives highlighted for initial implementation represent only a first wave of strategic action and are meant to inform public and private investment and the design of future initiatives by BEAM and its partners. Achieving the long-term goal will require engaging many partners in the mission to strengthen the region's competitive position and economic prosperity.

Overall Goal: Strengthen and leverage the region's robust advanced manufacturing sector and related strengths to capitalize fully on its potential to protect and create solid jobs and grow wages.

GOVERNANCE: Solidify the partnership between Kentucky's two largest metropolitan areas to guide implementation of the Economic Growth Plan and expand collaboration on growth strategies.

The next economy places a premium on coordination and collaboration. Economic success in this new environment requires new capacity to be deliberate in developing targeted growth strategies and engaging the public, private, and civic sectors to execute them, creating a new form of regional governance.

In that spirit, the BEAM region should:

- Foster partnership and alignment between Louisville and Lexington through implementation of the Economic Growth Plan.
- Share best practices for improving customer service, efficiency and effectiveness in metro governments and collaborate on legislative priorities with the Metropolitan Alliance for Growth.

HUMAN CAPITAL: Become a world-class center for advanced manufacturing by developing a skilled workforce equipped to meet the demands of 21st century industry.

Human capital is the single most important input to economic growth, and the development of a robust pipeline guided by employers to provide workers with the skills to compete in the global economy represents a top priority for BEAM leaders. The region confronts two critical challenges in human capital and skills: closing a growing gap in middle skills particularly in manufacturing and expanding the ranks of higher-skilled workers in science and technology fields.

Competitor states are investing heavily in skills training and apprenticeship opportunities in manufacturing and other fields. Others are significantly expanding the pipeline of technical skills and engineering talent critical to the next economy.

Among initial steps to address the skills issue, the BEAM region should:

- Expand capacity in its engineering schools to double the number of engineers graduating each year from Kentucky universities.
- Centralize and promote the availability of employer-supported training, apprenticeship, and education options—or “earn and learn” programs—and develop a range of customized tools to attract and train the next generation of workers.
- Build on emerging recognition by major employers for national manufacturing credentials to develop an employer-driven network of training centers like the Kentucky Manufacturing Career Center.
- Seek state funding to build Kentucky Community and Technical College advanced manufacturing training centers that serve the BEAM region.

INNOVATION: Develop an integrated ecosystem of support for advanced manufacturing centered on innovation and technology.

The 21st century production economy rewards businesses and industries that continually innovate in products, processes and markets. It favors firms that are agile and compete on quality, adding value and rapid customization, rather than those that primarily compete on cost. While major investments by global firms anchor the region's manufacturing base, the new economy also favors firms in the "middle market" that foster collaboration and continuous innovation. Improving the competitive position of the region's 1,600 small and medium-sized firms and connecting them to the latest technologies and innovation capacities will strengthen the region's overall capacity for manufacturing.

As first steps, the region should:

- Support existing and potential innovation hubs and centers for manufacturing excellence, extending the reach of regional resources and enhancing the depth and sophistication of support for the development of technology and production innovation.
- Develop an annual showcase of public and private providers of technology and innovation services designed to increase firm awareness, access and adoption of innovation capabilities in the region.
- Engage global manufacturing leaders as partners to small- and mid-sized firms through the Mayors' CEO Corps, lending leadership, talent, and resources to help firms make the transition to the next economy.
- Leverage the region's strength in logistics to grow higher technology sectors.

EXPORTS: Increase global demand for made-in-Kentucky products by helping BEAM manufacturers tap new and expanding export markets.

Both BEAM metropolitan areas export more than the average for regions across the nation, largely as a result of its strong manufacturing base and competitive advantage in global logistics. The rise of emerging markets and consumer demand provide an important source for growth for the region, bolstering BEAM's traded sectors, including its multi-modal transportation and logistics industry.

In this spirit, the region should:

- Implement the new Metropolitan Export Plan to increase by half the number of companies that begin to export or expand exports to new markets.

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- Collaborate with and support the Kentucky Export Initiative and existing trade partners to ensure optimal coordination and use of existing resources and programming to support firms' export success.

REGIONAL CONCENTRATIONS AND CLUSTERS: Beyond manufacturing, invest in targeted regional assets to diversify the economy into technology-based firms and knowledge industries.

The region's world class logistics assets draw new firms and sectors to the region, creating opportunities in new high-technology sectors, product customization and rapid repair.

The recent focus on establishing the Louisville region as a center of excellence for lifelong wellness and aging care offer the potential to grow headquarters functions, and Lexington's recent success in attracting high-end support services for a national professional firm opens up new potential for specialization in business services. To implement this strategy:

- Partner with Greater Louisville Inc. the Metro Chamber of Commerce, and Commerce Lexington to focus economic development efforts on growing the region's most promising concentrations in tradable sectors.

PLACE MAKING: Strengthen the region's competitive position by enhancing its metropolitan areas as attractive places to live, work, and do business.

The knowledge economy values proximity between workers, firms, and other assets such as research institutions, cultural amenities, and transit access. Modern infrastructure, smart technologies, and quality places attract knowledge workers and firms.

To this end, the region should:

- Enhance the region's profile as a center for advanced manufacturing by assembling land appropriate for development and job growth.
- Pursue a comprehensive and coordinated approach to the development of 21st century infrastructure that supports technology-driven industries and entrepreneurs, such as gigabit internet service.
- Support development and investments in metropolitan areas that create densely populated, mixed-use communities designed to meet the needs of knowledge workers and firms.

CALL TO ACTION

The BEAM region represents prime territory for this emerging manufacturing moment in America. Advanced manufacturing is evolving at an unprecedented pace, creating new products and jobs and its evolution will accelerate as promising new technologies including 3D printing and rapid prototyping mature, as new materials, production processes and power sources take hold.

The Economic Growth Plan for the region creates a clear pathway to maximize those opportunities for the 22-county region and to distinguish it as a global center of production and value for the next generation of manufacturing.

Both the Louisville and Lexington regions know firsthand the synergies created by strong economic clusters: food and beverages, lifelong wellness and aging care, manufacturing and logistics. In the future, the BEAM region's formidable production capacity will produce not just cars, trucks and appliances but also biomedical products and "green" solutions.

But to seize the moment in manufacturing, the region must strengthen its ecosystem of support for the new, high-tech culture of "making things" to grow and thrive.

Leaders in the BEAM region who have come together to create the Economic Growth Plan will guide its implementation, monitor progress, and craft new strategies to advance its goal. They invite new partners and strategic owners to join in expanding its reach, breadth, and depth, creating a comprehensive approach to economic transformation. Together, leaders, employers, and citizens, can make the BEAM region a true magnet of growth and invention to ensure prosperity for future generations.

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AT&T
Babbage Cofounder
Baptist Healthcare System
Bingham Greenebaum Doll
JPMorgan Chase Foundation
Cornett Integrated Marketing Solutions
Fifth Third Bank
GE
GLI Advanced Manufacturing and Logistics Network
Humana
LG&E
Lexmark International
Lynn Imaging
Mountjoy Chilton Medley
Stoll Keenon Ogden
UPS Foundation
U.S. Bank Foundation
Wyatt, Tarrant & Combs.

In addition, the following regional workforce development boards partnered with BEAM to commission labor market research:

Bluegrass Workforce Investment Board
Cumberlands Workforce Investment Board
KentuckianaWorks (Greater Louisville Workforce Investment Board)
Lincoln Trail Workforce Investment Board
Region 10 Workforce Board in Southern Indiana

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