

Indiana's Knowledge Corridor

Brigitte S. Waldorf

Department of
Agricultural Economics
Purdue University
West Lafayette, Indiana

To the Point

Indiana's highly educated population increasingly concentrates in the center of the state, along an axis that stretches from Tippecanoe County to parts of the Indianapolis metropolitan area and continues to extend to Monroe County. By the year 2000, 40% of Indiana's well-educated population resided in the eight counties along this axis. These eight counties—Boone, Hamilton, Hancock, Hendricks, Johnson, Marion, Monroe, and Tippecanoe—have thus become what can be called "Indiana's Knowledge Corridor" (IKC). The growth and increasing concentration of the highly educated population in the knowledge corridor provides an opportunity for unprecedented economic growth and a boost to Indiana's ability to compete in the global knowledge economy. To facilitate further growth, the report recommends assigning special status to the knowledge corridor as a coherent regional entity, aggressive marketing of the corridor's locational advantages, and support for improved transportation infrastructure.

Introduction

Indiana participated in the education boom that has led to a nationwide increase in educational attainment levels over the last decades. Indiana increased its percentage of college-educated residents and decreased its percentage of residents who have not completed high school. In fact, today Indiana features some of the nation's most educationally advanced counties. These counties cluster together in the center of the state, along an axis that stretches 57 miles¹ from Tippecanoe County to the Indianapolis metropolitan area and continues to extend 48 miles southwest to Monroe County.

The endpoints of this axis have a long tradition of educational excellence. Since the 19th century, Purdue University and Indiana University have contributed to the favorable educational standing of Tippecanoe County and Monroe County, respectively. However, what added to the emerging cluster of knowledge along the axis between Tippecanoe and Monroe counties during the last three decades was the remarkable improvement in educational standing of some counties in the Indianapolis metropolitan area. Notable in this context is the creation of IUPUI in 1969 and the expansion of Butler University and the University of Indianapolis. Thus, by the year 2000, a knowledge axis had emerged that includes—from north to south—Tippecanoe County, Boone County, Hamilton County, Marion County, and Monroe County. More recently, three additional counties—Hancock, Johnson, and Hendricks—have shown notable improvements in their educational standings that promise to enlarge the knowledge axis. In fact, together the five core counties and three future additions form the basis for what can be called "Indiana's Knowledge Corridor," or, in short, "IKC" (Figure 1, p. 2).

¹ All distances are straight-line distances between county midpoints.

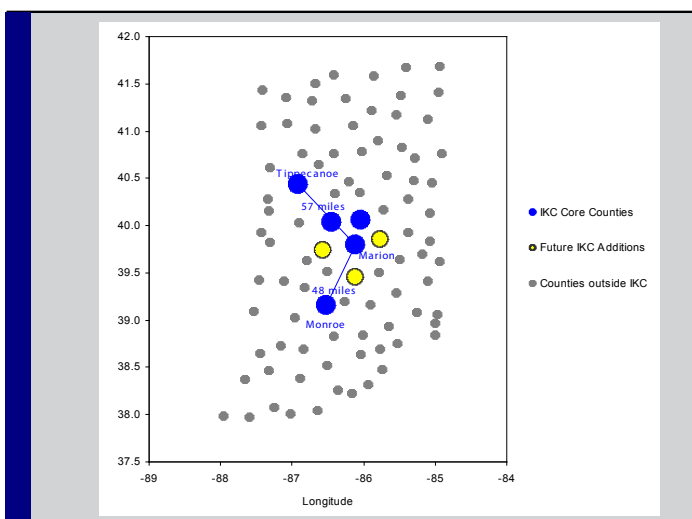


Figure 1. Indiana’s Knowledge Corridor (IKC)

The Evolution of Indiana’s Knowledge Corridor

In 1970, having a college education was still an exception. Only 10.7% of American adults had at least a four-year college degree. In Indiana, the percentage of college-educated residents was even lower than for the nation as a whole: only 8.3%, or one out of 12 adult residents, had graduated from college.² The two counties housing the major universities, Monroe and Tippecanoe counties, stood out with their very high percentages of college-educated residents: 27.4% and 20.6%, respectively. However, already in 1970, two of the counties between these poles had an above-average share of the highly educated population, namely Hamilton and Marion counties. In the remaining four counties—Boone, Hendricks, Hancock, and Johnson—the percentage of highly educated persons was at or below the 1970 statewide average. Nevertheless, in 1970, the eight counties that would later become Indiana’s Knowledge Corridor included less than a quarter of Indiana’s total population but more than a third of Indiana’s college-educated population (Figure 2).

During the 1970s, Indiana’s population grew—on average—by 1.4% annually. With an average annual growth rate of 7.2% per year, its highly educated population grew even faster than the population as a whole. This is particularly the case for the suburban counties of the Indianapolis metropolitan area. For example, during the 1970s, the average annual growth rate of the highly educated population in Hamilton County exceeded 26%. As a result, Hamilton County more than tripled its highly educated population during the 1970s. The two university counties, which already

² Unless otherwise noted, the data analysis presented in this report is based on the compilation of U.S. census data by the USDA Economic Research Service <http://www.ers.usda.gov/StateFacts/>

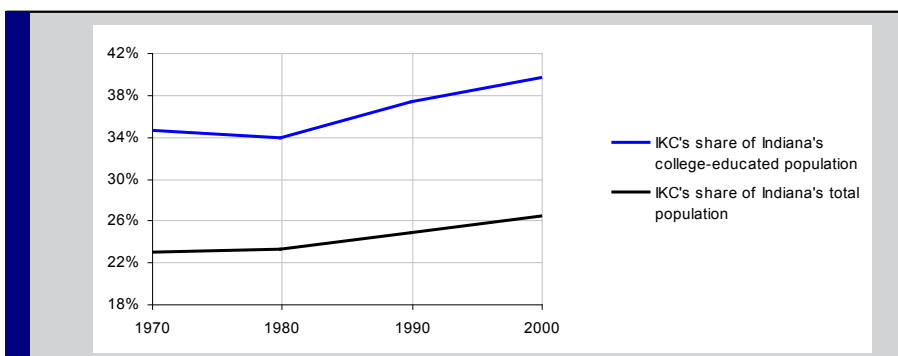


Figure 2. Shares of Indiana’s Total Population and College-Educated Population Residing in the IKC.

had a large educated population prior to 1970, did not show these excessively high growth rates. Nevertheless, both Tippecanoe County and Monroe County recorded a sizeable absolute growth of their highly educated population. Similarly, Marion County had a comparatively low growth rate but a large absolute increase of nearly 25,000 college-educated residents. Thus, by 1980, the share of college-educated residents in the IKC had actually declined slightly compared to 1970, yet all but one county—Hancock—exceeded the statewide percentage of college-educated residents, and four counties exceeded the 1980 national percentage.

Table 1. Growth of the College-Educated Population from 1970 to 1980

County	College Educated Population as a Percent of the Total Population of Age 25+		Average Annual Growth Rate	Absolute Increase
	1970	1980		
Boone	7.1 %	15.7 %	17.4 %	2,156
Hamilton	11.4 %	25.7 %	26.9 %	8,900
Hancock	6.6 %	11.3 %	13.4 %	1,618
Hendricks	8.3 %	14.4 %	14.5 %	3,379
Johnson	8.1 %	13.3 %	13.3 %	3,272
Marion	11.4 %	16.3 %	5.1 %	24,657
Monroe	27.4 %	31.3 %	5.1 %	5,051
Tippecanoe	20.6 %	25.5 %	4.6 %	4,757
Indiana	8.3 %	12.5%	7.2 %	163,914
U.S.	10.7 %	16.2 %	8.4 %	9,841,214

During the 1980s, the trends of the 1970s strengthened, and the pace of the emergence of a knowledge corridor picked up substantially (Table 2). Indiana gained 150,000 college-educated residents. The eight counties of the emerging IKC claimed nearly one-half (46.5%) of that gain. Once again, Hamilton County had the highest average annual growth rate of its college-educated population and, by 1990, led the state in terms of educational status. Hamilton County even surpassed Monroe and Tippecanoe counties, which had traditionally been the state’s leaders. By 1990, Hancock County continued to have the lowest educational status within the IKC, but all other counties had exceeded the state average, and five counties even surpassed the national percentage of college-educated residents.

Table 2. Growth of the College-Educated Population from 1980 to 1990

County	College Educated Population as a Percent of the Total Population of Age 25+		Average Annual Growth Rate	Absolute Increase
	1980	1990		
Boone	15.7 %	22.2 %	6.3 %	2,139
Hamilton	25.7 %	36.2 %	10.5 %	12,799
Hancock	11.3 %	14.9 %	5.3 %	1,500
Hendricks	14.4 %	18.2 %	5.3 %	3,013
Johnson	13.3 %	16.7 %	6.1 %	3,472
Marion	16.3 %	21.4 %	5.1 %	37,029
Monroe	31.3 %	32.9 %	2.6 %	3,855
Tippecanoe	25.5 %	30.7 %	4.0 %	6,076
Indiana	12.5%	15.6 %	3.8 %	150,351
U.S.	16.2 %	20.3 %	5.0 %	10,751,773

During the 1990s (Table 3), the eight counties of IKC continued to expand their shares of the college-educated population and claimed over 45% of the state's total increase of this highly valued population segment. In particular, Hancock, Hendricks, and Johnson counties substantially expanded their shares of the college-educated population. By the year 2000, all eight counties far exceeded the statewide percentage of college-educated residents, and only three counties were slightly below the nationwide percentage. Even Hancock County, which during the 1970s and 1980s was still lagging far behind, was catching up quite quickly and had the second highest average annual growth rate. Hamilton County topped the list and gained even more college-educated residents than its much bigger neighbor, Marion County. In fact, by the year 2000, almost 50% of Hamilton County's residents had a college degree. Hamilton County became one of the nation's most educated counties, ranking 14th among the nation's 3000+ counties.

Table 3. Growth of the College-Educated Population from 1990 to 2000

County	College Educated Population as a Percent of the Total Population of Age 25+		Average Annual Growth Rate	Absolute Increase
	1990	2000		
Boone	22.2 %	27.6 %	5.0 %	2,773
Hamilton	36.2 %	48.9 %	12.5 %	31,900
Hancock	14.9 %	22.2 %	9.0 %	3,897
Hendricks	18.2 %	23.1 %	7.9 %	6,918
Johnson	16.7 %	23.1 %	8.6 %	7,872
Marion	21.4 %	25.4 %	2.8 %	30,933
Monroe	32.9 %	39.6 %	3.7 %	7,067
Tippecanoe	30.7 %	33.2 %	2.5 %	5,279
Indiana	15.6 %	19.4 %	3.9 %	212,672
U.S.	20.3 %	24.4 %	3.8 %	12,152,352

By the year 2000, the eight-county knowledge cluster claimed an ever-increasing share of Indiana's college-educated population. As shown in Figure 2, IKC housed 26% of Indiana's total population in 2000, but almost 40% of Indiana's college-educated population. Thus, IKC offers valuable opportunities for serving as a catalyst for economic growth in the knowledge sector and attracting additional intellectual capital from outside the state.

Concentration in Space

The center of the IKC is approximately located in the state's capital, Indianapolis. How far away from this center do Indiana's college-educated residents live? Table 4 tracks the distances from Indianapolis over time and shows that the main push towards the emergence of the IKC did not come until the 1980s. In 1970, slightly more than a quarter of the college-educated population lived within a 25-mile radius around Indianapolis. By 1980, this share had barely increased. By 1990, however, it had risen to 30% and—10 years later—to about 33%. A similar, albeit less drastic trend can be recorded for the share of college-educated residents within a 50-mile radius from Indianapolis: it increased from 44% in 1970 to 48% in 2000. Extending the area to a 75-mile radius and thus beyond the reach of the knowledge corridor does not result in increasing shares over time.

In contrast, the share of poorly educated residents (those without a high school degree) within close proximity of Indianapolis has been almost constant over time: 19% lived within a 25-mile radius around Indianapolis in 1970, only slightly increasing to 20% by the year 2000. Moreover, the share of poorly educated residents in close proximity to Indianapolis was also substantially smaller

than that of the highly educated population. In fact, the share of the poorly educated population only exceeded that of the highly educated population at very far distances from Indianapolis. This suggests that the poorly educated population continues to be left behind at the state’s periphery, while the highly educated population increasingly concentrates in Indiana’s Knowledge Corridor, centered about Indianapolis.

Table 4. Share of Highly Educated (4+ Years of college) and Poorly Educated (less than High School) within 25–Mile, 50–Mile, and 75–Mile Radius from Indianapolis, 1970 to 2000

Year	Share of population within a		
	25–Mile Radius	50–Mile Radius	75–Mile Radius
College-Educated Population			
1970	26 %	44 %	58 %
1980	27 %	44 %	57 %
1990	30 %	45 %	58 %
2000	33 %	48 %	59 %
Population Without a High School Degree			
1970	19 %	35 %	51 %
1980	19 %	35 %	51 %
1990	19 %	35 %	51 %
2000	20 %	36 %	51 %

These results also suggest that Indiana’s Knowledge Corridor is associated with an increasing spatial segregation by educational attainment level. In 1970, the segregation index³ measuring the spatial separation between the highly educated and those without a high school degree was 19, suggesting that 19% of the two population groups would need to move to another county in order to eradicate the segregation by educational attainment level. Over time, the extent of segregation of the highly educated population increased. By the year 2000, 23%, or nearly one fourth of the two population groups, would have needed to relocate so as to eradicate the segregation of the highly educated from the poorly educated.

Profile of Indiana’s Knowledge Corridor

The eight counties of IKC form the most important growth area of Indiana’s economy. The corridor includes parts of Indiana’s major metropolitan areas, with their many knowledge-based firms; Indiana’s traditional centers of learning and discovery, Purdue University and Indiana University; many smaller or more recently founded colleges and universities, such as Butler University, IUPUI, and Ivy Tech campuses; and a dense network of highways and interstates.

Demographically, IKC has a young, well-educated, and fast-growing population. As outlined in the previous section, IKC has a disproportionately large share of well-educated residents. Equally important, its youth continue education upon high school graduation at a substantially higher rate

³ The well-known segregation index offers a straightforward means to assess the separation of the highly educated (H) from the poorly educated (P) populations across Indiana’s counties. It is defined as:

$$S = 50 \sum_{i=1}^{92} \left| \frac{H_i}{H} - \frac{P_i}{P} \right|$$

H and P are the total population sizes of two groups in Indiana, and H_i and P_i are the respective population sizes of the two groups in one of the 92 counties i ($i= 1, \dots, 92$). The segregation index varies between 0 and 100, with 0 signaling the absence of segregation and 100 signaling complete segregation.

than in the rest of the state, and those who do continue their education are more likely to choose a 4-year college over a 2-year college or vocational training (Table 5). Thus, we can expect that the knowledge corridor will further expand its advantageous lead in the future.

Table 5. Demographic Characteristics

Indicator	Indiana's Knowledge Corridor	Rest of the State
Education		
% Residents of age 25+ with at least a 4-year college education, 2000	29.2	15.9
% High school graduates going on to higher education, 2003/04	81.2	76.9
% High school graduates going on to a 4-year college, 2003/04	62.9	56.4
Population Growth, 2003/04		
Population change due to domestic migration (per 1,000 residents)	+2.0	-1.5
Population change due to international migration (per 1,000 residents)	+2.8	+1.3
Rate of natural increase (births minus deaths per 100 residents)	+0.8	+0.4
Age Structure, 2000		
% Younger than 45	67.9	62.6
% Younger than 65	89.8	86.9

Source: Compiled using data from STATS Indiana (<http://www.stats.indiana.edu/profiles/pr18000.html>), the U.S. Census Bureau, and the USDA Economic Research Service <http://www.ers.usda.gov/StateFacts/>.

Indiana's Knowledge Corridor gains population through a surplus of births over deaths and large inflows of domestic as well as international migrants. In 2003-2004, it gained a total of 4.8 migrants—2 from domestic migration and 2.8 from international migration—for every 1,000 residents already living in the corridor. Migrants tend to be young, and thus it is not surprising that a comparatively large share of IKC's population is young. In fact, 68% of the population is younger than 45; 90% is younger than 65.

It is not only the demographic but also the economic structure that sets IKC apart from the rest of the state. All eight counties of the corridor are classified as metropolitan counties, and thus it is not surprising that its economy is not based on agriculture. Furthermore, IKC is also not anchored in manufacturing: compared to the rest of Indiana, where manufacturing accounts for about 20% of non-farm employment, IKC's reliance on manufacturing is substantially smaller, only accounting for 10%. Instead, IKC has a strong over-representation of jobs that require higher education. For example, almost 6% of IKC's non-farm employment is in professional and technical services, compared to only 3% in the rest of the state.

How Does Indiana’s Knowledge Corridor Fare in a National Comparison?

Indiana’s Knowledge Corridor compares very well in a national comparison. The relative educational deprivation declined over time for all U.S. counties, for all Indiana counties, and in particular for the eight-county region making up the IKC.

Compared to the nation, Indiana counties are underrepresented among the nation’s least deprived counties as well as among the nation’s most deprived counties. However, over time, its representation among the least deprived as well as among the most deprived counties has increased. This suggests an increasing disparity in educational status throughout Indiana. But, for Indiana’s Knowledge Corridor, these trends also suggest that it improved its educational status nationwide. In fact, in 1970, only three IKC counties ranked among the top 10th percentile of the nation’s least deprived counties. In 2000, however, all five IKC core counties belonged to the nation’s top 10th percentile. Most remarkable is the rise of Hamilton County in the national rankings. Ranked 294th in 1970, Hamilton now ranks 10th in the nation.

Table 6. *The Top-10 Educationally Least-Deprived Counties in the Nation and in Indiana, 1970 and 2000^a*

1970				2000			
Nation		Indiana		Nation		Indiana	
Rank	County	Rank	County	Rank	County	Rank	County
1	Los Alamos, NM	18	Monroe	1	Falls Church, VA	10	Hamilton
2	Pitkin, CO	44	Tippecanoe	2	Los Alamos, NM	76	Monroe
3	Montgomery, MD	294	Hamilton	3	Pitkin, CO	141	Tippecanoe
4	Williamsburg, VA	367	Porter	4	Douglas, CO	232	Boone
5	Fairfax, VA	400	Marion	5	Arlington, VA	304	Hendricks
6	Johnson, IA	436	Allen	6	Howard, MD	359	Porter
7	Arlington, VA	470	Bartholomew	7	Boulder, CO	398	Hancock
8	Benton, OR	495	Steuben	8	Fairfax, VA	457	Johnson
9	Story, IA	518	Hendricks	9	Montgomery, MD	469	Allen
10	Orange, NC	598	Montgomery	10	Hamilton, IN	474	Warwick

^a Based on the Index of Relative Educational Deprivation (Waldorf 2005).

Policy Implications

This report documents that a powerful knowledge corridor has emerged in the very center of Indiana. This development provides the opportunity for unprecedented economic growth involving, for example, R&D and innovation. This growth is likely to go beyond the boundaries of the IKC and involve neighboring counties as well. In fact, the literature suggests that concentrations of knowledge—such as the IKC—stimulate economic growth within the region as well as in more peripheral counties. These spillovers of economic growth will thus ultimately benefit the entire state.

In light of these potential benefits, a number of supporting strategies for Indiana's knowledge economy should be designed to facilitate the location of new firms and enterprises and thus be geared towards improving Indiana's overall ability to compete successfully in the global knowledge economy. Such strategies should include:

- Adopting a new regional perspective that assigns a special status to Indiana's Knowledge Corridor. Currently, Indiana has number of regional divisions, but none singles out the knowledge corridor as a single cohesive entity.
- Marketing Indiana's Knowledge Corridor. Successful knowledge clusters are known by catchy names, such as "Silicon Valley" in California, "Research Triangle" in North Carolina, the "National Knowledge Axis" in the Netherlands, or the "Central European Boomerang." A well-defined profile and name will strengthen the area's identity as a successful knowledge cluster, emphasize the locational advantages of the corridor, and boost entrepreneurial job creation.
- Investing in infrastructure. The knowledge economy is also a network economy that strongly relies on communication and transportation. Improved infrastructure will thus create the positive business environment that is so vital for stimulating entrepreneurship. This is particularly important because Indiana is far away from the main centers of knowledge worker concentration throughout the nation: the average distance from Indianapolis to the 10 metropolitan areas that gained the most brain power between 1995 and 2000 exceeds 1,000 miles.

Strategies such as these and those yet to be developed would capitalize on and extend the advantage of a significant state resource: Indiana's Knowledge Corridor.

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