The New Economy

A Guide for Indiana

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Central Indiana's Future:
Understanding the Region and Identifying Choices

The Center for Urban Policy and the Environment has launched a new research project—Central Indiana's Future:Understanding the Region and Identifying Choices—funded by an award of general support from the Lilly Endowment. The aim of the project is to increase understanding of the region and to inform decision-makers about the array of options for improving quality of life for Central Indiana residents. Researchers from several universities are working to understand how the broad range of investments made by households, governments, businesses, and nonprofit organizations within the Central Indiana Region contribute to quality of life. The geographic scope of the project includes 44 counties in an integrated economic region identified by the U.S.Bureau of Economic Analysis.

The Center for Urban Policy and the Environment is part of the School of Public and Environmental Affairs at Indiana University–Purdue University Indianapolis. For more information about the Central Indiana Project or the research reported here, contact the center at 317-261-3000 or visit the center's Web site at www.urbancenter.iupui.edu.

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EXECUTIVE SUMMARY

New economy is typically used to denote sectoral economic developments that, since the mid-1980s, are said to be the key to economic growth and a rising standard of living. Characteristics that distinguish the new economy from the old economy include:

- Growth is driven by technological innovation and the accumulation of knowledge centered on computers, information technology (IT), and communication networks, instead of industrial manufacturing.
- Foreign trade and foreign direct investments (FDI) are more important for success in the new economy than in the old economy because production activities can be located at their place of highest comparative advantage around the world.
- High-tech firms in a certain economic sector tend to concentrate in a certain geographical area, promoting symbiotic relationships.
- The day-to-day operation of the new economy is dynamic, involving greater risk and uncertainty relative to the old economy.

In sum, the new economy is said to promote economic growth at the regional, national, and international levels. Taking a broader perspective, however, the new economy may not be that different from the old economy. In fact, there is a lively debate on its importance, focused on the effect of computer-based technology on labor productivity.

The concentration analysis presented in this report reveals that Indiana is economically stronger in high-tech sectors related to manufacturing, or the old economy, than in high-tech sectors related to the new economy (e.g., computers, data processing, IT). It also is apparent that the geographical concentration of new economy sectors in Indiana is lower than the U.S. average.

What should be the response of the state government through its economic development policy? One approach suggests a general framework intended to serve as a basis for a more extensive analysis of how to accelerate the growth of the standard of living in Indiana. Some analysts argue that state governments should promote specific companies and/or technologies, using industrial policies such as tax incentives, subsidies, and easy loans. However, this report asserts that state governments should focus on creating a healthy business environment at the macro level. In particular, state governments should promote the development of infrastructure and education systems, stimulate innovation regardless of type, and promote existing comparative advantages. Over time, such policies will boost economic growth and raise the standard of living.

INTRODUCTION

The term new economy is typically used to denote sectoral economic developments that, since the mid-1980s, are said to have become the key to economic growth and a rising standard of living. It is argued that several characteristics distinguish the new economy from the old economy. First, growth in the new economy is driven by technological innovation and the accumulation of knowledge centered on computers, information technology (IT), and communication networks, and not on industrial manufacturing. Second, the new economy enables the location of production activities at their place of highest comparative advantage around the world. As such, foreign trade and foreign direct investments (FDI) are more important for success in the new economy than in the old economy. A third feature of the new economy is the tendency of high-tech firms in a certain economic sector to concentrate in a certain geographical area, promoting symbiotic relationships among them. At the same time, due to the nature of its quickly changing innovations, the day-to-day operation of the new economy also is dynamic, involving greater risk and uncertainty relative to the old economy.

This report focuses on two primary questions. First, how well developed is the new economy in Indiana? Second, what are the policy-making implications of its new economy for Indiana state government? While the status of the new economy in Indiana is relatively unambiguous, questions regarding desirable policy choices are open to debate.

State by state data on the new economy have been analyzed by two organizations—the Progressive Policy Institute and the Milken Institute.[1] According to these data, the new economy in Indiana is relatively underdeveloped compared with the U.S. average. This finding, to the extent that it holds, naturally raises the question of how to improve Indiana's performance. A general framework on how to accelerate the growth of the standard of living in Indiana is proposed. Sharing the same goal, some analysts argue that state governments should promote specific companies and/or technologies, using industrial policies such as tax incentives, subsidies, and easy loans. Conversely, this report maintains that state governments should focus on creating a healthy business environment at the macro level. In particular, state governments should promote the development of infrastructure and education systems, stimulate innovation regardless of its type, and promote existing comparative advantages. Over time, such policies will boost economic growth and raise the standard of living.[2]

This report is organized as follows. Section II puts the new economy in a broader perspective. Section III presents data on Indiana's new economy. Sections IV and V discuss the general role of government in the new economy.

[1] According to the Web site (www.ppionline.org), the Progressive Policy Institute, a project of the Third Way Foundation, conducts research and provides commentary regarding progressive politics based in Washington, D.C. According to the Web site (www.milkeninstitute.org), the Milken Institute is a nonprofit economic think tank based in Santa Monica, California.

[2] The overall standard of living is typically measured by national (or state) real income per capita, real gross domestic (or state) product per capita, and real average wage per job.

HIGH GROWTH SECTORS,GEOGRAPHIC SPECIALIZATION, GLOBALIZATION,AND HIGHER PRODUCTIVITY DEFINE THE NEW ECONOMY

Advances in computer-based technology since the mid-1980s have created growth in computer-based services, such as information management, Internet-based electronic commerce (e-commerce), communications, data management, computerized production and factor supply networks (business to business, or B2B),and Internet-based financial services (e-finance). These advances, defined by some as Information Technology (IT),are said to drive a fundamental change in the economy—a new economy. While the old economy is based on manufacturing, the new economy is based on services designed to handle ever-growing information flows.[3]

[3] For surveys on the new economy, see, e.g., Peet 2000 and Long 2000.

The analytical,and policy-relevant, question raised is the role of specific sectors in economic growth. Two approaches are used to explain economic growth. One approach sees the economy's output (goods and services) as determined by factors of production (labor, physical capital,machines, factories),and technology (the know-how of putting the two together to produce output). This approach does not distinguish between economic sectors. Formalized mathematically by Solow (1957) and others, it is argued that national income growth requires technological progress broadly, across a whole economy. More recent studies attribute technological progress to the desire to maximize profits and the accumulation of human capital (knowledge, experience, education).[4]

[4] For a review of this view, see, e.g., Barro and Sala-i-Martin 1995.

According to a second approach,associated with Schumpeter (1961),economic growth is caused by growth in certain economic sectors that, at various times, drives growth in labor productivity (output per unit of labor). Schumpeter observes an empirical regularity, first noted by the Soviet economist Nikolai Kondratieff in the 1920s. There are "long waves" of growth in time series of wages, prices, and production output of major countries (e.g.,the United States),each lasting around 50 years. The rate of economic growth first rises and then declines, only to rise again later.[5]

[5] For a review, see, e.g.,Modelski and Thompson 1996 and Valery 1999.

Schumpeter argues that long waves of economic growth are caused by radical innovations in leading sectors. Going back to the late 18th century (some studies go back further, e.g.,see Modelski and Thompson 1996),he identifies waterpower, textiles, and iron as the drivers of the wave from the 1780s to the 1840s. The next wave, from the 1840s to 1900, was driven by steam, railroads, and steel. Electricity, chemicals, and internal combustion engines drove the wave from 1900 to the 1950s. Petrochemicals, electronics, and aviation drove the wave from the 1950s to the early 1990s. The current wave presumably is driven by the new economy. It, then,is not

unique;similar to the old economy, economic growth in the new economy is driven by radical technological innovations.

Two geographical aspects are said to further distinguish the new economy from the old economy. One aspect involves globalization.In broad terms, globalization implies that the world becomes a single economic unit, with free trade, labor and physical capital mobility, and financial capital mobility. The new economy reduces the cost of doing global business. Using IT, firms can more easily monitor and manage a global production and supply network,locating activities in places that entail the lowest cost and highest labor productivity. Again,this is not unique to the new economy; some previous leading sectors (e.g.,steam power, railroads, aircraft) had similar effects on the structure and extent of global business.

Another geographical aspect of the new economy involves regional concentration of high-tech sectors.In general,the geographical concentration of sectoral business is the result of firms seeking proximity with others that engage in a similar economic activity, leading to increasing returns to scale due to such factors as shared supplier networks and labor force, and technology and knowledge spillovers. Geographical concentration,or clusters, of sectoral business can become a source of competitive advantage (Porter 1996;Krugman 1997).However, again,such sectoral concentrations also occurred in the old economy (e.g.,pharmaceutical industry in Indianapolis;car industry in Detroit).

In sum,the new economy is said to promote economic growth at the regional, national,and international levels. Taking a broader perspective, however, the new economy may not be that different from the old economy. In fact, there is a lively debate on its importance, focused on the effect of computer-based technology on labor productivity.

The growth of labor productivity over time is the best empirical predictor of growth in the standard of living over time (Krugman 1996).As each laborer produces more output in a given time period, his or her income rises, in turn raising the overall standard of living. Labor productivity rises due to two economic forces:the accumulation of physical capital,which assists laborers to produce more output in a given period of time, and technological progress, which provides laborers with better machines and production and management techniques.Empirically, technological progress across the whole economy explains the largest share of the growth in the standard of living over time (Nicholson 1999).

More than a decade ago, Solow (1987) pointed out an apparent paradox—the computer age is apparent everywhere but in the productivity statistics. There have been several reactions to this statement.Some scholars argue the current

productivity statistics are not well equipped to measure the effects of the new economy on labor productivity, and that the new economy payoffs (similar to those of previous leading sectors) require time to emerge. Other studies argue that information technology pales in importance relative to past leading sectors, and that substantial activity created by computers has zero or even negative impact on labor productivity.[6]

Gordon (2000) argues that growth in labor productivity has been concentrated in the computer industry, which makes up less than five percent of the overall economic activity. In the rest of the economy, if one compensates for the temporary effects of recessions and economic booms, growth in labor productivity has been either unchanged or lower than in earlier periods. Jorgenson and Stiroh (2000) argue that the new economy has accelerated the growth of productivity in some, but not all, non-computer-related sectors. But, they also argue that the 1990s productivity growth in sectors most dependent on computers (e.g., banking, insurance) has lagged relative to earlier periods.

Still, the new economy changes the way business is done (e.g., e-commerce, e-finance, B2B). Those states that fail to recognize these changes may see their market shares decline because their business sector simply cannot communicate efficiently with the business sectors in other states.

[6] For a review of this debate, see, e.g., Woodall 1996 and Gordon 1998.

Table 1:Indiana New Economy Index in the Late 1990s

Indicator	Rank	Score	U.S. Average
Overall	37	41.0	48.1
Knowledge Jobs	43	4.1	6.0
Share of office jobs in workforce	34	16.7%	19.6%
Share of managerial/professional/tech jobs	36	22.3%	24.9%
Weighted measure of workforce education	42	48.5	58.5
Globalization	19	6.4	6.0
Share of export in manufacturing	23	17.8%	18.1%
Share of labor employed by foreign firms	15	4.2%	3.9%
Economic Dynamism	34	5	6.0
Share of high growth firms' jobs in workforce	26	13.8%	14.3%
Share of startup failure out of all companies	32	2.2%	2.7%
Share of initial public offerings in GSP	30	0.2%	0.4%
Digital Economy Transformation	28	5.4	6.0
Share of on-line population	41	26%	31%
Number of commercial Internet domains per firm	31	0.2	0.3
Weighted measure of technology in schools	23	1.9	2.0
Weighted measure of technology in governments	16	67.1	60.4
Innovation Capacity	29	4.7	6.0
Share of high-tech jobs in workforce	33	2.7%	4.5%
Share of scientists and engineers in workforce	43	0.3%	0.4%
Number of patents per 1,000 workers	24	0.4	0.5
Share of private sector R&D investment in GSP	12	1.8%	1.8%
Share of venture capital in GSP	33	0.0%	0.2%

Notes: Score denotes the score of Indiana.U.S. Average denotes the U.S. average score across the 50 states. Rank is out of 50.
Score and U.S. Average are rounded figures.

THE NEW ECONOMY LAGS IN INDIANA

R.D. Atkinson,R.H. Court, and J.M. Ward (1999) from the Progressive Policy Institute rank the performance of the 50 states in the late 1990s in 17 new-economy categories, which can be presented in five groups:[7]

1.Knowledge jobs measures the share of office jobs in the state's workforce, the share of jobs held by managers, professionals, and technicians in the workforce, and the overall (weighted) level of labor education.

2.Globalization measures the share of export in manufacturing and the share of the state's workforce employed by foreign firms located in the state.

3. Economic dynamism measures the share of jobs in fast-growing firms (with sales growth of at least 20 percent) in the workforce, the combined share of new start-ups and existing business failures out of all companies (job churning), and the share of initial public stock offerings in Gross State Product (GSP).

4.Digital economy transformation measures the percentage of adults with Internet access in the state, the number of dot.com Internet domains per firm,the use of technology in schools, and the use of technology in government offices.

5.Innovation capacity measures the share of high-tech jobs, scientists and engineers in the workforce, the number of patents issued per 1,000 workers, the share of research and development (R&D) investments in GSP, and the share of venture capital (investments in new and unproven technologies) in GSP.[8]

Table 1 presents the ranking of Indiana in these categories.Out of the 50 states, Indiana ranks 37th overall in the United States.By category, Indiana ranks 43rd in knowledge, 19th in globalization,34th in economic dynamism,28th in digital economy, and 29th in technological innovation capacity. In knowledge jobs, economic dynamism,digital economy, and technological innovation capacity, the state's score is below the U.S. average;in globalization,it is above the U.S. average.

Among the components of knowledge jobs, Indiana's ranking is lowest in weighted workforce education (ranked 42nd in the United States),which is an index combining the number of graduate degrees, bachelor's degrees, associate's degrees, and individuals with some college education.Among the components of globalization,the share of Indiana's workforce employed by foreign companies located in Indiana is above the U.S. average (ranked 15th in the United States). The export share of manufacturing is substantial (17.8 percent),but is below the U.S. average (18.1 percent).In economic dynamism,the state is below the U.S. average in all components.In digital economy transformation,the state is below the U.S. average in percentage of online population,number of Internet domain names per firm, and use of technology in schools, and above the U.S. average in governmental use

[7] The data come from many sources, including the National School Board Association,Institute for Public Policy and Business Research, Center for Strategic and International Studies, Bureau of Economic Analysis, American Electronic Association, Bureau of Labor Statistics, and Patent and Trademark Office.

[8] The weighted measure of education combines the shares of high school graduates with no college degree, college degrees, and graduate degrees. The weighted measure of technology in schools combines the shares of classrooms wired for the Internet, teachers with technology training, and schools with more than half of teachers having school-based e-mail accounts. The weighted measure of technology in government offices is based on the use of IT.

of technology. In innovation capacity, the state is below the U.S. average in shares of high-tech jobs and scientists and engineers in the workforce, number of patents per 1,000 workers, and share of venture capital in GSP, while its share of research and development in GSP equals the U.S. average.

The state of Indiana,then,is weakest in the categories of knowledge jobs and innovation capacity. Its performances in the categories of economic dynamism and digital economy transformation are better, but still below the U.S. average. In the digital economy transformation category, the government sector is doing considerably better than the overall population and the private sector. In the globalization category, the state performs above the U.S. average.[9]

Next, consider the extent of geographical concentration of high-tech sectors in Indiana's metropolitan regions. Sectoral regional concentrations, in particular, when they are higher than the U.S. average, are understood to be an indication of a region's comparative advantage. De Vole and Wong (1999) from the Milken Institute measure the concentration of 14 high-tech sectors in 1998 for 315 metropolitan areas in the United States, including both new and old economy sectors:

- medical drugs (pharmaceutical industry)
- computers and office equipment
- wireless communication equipment and software
- electronic components and accessories
- aircraft and parts
- guided missiles and space vehicles
- search and navigation equipment
- measuring and control devices
- medical instruments and supplies
- telephone communication services
- computer hardware and data processing software
- motion picture production equipment and activity
- engineering and architectural services
- scientific research and testing services.[10]

For each sector in each metropolitan area,a location quotient is computed as follows. First, the share of the regional sectoral real output in the regional total real output is computed. The share of the U.S.sectoral real output in the U.S. total real output is then computed. Finally, the regional share is divided by the national share. A higher quotient for a region indicates more sectoral concentration in that region.

[9] Having a large share of the local workforce employed by foreign companies may have negative effects, as it implies smaller local control of the domestic workforce. This issue is debated in the literature. To the extent that having a large share of the local workforce employed by foreign companies has negative effects, the higher than average performance of Indiana's economy in the globalization category may be problematic.

[10] De Vole and Wong's (1999) data come from the Bureau of Labor Statistics, Bureau of Economic Analysis and Regional Financial Associates. The resulting large data set was put together by the Milken Institute.

Table 2 measures the geographical concentration of high-tech sectors in the Indiana metropolitan areas. The total high-tech output category was computed for a list of the 50 most concentrated metropolitan areas in the United States (according to their location quotients), the total manufacturing and services high-tech output categories were computed for a list of the 25 most concentrated areas, and the sectoral high-tech output categories were computed for a list of the 10 most concentrated areas in the United States. For each category, the real output, the

Table 2:High-Tech Geographical Concentrations in Indiana in 1998
Panel A: Sectoral High-Tech

Category	Metro Area	Real Output 1992 $billions	Rank	Quotient	Employees	Percent of U.S. Real Output
Total High-Tech	South Bend	1.2	16	2.0	5,560	0.2
	Indianapolis	5.8	45	1.3	43,800	0.8
	Elkhart-Goshen	1.4	49	1.3	4,840	0.1
Manufacturing	South Bend	4.3	11	4.3	2,920	0.4
	Elkhart-Goshen	0.7	22	2.9	4,130	0.3
Medical Drugs	Elkhart-Goshen	0.6	4	18	1,570	1.5
	Lafayette	0.2	7	10.3	1,730	0.6
	Indianapolis	2.1	8	8.1	9,170	5.3
Aircraft and Parts	Indianapolis	1.8	7	1.7	4,860	5.9
Missiles and Space	Terre Haute	0.0	7	6.4	240	0.3
Measuring and Control	Lafayette	0.1	6	16.7	1,380	1.0

Panel B:High-Tech Composites

Type	Metro Area	Composite	Rank
Total High-Tech	Indianapolis	1.1	29
Relative Growth	Indianapolis	1.4	36

Notes: Metro denotes metropolitan. Rank is out of 50 states. Quotient denotes the location quotient of that category. Employees denotes the number of employees. Percent of U.S. Real Output denotes the percentage of real output in a category out of the U.S. real output of that category. The numbers are rounded.

U.S. rank according to the location quotient, the size of the labor force, and the share of the area's real output out of the U.S. real output (of that category) also are presented.

The highest overall high-tech concentration in Indiana is in the metropolitan area of South Bend (ranked 16th in the United States), followed by the metropolitan areas of Indianapolis (ranked 45th) and Elkhart-Goshen (ranked 49th). High-tech manufacturing is concentrated in South Bend (ranked 11th in the United States) and Elkhart-Goshen (ranked 22nd). The state also has industry concentrations in the medical drugs sector (Elkhart-Goshen—ranked 4th in the United States, Lafayette—ranked 7th, and Indianapolis—ranked 8th), aircraft & parts (Indianapolis—ranked 7th), missiles and space (Terre Haute—ranked 7th) and measuring and control (Lafayette—ranked 6th). Indiana's economic activity in the other 10 high-tech sectors (out of those 14) is not agglomerated enough to make it onto this list.

A location quotient larger than 1 indicates that, on average, a particular activity is more concentrated in that location than in the entire United States. While this is interesting to know, the extent of activity in that location actually could be relatively small. For example, the location quotient of the missiles and space sector in Terre Haute is 6.4 (i.e., this industry is 6.4 times more concentrated in Terre Haute than in the entire United States on average). However, the extent of economic activity in the missiles and space sector in Terre Haute is relatively small, employing 240 people and producing real output of $10 million per year. In fact, except for Indianapolis, the extent of economic activity in each of Indiana's metropolitan areas is relatively small.

One way to combine data on sectoral regional concentration with data on the economic size of the particular sector is to compute the following two composite indices: (1) real output times location quotient; and (2) real growth times location quotient, which are presented in Panel B of Table 2. In terms of these indices, only the Indianapolis metropolitan area is among the top 50 most concentrated and economically large high-tech centers of the country. In terms of the composite output index, Indianapolis is ranked 29th in the United States, and in terms of the composite real growth rate index, it is ranked 36th.

The concentration analysis reveals that Indiana is economically stronger in high-tech sectors related to manufacturing—or the old economy—than in high-tech sectors related to the new economy (e.g., computers, data processing, IT). It also is apparent that the geographical concentration of new economy sectors in Indiana is lower than the U.S. average. Dividing the state into three loosely-defined regions, most of the high-tech concentration occurring in Indiana is in the middle part of the state, with northern Indiana second. Southern Indiana has the least amount of high-tech concentration in the state.

THE CASE AGAINST NEW ECONOMY INDUSTRIAL POLICY

Indiana's new economy is relatively underdeveloped compared with the national average. In most categories there is ample room for improvement, assuming the goal is to excel in the new economy. It is well documented that states excelling in the new economy generally have a higher income per capita than that of Indiana. It also is evident that in the 1980s and 1990s, Indiana's overall labor productivity (as measured by gross state product per worker) and average real wage per job have been considerably lower than the U.S. averages, respectively (Break Away Growth Statistics, 1999).[11] Naturally, this raises the question of what should be the response of the state government through its economic development policy. There are basically two approaches to economic development policy. One approach advocates that government should promote specific industries and firms using industrial policies. A second approach advocates that government should not micro-manage the market, but rather promote infrastructure development and an overall healthy business climate.

[11] The labor productivity and wage per job data reported in Break Away Growth Statistics (1999) come from the Bureau of Economic Analysis.

The goal of industrial policy is to stimulate specific industries and/or companies by providing them with government subsidies, tax incentives, and easy loans. This approach is most associated with the newly industrialized countries (e.g., South Korea, Taiwan, Singapore, Hong Kong, Brazil), as well as Japan. Supporters of industrial policy argue that economic growth of certain high-tech or manufacturing sectors and companies can stimulate the growth of the macro economy. Since the development of such sectors and companies (so-called, winning sectors and national champions, respectively) may require large investments and could be risky, it is argued that government should stimulate their development.[12]

[12] For a review of these views, see, e.g., Salvatore 1998.

Industrial policy is in place in several U.S. states. For example, Ohio attempts to attract large manufacturing firms, spending about one billion dollars a year on various incentives, or 2.6 percent of the state's budget (Iannone 1999). The New Enterprise Creation Act (1999) of Missouri authorizes state funds to support new economy companies. Michigan uses various industrial policies to assist business (Economic Development: State Financial Incentives, 1998). Not surprisingly, industrial policy typically is favored by private business. For example, the Indiana Chamber of Commerce wants to attract high-tech firms to the state by creating a tax structure that encourages business, and by expanding state-business cooperation (Smith 2000).

There are arguments suggesting that Indiana's government should not use industrial policy to promote its new economy. First, when all the U.S. states use industrial policy to promote targeted industries, their efforts may simply negate

each other. There also is the issue of other states' retaliations. For example, luring companies to relocate into one state comes at the expense of others. The losing states may become more aggressive in future competitions, increasing the assistance to remaining firms. The situation among U.S. states is not different from the one between countries (e.g., in which the United States assists Boeing, and the European Union assists Airbus, each seeking domination of the aircraft manufacturing industry). Such competitions are wasteful.

Second, the experiences of many countries, including the United States, show that industrial policy gives rise to excessive private sector lobbying and interest group activity, as companies compete for privileges. These actions are wasteful from a societal point of view, and can lead to political corruption.

Third, the use of industrial policy assumes that governments can identify "winning" companies and technologies. The difficulty of doing so, and the risk of promoting losers, is a known problem of industrial policy (e.g., see *The Economis*t, 1994). This problem is compounded in the new economy, with its risky and dynamic business conditions. Many new economy firms currently are not profitable, and whether or not they will be profitable in the future is not clear. For a while, there was a frenzy in financial markets, and many Internet firms were traded at very high prices, regardless of their cash flow fundamentals, on the expectation that they will deliver profits in the future. Today, financial markets are coming to realize that many new economy firms will never be profitable, which resulted in those companies losing considerable market value. *The Economist* (2000b) whimsically described this transformation as one "from dot.com to dot.bomb." Large investment houses find it hard to identify new economy companies that will be successful. There is no reason to believe that U.S. state governments, with their smaller staffs and less funding, will do better. Furthermore, while investment houses use the money of relatively informed private investors who are willing to risk their money, the public is generally less informed and more risk averse than private investors. In practice, governments also cannot consult the public on the allocation of industrial policy funds.

Finally, the benefits from the new economy in terms of improving overall labor productivity are unclear. Consequently, it is not clear that the promotion of the new economy will stimulate large labor productivity benefits in other sectors. One also needs to consider the old economy, which is particularly important in Indiana, where the share of manufacturing in GSP is the highest in the nation.[13] The new economy is basically a service to the old economy. In fact, in the new economy, the old economy actually could become more important. Suppose that all U.S. states except Indiana

[13] In 1997, the share of manufacturing in Indiana's GSP was 32 percent; in services, 15 percent; in finance, insurance and real estate, 13 percent; and in retail, 9 percent (NE-MW Economic Data, 2000).

had only new economy sectors. Indiana then would be able to extract monopoly profits from others. The new economy does not replace the old economy. Of course, new economy methods that improve the efficiency of the old economy should be adopted. However, one typically consumes more than just software packages and Internet surfing.

In light of the above, it is not surprising that nations that used industrial policy intensively in the past, do not intend to do so in the future. The case of Singapore provides one example to that effect (*The Business Times*, 2000). The Japanese ministry of international trade and industry (MITI) also admits that its extensive industrial policy efforts were largely unproductive and should be abandoned (Valery 1999).

GOVERNMENT HAS A ROLE IN THE NEW ECONOMY

The previous section argued against using industrial policy in the new economy. This does not mean to say that government has no role in the new economy. In general, government should promote social, legal, and physical infrastructures conducive to the smooth operation of the market. How to implement this approach is explored next, with the goal of suggesting an agenda for a policy-making discussion.

Human Capital

Human capital is important to both the new and the old economy. Indiana's knowledge jobs scores are below the U.S. average. This implies the need for policies to ensure that the state will have the skilled workforce required for future economic growth. Indiana's relatively low knowledge jobs scores reflect its relatively less-educated workforce. These scores cannot be raised overnight. Many approaches to improving education are already being debated in Indiana. To prosper in the future, educational competencies of the state labor force must be increased. The performance of schools must be increased, educated Hoosiers retained in the state, and skilled workers from elsewhere attracted to the state.

Infrastructure

Promoting the development of infrastructure is an important role of governments. The U.S. government–promoted interstate highway system, for example, has stimulated national economic growth since the 1930s. The new economy clearly changes how we do business and communicate. If Indiana does not have a well-developed telecommunication infrastructure, its ability to do business with others will decline. As noted, Indiana's scores in terms of on-line population and use of the Internet by firms are below the U.S. average. Obviously, states that are less linked to the Internet participate less in the new economy and are less likely to be attractive to new economy firms. Indiana's government can accelerate the state's transition into the digital age. For example, it could promote the development of telecommunication infrastructure by providing tax credits or easy loans to private investors, public organizations, and individuals, as well as by co-investing with private business in infrastructure development.

Digital Government

The development of new economy infrastructure is complicated and expensive. The state government could lead the transformation, moving to provide its services on the Internet. This process seems to follow four stages (Symonds 2000). In stage one,

governments use the World Wide Web to provide information to the public. In stage two, the Web is used for two-way government-public communication, where citizens provide some information to government offices. In stage three, the provision of government services moves to the Web (e.g., issuance of driving license, payment of fines). In stage four, one Web portal integrates all government on-line services, providing a full two-way communication with the public. The large scope projects involved with the establishment of on-line government services also entail a potentially important beneficial side product; they may further stimulate the state's economy, creating positive spillovers into other sectors.[14]

Promoting Innovation

Providing government services to the public on the Internet is one example of technological innovation. Indiana's innovation score is lower than the U.S. average score. Innovation is risky and requires commitment. Indiana government could promote innovation in several ways. For example, it could financially support research and development in universities and research institutions, encouraging interaction with private firms.[15] Research and development should be promoted regardless of type (e.g., by using tax credits for research and development in all sectors). To stimulate capital ventures, government could ease taxes on capital gains and assist in the commercialization of innovations. Government also could provide firms with information on relevant technologies. To further reduce risk from innovation, the state could co-invest with the private sector in setting up business incubators for young firms, providing them services such as office space, technology infrastructure and business support services (e.g., lawyers, marketing) at reduced prices. While Indiana currently does not have comparative advantage in new economy sectors, innovation also could be based on old economy high-tech sectors, in which Indiana has comparative advantage (e.g., medical drugs, aircraft, and missiles). Establishing a common legal framework for specific high-tech sectors across states can further reduce transaction costs and promote economic growth. Technological innovation generally requires minimization of government regulation and red tape. Obviously, market failures (e.g., antitrust activity, monopolies, environmental externalities) still require government regulation in the new economy.

Globalization and Geographical Concentration

Indiana's export performance is one of its stronger economic attributes and should be promoted, regardless of its type. The state government also could stimulate Foreign Direct Investment (FDI) in Indiana, which also is a relatively strong attribute

[14] Stages one through three are already under way in Indiana as well as in some other states (e.g., Arizona, see Symonds 2000). For example, Indiana provides agency and government information, citizen and business contacts, and forms on the Internet (www.ai.org). Nearly all of these services are free, but some "premium services" require a subscription. Indiana also provides some stage three services, including electronic state tax filing, license plate renewal, rental housing tax credit compliance forms for landlords, and adoption interest forms.

[15] Purdue University and Indiana University have some programs to support research and development. For example, Indiana University has the Advanced Research and Technology Institute (ARTI) and Purdue supports the Purdue Research Park, Purdue Gateways Program, and Purdue Technology Center.

of the state's economy. Promotion of FDI should be done carefully, however, to prevent situations in which foreign firms quickly shift their places of business to other countries as they see fit. This may not be easy to implement, as overly restrictive legal contracts could prevent FDI altogether. As is true of industrial policy, however, government efforts to promote geographical concentration of business from scratch may fail. The state government could stimulate existing geographical concentrations of business, for example, by promoting regional research institutes to become a magnet for attracting more firms in their respective areas. For example, Lafayette is becoming a center of measurement and control and pharmaceutical industries and Terre Haute is becoming a center in space technology. Building research institutes in these locations, specializing in these sectors, respectively, likely is to attract more firms to the area,further promoting business geographical concentration and economic growth.

Business and Natural Environments

Finally, Indiana's overall business and natural environments also are important. A high quality of life includes such things as recreational areas, good air quality, high-quality schools and libraries, shopping areas, good roads, and high-quality hospitals. These are important magnets for employees in the high-tech industries. While proximity to raw materials and markets still is important in the new economy, high-tech industries generally are less restricted in that respect. The most important asset of high-tech firms obviously is their employees. This relatively higher-paid and better-educated labor force likely is to prefer well-developed communities, all other things being equal.Similar arguments apply to the business environment in the state, and whether the state government is fiscally sound and provides many services to the public.States with heavy regulation of markets, excessive red tape, and high property, inventory, and income taxes, probably also will be deemed less attractive for high-tech firms, all other things being equal.

CONCLUDING REMARKS

This report does not recommend that Indiana's government take specific actions regarding specific industries to spur growth in the new economy. The relatively hands-off approach of Indiana's state government has been quite successful in the past. However, beginning in the early 1980s the standard of living in the state has begun to fall below the U.S. average. The transition to the new economy provides an opportunity for the state to close this gap. While the eventual economic outcomes depend on the actions of many, whether or not Indiana will prosper in the new economy no doubt depends in large part on the policies of the state government. Instead of seeking specific, new high-tech industries and companies, state policy makers should focus on improving the fundamentals of workforce skills, infrastructure, and quality of life critical to success of all firms.

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