A New Path to Prosperity?

Manufacturing and Knowledge-Based Industries As Drivers of Economic Growth

Second Edition

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A Catalyst for Prosperity

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Introduction

In 2004, Michigan Future, Inc., published A New Path to Prosperity? Manufacturing and Knowledge-Based Industries As Drivers of Economic Growth. The report was a paradigm-altering analysis of what matters most for state and regional prosperity. The report found that a relatively high presence of manufacturing activity no longer determined which states were prosperous. Instead, we found that states that were over-concentrated in knowledge-based industries – those that employ a disproportionately large share of workers with at least a bachelor's degree – were leading the way to prosperity in the 21st century.

The report also included a paradigm-altering description of what mattered to states achieving an over-concentration in knowledge-based industries. The report detailed that states with a high concentration of 25 to 34-year-olds with a bachelor's degree or more is a core characteristic of states with high-prosperity, knowledge-economy concentrated jobs.

In summarizing our findings, we wrote:

Taken together, these patterns strongly suggest that being concentrated in high-pay knowledge-based industries, rather than manufacturing, is now the most reliable pathway to prosperity for states.

The evidence in this report strongly suggests that knowledge-based industries and young professionals will be the most important drivers of future economic growth. Communities with high concentrations of both are quite likely to be more prosperous. It seems that the best use of policy makers' time and attention with respect to the economy might come from developing a new agenda on how best to grow a knowledge-based economy in Michigan.

In 2004 the report's conclusions were highly controversial. So much so that it is the only report in Michigan Future's three decades history that did not include a listing of our board members. Many of them did not want their names associated with a report that made the case that manufacturing was no longer the key driver for Michigan's economic prosperity.

We are re-releasing our 2004 report not to take credit for getting it right, but rather because its analysis and conclusions are as relevant today as they were two decades ago. Other than updating the data we would essentially write the same report today, but with more emphasis placed on wages paid in knowledge economy industries, not just the number or share of jobs in those industries. We would also note that Michigan needs to increase the labor force participation rate and to attract and retain more wealthy residents with high capital income.

By 2004 it was clear to us that manufacturing was a declining share of state and national employment and that the wage premium Michigan manufacturing workers had compared to the nation was not sustainable. We found that manufacturing — although still an important and valuable component of the Michigan labor market — was no longer a driver of growth or prosperity. We predicted that if Michigan did not become more concentrated in knowledge-based industries and retaining and growing our share of young professionals, Michigan would become a low-prosperity state. **That is exactly what has happened, as Michigan is now ranked 39th in personal income per capita among the 50 states.**

Most alarming is that if each state's personal income per capita grew over the next 23 years at the same rate as between 1999 and 2022, Michigan would end up as the 48th poorest state in the country by 2045, just above Alabama and Mississippi. Even if every state's income per capita grew at the same rate as it did between 2012 and 2022 – a relatively good decade for Michigan – Michigan would rank 34th in 2045, which is where we ranked in 2019. Michigan needs to change if it wants to be a relatively prosperous state again.

To understand the reasons for Michigan's steep per capita income decline compared to the nation during the period of 1999 to 2022, we deconstruct the components of personal income per capita into several key categories.

In the below table, personal income per capita is divided into three major categories:

1. Capital income which includes interest, dividends, and rent;
2. Transfer payment income which includes Social Security and Medicare and Medicaid as well as income support payments; and
3. Earnings which include all income from work and employer paid benefits.

Personal income is a residence-based measure net of social insurance taxes while earnings by industry is based upon the location of the business establishment. Thus, in the table, we must distinguish between net earnings per capita and gross earnings per capita.

We divide gross work earnings per capita into five industry groups:

1. High-wage private sector knowledge economy industries;
2. Motor vehicles and body parts, machinery, and fabricated metals manufacturing;
3. Other low-education attainment manufacturing;
4. Other private sector industries; and
5. Government.

The data for the U.S. and Michigan for 1999, converted into 2022 dollars using the U.S. personal consumption expenditure deflator, and 2022 are shown in the table.

Earnings by Residence and Place of Work

	United States	United States	Michigan	Michigan
	1999 in 2022$	2022$	1999 in 2022$	2022$
Personal Income Per Capita by place of residence	46,081	65,470	45,943	57,038
Capital income (dividend, interest, and rent)	8,733	12,917	7,834	10,479
Transfer payment income	5,927	12,008	6,151	12,293
Net earnings by place of residence	31,421	40,545	31,958	34,266
Residence adjustment & social insurance taxes	-3,800	-5,085	-3,998	-4,299
Gross earnings by place of work	35,221	45,630	35,956	38,565
High-wage high-educational attainment industries	8,778	12,633	7,435	8,750
High-wage high-educational attainment service industries	7,379	11,365	6,742	8,024
High-wage high-educational attainment manufacturing industries	1,399	1,268	694	727
Motor vehicle & parts, machinery, fabricated metal	1,324	970	5,573	3,028
Other low-educational attainment manufacturing industries	2,307	1,770	2,422	2,133
Other private non-manufacturing industries	17,216	23,561	15,757	19,826
Government	5,597	6,696	4,768	4,828
Estimated net earnings by industry, residence based				
High-wage high-educational attainment industries	7,830	11,225	6,609	7,775
High-wage high-educational attainment service industries	6,583	10,098	5,992	7,129
High-wage high-educational attainment manufacturing industries	1,248	1,127	616	646
Motor vehicle & parts, machinery, fabricated metal	1,181	862	4,953	2,690
Other low-educational attainment manufacturing industries	2,058	1,573	2,153	1,896
Other private non-manufacturing industries	15,359	20,935	14,005	17,616
Government	4,993	5,950	4,238	4,290

The high-wage private sector knowledge economy industries include three manufacturing industries: chemicals, computers, and other transportation equipment (mostly aerospace). Like information, finance and insurance, professional and technical services, and company management, these manufacturing industries are characterized both by high wages and a relatively high proportion of workers with at least a bachelor's degree. Note that motor vehicle and parts manufacturing doesn't meet either of these requirements.

The three high-wage, high-educational attainment manufacturing industries accounted for 2.7 million of the 25.6 million private high-wage, high-educational attainment industry jobs in the United States in 2022.

Before we explore the data, we should define what we mean by manufacturing. Manufacturing refers specifically to work done in factories. Most workers in management and pre- and post-production occupations for firms that build things are not physically located in factories and thus are not considered as part of manufacturing. They are mostly now accounted for in the knowledge-based service industries, primarily in management of companies and professional and technical services.

Michigan's per capita income in 2022 was 13 percent below the national average, the lowest Michigan has been compared to the nation since the data was first compiled in 1929. Michigan ranked 39th among the 50 states. Michigan is now structurally one of the nation's poorest states.

This is the opposite of where Michigan was in the 20th Century when the state was structurally a relatively high prosperity state. In 1999, Michigan ranked 16th in per capita income, slightly below the national average.

Between 1999 and 2022, real personal income per capita grew by $19,389 in the U.S. and by $11,095 in Michigan. Earnings per capita by place of residence, net of social insurance taxes grew by $9,124 in the U.S., but only $2,308 in Michigan between 1999 and 2022. The difference ($6,816) in growth in earnings per capita ($9,124 minus $2,308) accounts for 82 percent of the short fall in the growth in real personal income per capita in Michigan compared to the U.S.

Real transfer payment income per capita grew faster in Michigan than in the country over this period ($6,143 compared to $6,081, which narrowed the short fall in real personal income per capita growth by $62 or about 1 percent)[1]. Capital income per capita grew slower in Michigan than the U.S. between 1999 and 2022 ($2,645 compared to $4,183). This difference of $1,539 accounts for about 19 percent ($1,539/$8,294) of the gap in income growth between Michigan and the U.S.

Thus, the relatively weak growth in employment-based earnings in Michigan accounts for most of the growing gap between Michigan and the U.S. in personal income per capita.

The typical story told to explain Michigan's relative economic decline between 1999 and 2022 is that the weakness reflects the collapse of the motor vehicle manufacturing industry and related industries. While it is true that earnings per capita in motor vehicle manufacturing and related industries did collapse between 1999 and 2022, this was not the largest contributing factor to the shortfall in earnings per capita growth in Michigan.

[1] Transfer payments accounted for 31 percent of all personal income growth in the U.S. and 55 percent of all personal income growth in Michigan between 1999 and 2022, but the very scary implications of this growth for the country as well as the state is a problem for another paper.

Earnings in motor vehicle and parts, machinery, and fabricated metals manufacturing declined from 15.5 percent of all earnings in Michigan in 1999 to 7.9 percent of earnings in 2022. In the U.S., the industry earnings share fell from 3.8 percent in 1999 to 2.1 percent in 2022. On a per capita basis in Michigan, real earnings fell 46 percent from $5,573 in 1999 to $3,028 in 2022, or $2,545 per person. In the U.S., per capita earnings in these industries also fell sharply by 27 percent, but the dollar decline was much smaller $354 ($1,324 - $970). The difference in the decline in earnings in this group of industries accounts for $2,191 of the gap in gross earnings per capita growth between Michigan and the U.S.

To compare the gap in industry earnings per capita to the loss of personal income per capita, we had to convert gross earnings by industry on an establishment basis to net earnings by industry on a residence basis by reducing gross industry earnings by social insurance taxes and the residence adjustment on an equal proportional basis. After this calculation the difference in the decline in earnings in motor vehicle, machinery, and fabricated metals manufacturing accounted for $1,944 of the gap in net earnings and personal income growth between Michigan and the U.S. This difference accounts for 23 percent ($1,944/$8,294) of the gap in growth in personal income per capita between Michigan and the U.S. from 1999 to 2022.

Earnings in the high-wage high-educational attainment knowledge economy industries grew from 20.7 percent of all earnings in Michigan in 1999 to 22.7 percent of earnings in 2022. In the U.S., these industries earnings share grew from 24.9 percent in 1999 to 27.7 percent in 2022. On a per capita basis in Michigan, real earnings increased 18 percent ($7,435 to $8,750) or $1,315 per person. In the U.S., per capita earnings in these industries increased by 44 percent. In dollar terms, this was a real increase of $3,856. The difference in the growth in earnings in this group of industries accounts for $2,541 of the gap in gross earnings per capita growth between Michigan and the U.S.

Converting gross earnings by industry into net earnings by industry, the difference in the growth in earnings in high-wage high education attainment industries accounted for $2,379 of the gap in net earnings and personal income growth between Michigan and the U.S. This difference accounts for 29 percent ($2,379/$8,294) of the gap in growth in personal income per capita between Michigan and the U.S. from 1999 to 2022.

So, the relatively slow growth in earnings in the high-wage, high-education attainment industries explain a larger share of Michigan's relatively poor growth in personal income per capita between 1999 and 2022 than the decline in earnings in motor vehicles, machinery, and fabricated metals manufacturing (29 percent compared to 23 percent). Relatively poor growth in capital income per capita accounts for an additional 19 percent of the gap, and weak growth in government earnings explains another 11 percent of the gap.

Even if Michigan's motor vehicle and related manufacturing industries had not suffered such a drastic decline as that which occurred between 1999 and 2022, Michigan would have still become a much poorer state relative to the rest of the country.

Work earnings are the multiplicative product of the number of people working and average earnings per worker. Earnings include employer paid benefits, proprietors' income, and wage and salary income. This year's analysis revealed that a key factor in identifying high-prosperity states is the average wage paid in the high-wage, high-educational attainment industries.

You can see this clearly by comparing Michigan and Massachusetts.

Massachusetts is the prototypical high-prosperity, knowledge economy state. In 2022, it was ranked first in personal income per capita and first in the proportion of 25 to 34-year-olds with a B.A. or more.

By contrast, Michigan was 39th in personal income per capita and 31st in the proportion of 25 to 34-year-olds with a B.A. or more.

In 2022, about 24.8 percent of Massachusetts personal income is from net residence adjusted earnings in high-wage, high-educational attainment industries and only about 2.5 percent from low-educational attainment manufacturing. In Michigan, the shares are 13.6 percent and 8.0 percent, respectively.

In 2022, private high-wage, high-educational attainment industries account for 21.2 percent of Massachusetts total payroll employment. In Michigan, they account for only 15.2 percent. Nationally, their share is 16.2 percent [2].

The gap between Michigan and the nation, and especially Massachusetts, is even greater when it comes to wages. In 2022, the average wage in the high-wage, high-educational attainment industries were $101,092 in Michigan, $128,565 in the U.S., and $165,264 in Massachusetts. Compared to Michigan, the average wage in these industries, which are critical to the economic prosperity of any state, was 27.2 percent higher in the U.S., and an astonishing 63.5 percent higher in Massachusetts.

The average real wage in the high-wage high-education attainment industries increased by 43 percent in the U.S., 53 percent in Massachusetts, but only 14 percent in Michigan between 1999 and 2022. If real wage growth in these high-wage, high-educational attainment industries in Michigan continues to lag the rest of the country, Michigan will inevitably continue to get poorer relative to the rest of the country and especially compared to states like Massachusetts.

In a Detroit News op-ed that accompanied the release of the 2004 report, subtitled State should quit protecting factory employment and attract high-pay, high-education industries, we wrote:

The public, media and policy makers in our state continue to focus too much on saving an inevitably shrinking number of factory jobs and too little on attracting and growing knowledge-based industries and in preparing, retaining and attracting young knowledge workers.

Knowledge-based industries and young knowledge workers will be the most important driver of future economic growth. Communities with high concentrations of both will become more prosperous, and communities with low concentrations will become poorer compared with their neighbors. It is time for Michigan to get to work on a new agenda—one that will hasten our transition away from the Industrial Age to an increasingly knowledge-driven and entrepreneurial economy.

The story is basically the same today. There is still not enough focus on growing high-wage, high-educational attainment jobs and increasing wages in these industries, except that Michigan is starting from an even poorer position today than it was at the beginning of this century.

[2] These wage and salary employment and average wage statistics are BEA measures, which includes Farm and Military employment to conform to the personal income statistics.

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Introduction

Michigan lost nearly 163,000 manufacturing jobs from 2000 through2003, a decline of 18 percent. This steep decline is Topic A in discussions about the future of Michigan's economy. There is a widespread concern that the lost manufacturing jobs are gone forever and, even more worrisome, that many of the more than 700,000 remaining manufacturing jobs are at risk.

Obviously, the permanent loss of a manufacturing job is a hardship for workers and their families. This is particularly true for the many former manufacturing workers who end up in lower-paying jobs for the remainder of their careers.

But the concern about manufacturing job losses goes beyond the effect on the workers and their families. Around the country, particularly in industrial states like Michigan, manufacturing employment losses are viewed with greater concern than job losses in other industries. Manufacturing, which historically has been a high-wage industry, is viewed as an irreplaceable mass pathway to the middle class. The fear is that without a robust manufacturing sector our economy will be increasingly dominated by low-wage service-providing industries. Also, there is concern that the large loss of good-paying manufacturing jobs will depress the overall economy. Manufacturing is viewed as an important engine powering the economy. In industrial states like Michigan, many view it as the most important engine.

This report is designed to explore whether these two concerns are warranted. We look at data to see if there are other industries producing lots of new middle-class jobs. We also explore whether high manufacturing concentrations are correlated with stronger state economies, and if not, what are the industries that are powering the most prosperous states?

We compare manufacturing as an engine of economic growth with what we call knowledge-based industries. These are a cluster of industries where work is largely done in offices, schools, and hospitals. The knowledge-based industries include:

- Wholesale trade
- Information
- Financial activities
- Professional and technical services
- Management of companies
- Education
- Health care and social assistance
- Government, except education

Before we explore the data, we should define what we mean by manufacturing. In our conversations about the manufacturing industry we tend to use two definitions, one related specifically to factory work, the other to those who work for a manufacturing company. For this report, manufacturing refers specifically to work done in factories, making products. This is the definition of manufacturing in the nation's new industrial classification system.

Workers in management as well as pre- and post-production occupations in such important Michigan industries as motor vehicles, office furniture, chemicals, and pharmaceuticals are no longer considered part of the manufacturing industry. They are now accounted for in the knowledge-based industries, primarily in management of companies and professional and technical services.

Workers in management as well as pre- and post-production occupations in such important Michigan industries as motor vehicles, office furniture, chemicals, and pharmaceuticals are no longer considered part of the manufacturing industry. They are now accounted for in the knowledge-based industries, primarily in management of companies and professional and technical services.

The data on employment by industry used in this report—compiled by the U.S. Department of Labor, Bureau of Labor Statistics (BLS)—utilizes the new industry definitions. Detailed description of industries are available at bls.gov (click on industries). For this report we use the BLS classifications except for education, where we combine both public and private K-16 education.

The new industrial classification system allows us to explore much more precisely the impact of the loss of good-paying factory jobs. These are the jobs that are seen by many as the backbone of a strong economy, and that seem to be most at risk, threatened by technology and trade. They are the jobs that have been identified by many as crucial to the future of Michigan's economy.

I. Employment in Michigan 1990-2003

We begin with a look at employment by industry in Michigan from 1990 through 2003. We chose this time period so as to be able to look at structural, rather than cyclical, changes in the Michigan economy. With these data we can look at how employment by industry changed in Michigan in a period that includes the boom years of the nineties as well as the subsequent downturn.

As shown in Table 1 (page 11) we have divided the economy into three industry groupings:

- high pay, low education
- middle and high pay, high education (knowledge-based industries)
- low pay, low education

Michigan added 450,000 jobs (about 11 percent) from 1990 to 2003. Most noticeable is that manufacturing is virtually the only industry that lost jobs (more than 100,000) over this period. Small gains in manufacturing during the expansion years were more than offset by large job losses during the downturn.

The greatest employment gains (about 274,000) came in the knowledge-based industries. There also were substantial gains (about 217,000) in the low-paying, low- education industries. Even in the high-paying, low-education cluster, the nonmanufacturing industries added jobs (about 63,000).

In our last report, Michigan Workers in the Boom Years: Employment and Employment Earnings 1991–2000, we identified, as one of the long term trends driving the Michigan economy, that work is increasingly centered in offices, schools, and hospitals.

This trend held true in both the expansion and downturn. Of our three groupings, knowledge-based industries employment was virtually unchanged during the downturn, while the other two suffered widespread job losses.

Table 1
Employment in Michigan by Type of industry, 1990–2003

Industry	Average Annual Pay 2002	Employment 1990	Employment 2000	Employment 2003	Change 1990–2000	Change 2000–2003	Change 1990–2003
Total all industries	$38,135	3,969,700	4,673,900	4,419,700	704,200	–254,200	450,000
High pay, low education		1,107,700	1,249,300	1,066,800	141,600	–182,500	–40,900
Manufacturing	$52,033	837,600	896,700	733,800	59,100	–162,900	–103,800
Mining	$44,398	9,700	7,600	5,900	–2,100	–1,700	–3,800
Construction	$42,951	143,100	209,600	199,400	66,500	–10,200	56,300
Transportation & utilities	$45,815	117,300	135,400	127,700	18,100	–7,700	10,400
Middle & high pay, high education		1,732,200	2,002,500	2,006,000	270,300	3,500	273,800
Wholesale trade	$51,580	159,500	186,000	173,900	26,500	–12,100	14,400
Information	$47,191	70,800	76,700	74,400	5,900	–2,300	3,600
Financial activities	$44,305	195,400	209,400	218,500	14,000	9,100	23,100
Prof. & tech. services	$60,524	201,000	276,100	254,600	75,100	–21,500	53,600
Management of companies	$77,490	59,900	70,500	67,200	10,600	–3,300	7,300
Education	$35,482	360,900	413,500	442,100	52,600	28,600	81,200
Health care & social assistance	$34,856	370,500	447,900	466,300	77,400	18,400	95,800
Gov't. except education	$39,530	314,200	322,400	309,000	8,200	–13,400	–5,200
Low pay, low education		1,129,800	1,422,400	1,346,700	292,600	–75,700	216,900
Natural resources (forestry & fishing)	$25,636	1,800	1,900	1,800	100	–100	0
Retail trade	$22,473	505,600	559,800	530,500	54,200	–29,300	24,900
Employment services	$27,130	57,300	174,700	143,800	117,400	–30,900	86,500
Other admin. support	$28,716	89,900	117,500	111,600	27,600	–5,900	21,700
Arts, entertainment & recreation	$23,647	39,300	64,000	62,300	24,700	–1,700	23,000
Accommodations & food service	$11,775	292,300	336,400	322,600	44,100	–13,800	30,300
Other services	$24,046	143,600	168,100	174,100	24,500	6,000	30,500

Source: Bureau of Labor Statistics, CES and CEW, http://stats.bls.gov/sae/home.htm, and http://stats.bls.gov/cew/home.htm, as of February 15, 2004.
Compiled by Donald Grimes, University of Michigan.

In 2003, knowledge-based industries employed slightly more than 2 million Michiganians, about 45 percent of all jobs in the state. The flip side of this long-term trend toward concentration of work in offices, schools, and hospitals is that Michigan jobs are increasingly less concentrated in factories. In 2003, manufacturing accounted for less than 17 percent of jobs in the state.

In Table 2 (page 12), we look at employment by industry over the same period for Michigan compared with the nation. The headline here is that overall employment in Michigan from 1990 to 2003 grew less than two-thirds as fast as it did in the nation. If Michigan's employment growth had been the same as the nation's, there would have been about 290,000 more Michigan workers in 2003.

Perhaps most surprising, Michigan's slower job growth was not caused by the loss of manufacturing jobs. In fact, manufacturing employment in Michigan declined at a significantly slower rate in Michigan than in the nation (–12.4 percent vs. –17.9 percent). If manufacturing employment in Michigan had declined at the same rate as it did in the nation, 45,000 more Michigan manufacturing workers would have lost their jobs by 2003.

Table 2
A Comparison of Job Growth in Michigan and the United States, by Industry Category
1990–2003

Industry	Average Annual Pay 2002		Michigan Employment		U.S. Employment		% Change 1990–2003	
	Michigan	U.S.	1990	2003	1990	2003	Mich.	U.S.
Total all industries	$38,135	$36,764	3,969,700	4,419,500	109,487,100	129,931,500	11.3	18.7
High pay, low education			1,107,700	1,066,800	27,853,700	26,505,700	–3.7	–4.8
Manufacturing	$52,033	$44,097	837,600	733,800	17,695,000	14,524,000	–12.4	–17.9
Mining	$44,398	$60,392	9,700	5,900	680,100	502,300	–39.2	–26.1
Construction	$42,951	$39,027	143,100	199,400	5,263,000	6,722,000	39.3	27.7
Transportation & utilities	$45,815	$40,772	117,300	127,700	4,215,600	4,757,400	8.9	12.9
Middle & high pay, high education			1,732,200	2,006,000	50,193,300	63,229,200	15.8	26.0
Wholesale trade	$51,580	$49,241	159,500	173,900	5,268,400	5,605,700	9.0	6.4
Information	$47,191	$56,103	70,800	74,400	2,688,000	3,198,000	5.1	19.0
Financial activities	$44,305	$55,172	195,400	218,500	6,614,000	7,974,000	11.8	20.6
Prof. & tech. services	$60,524	$58,672	201,000	254,600	4,556,700	6,624,000	26.7	45.4
Management of companies	$77,490	$69,277	59,900	67,200	1,667,400	1,675,400	12.2	0.5
Education	$35,482	$34,058	360,900	442,100	9,320,000	12,653,300	22.5	35.8
Health care & social assistance	$34,856	$34,043	370,500	466,300	9,295,800	13,887,500	25.9	49.4
Gov't. except education	$39,530	$40,887	314,200	309,000	10,783,000	11,611,300	–1.7	7.7
Low pay, low education			1,129,800	1,346,700	31,440,100	40,196,600	19.2	27.9
Natural resources (forestry & fishing)	$25,636	$30,005	1,800	1,800	84,900	68,700	0.0	–19.1
Retail trade	$22,473	$23,232	505,600	530,500	13,182,300	14,912,000	4.9	13.1
Employment services	$27,130	$22,098	57,300	143,800	1,493,700	3,335,700	151.0	123.3
Other admin. support	$28,716	$27,657	89,900	111,600	3,130,600	4,362,700	24.1	39.4
Arts, entertainment & recreation	$23,647	$26,159	39,300	62,300	1,132,000	1,801,100	58.5	59.1
Accommodations & food service	$11,775	$13,946	292,300	322,600	8,155,600	10,324,400	10.4	26.6
Other services	$24,046	$23,784	143,600	174,100	4,261,000	5,392,000	21.2	26.5

Source: Bureau of Labor Statistics. Compiled by Don Grimes, University of Michigan.

The industries where Michigan lagged the nation are inthe service sector. This is true both in the knowledge-based industries where employment grew 26 percent nationally compared with about 16 percent in Michigan, and in the low-paying, low-education cluster where employment grew nearly 28 percent nationally compared with just above 19 percent in Michigan.

The trend toward concentration of work in offices, schools, and hospitals is even more pronounced nationally than in Michigan. In 2003, 49 percent of American workers were employed in knowledge-based industries, only 11 percent in manufacturing.

This evidence should allay the widespread concern that most of the new jobs being created in Michigan—and across the country—are in the low-paying, low-education industries. As we have seen, there has been substantial employment growth in knowledge-based industries in Michigan and even more so nationally. To a lesser degree, traditional good-paying industries such as construction, transportation, and utilities continue to add jobs.

II. Drivers of State Prosperity

In this section we explore the relationship between the economic prosperity of states and their concentration in manufacturing and knowledge-based industries.

For the remainder of this report we focus on the four knowledge-based industries with the highest average annual pay nationally: information, financial activities, professional and technical services, and management of companies. These are the private sector industries that many believe are the main growth engines of the post-industrial economy. We call this cluster high-pay knowledge-based industries.

We use per capita income as our measure of economic well-being. We look at both per capita income by state in 2001 and the change in per capita income by state compared with the national average from 1969 to 2001. We include the trend data because we want to know how well states are doing as our economy makes the transition from the Industrial Age to the Information Age. We use 1969 as the base year because it is as far back as available data goes. It is also a reasonable base year for looking at the transition to a post-industrial economy.

(Per capita income is the most comprehensive and reliable estimate of income of state residents. It includes all wage, dividend, self-employment, and interest income as well as transfer payments. It also includes employer and government payments for health care and retirement. It does not include capital gains. The data are compiled by the U.S. Department of Commerce, Bureau of Economic Analysis.)

We use share of employment earnings as the measure of industry concentration. We use employment earnings, rather than employment, because we want to account for both the number of workers in an industry and how much they earn. Manufacturing, of course, is considered such a powerful engine of the economy because it both employs lots of workers and pays high wages. Share of employment earnings allows us to best measure the relative importance of an industry to the state's overall economy.

One drawback to the data is that per capita income is based on where a person lives, while employment earnings is based on where a person works. So, particularly in states where large numbers live in the state but work in another, the industry concentration statistics are not as precise as we would like.

We present the data on per capita income and share of earnings in Table 3 (page 14), grouping the states into four categories:

- Above-average per capita income in 2001, above-average growth 1969–2001
- Above-average per capita income in 2001, below-average growth 1969–2001
- Below-average per capita income in 2001, above-average growth 1969–2001
- Below-average per capita income in 2001, below-average growth 1969–2001

Table 3
Per Capita Income and Share of Earnings by State, 1969–2001

State	Per Capita Income		Share of Earnings, 2001 NAICS Basis	
	Level in 2001	Change 1969–2001 Relative to U.S.	Manufacturing	High-pay knowledge-based industries
United States	**$30,527**	**n.a.**	**13.80%**	**23.32%**
Above-average per capita income in 2001, above-average growth 1969–2001				
District of Columbia	$45,284	31.24%	0.53%	31.55%
Massachusetts	$38,945	18.06%	13.25%	32.27%
Colorado	$34,003	15.51%	9.01%	27.58%
Connecticut	$42,550	13.37%	15.15%	32.24%
Virginia	$32,328	13.25%	9.02%	27.79%
New Hampshire	$33,771	13.23%	18.66%	19.44%
New Jersey	$39,077	10.39%	11.60%	28.55%
Minnesota	$32,722	8.99%	15.82%	24.04%
Maryland	$35,355	6.43%	7.75%	22.23%
Above-average per capita income in 2001, below-average growth 1969–2001				
Washington	$32,271	–0.70%	13.20%	23.76%
New York	$35,626	–2.90%	7.53%	38.66%
Illinois	$32,782	–5.80%	14.50%	26.40%
California	$32,892	–10.32%	13.17%	26.83%
Delaware	$31,494	–11.82%	11.05%	34.48%
Alaska	$31,837	–20.03%	3.78%	12.12%
Below-average per capita income in 2001, above-average growth 1969–2001				
Georgia	$28,555	11.53%	12.19%	23.47%
Tennessee	$26,916	11.32%	18.21%	15.53%
North Carolina	$27,501	10.94%	19.22%	17.31%
Alabama	$24,845	10.27%	17.90%	15.24%
Mississippi	$21,967	9.68%	17.41%	11.53%
South Dakota	$26,876	9.60%	11.16%	14.30%
South Carolina	$25,067	8.78%	19.39%	13.12%
Arkansas	$23,072	7.75%	19.02%	14.50%
Maine	$27,157	7.34%	14.64%	15.86%
Texas	$28,943	7.19%	13.11%	20.03%
Vermont	$28,988	7.11%	18.99%	14.22%
Wyoming	$30,197	5.93%	5.16%	9.82%
Louisiana	$24,517	5.03%	11.58%	14.28%
Kentucky	$24,954	4.76%	19.33%	13.12%
North Dakota	$25,830	4.43%	8.65%	12.90%
West Virginia	$23,068	2.89%	13.43%	11.01%
New Mexico	$23,928	2.52%	6.61%	15.97%
Nebraska	$28,713	0.99%	12.32%	17.89%
Kansas	$28,490	0.78%	17.54%	17.99%
Florida	$29,247	0.55%	6.80%	20.51%
Below-average per capita income in 2001, below-average growth 1969–2001				
Pennsylvania	$30,318	–0.01%	16.68%	21.06%
Oklahoma	$25,447	–0.06%	16.11%	13.70%
Utah	$24,388	–0.74%	12.56%	20.11%
Wisconsin	$29,361	–1.47%	23.99%	15.69%
Missouri	$27,932	–1.49%	14.40%	21.84%
Rhode Island	$30,103	–1.83%	14.86%	20.11%
Oregon	$28,512	–2.12%	16.19%	17.37%
Idaho	$24,947	–2.72%	14.22%	16.21%
Arizona	$26,055	–5.29%	11.70%	18.37%
Indiana	$27,619	–5.62%	26.49%	13.37%
Iowa	$27,357	–5.69%	19.39%	15.19%
Montana	$24,036	–6.74%	6.37%	12.97%
Ohio	$28,627	–8.41%	21.14%	18.29%
Michigan	**$29,499**	**–11.79%**	**23.80%**	**19.80%**
Nevada	$30,347	–18.13%	4.78%	16.42%
Hawaii	$28,690	–24.45%	2.85%	14.18%

Source: Bureau of Economic Analysis. Compiled by Donald Grimes, University of Michigan.
High-pay knowledge-based industries include information, finance and insurance, professional and technical services, corporate headquarters.

Michigan's Performance

We begin with an overview of Michigan's economic performance.

- Its per capita income in 2001 ranked 20th among the states,2.7 percent below the national average.
- Maybe most alarming, its per capita income from 1969 to 2001 grew nearly 12 percent slower than the national average. Only four states had a worse performance.
- Its share of employment earnings from manufacturing—the third highest in the nation—was 10 percentage points greater than the national average.
- Its share of employment earnings from high-pay knowledge-based industries—21st in the nation—was 3.5 percentage points below the national average
- It is one of fifteen states (including the surrounding states of Ohio, Indiana and Wisconsin) where manufacturing is greater than high-pay knowledge-based industries as a share of employment earnings.
- It is one of sixteen in the grouping of states that are below the national average in both 2001 per capita income and per capita income growth from 1969 to 2001.

As we will see, Michigan's performance is consistent with the patterns that emerge when we explore the data in Table 3.

National Patterns

When we look at the relationship between per capita income and concentrations of employment earnings in both manufacturing and high-pay knowledge-based industries, some clear patterns emerge:

1. Of the twenty-five states with employment earnings shares from manufacturing greater than the national average, twenty-one have 2001 per capita income **below** the nation average.
2. Of the thirteen states with employment earnings share from high-pay knowledge-based industries greater than the national average, twelve have 2001 per capita income **above** the nation average.
3. Of the fifteen states where the share of employment earnings from manufacturing is greater than from high-pay knowledge-based industries, all have 2001 per capita income **below** the national average.
4. Of the fifteen states with per capita income greater than the national average in 2001, **all** had a greater share of employment earnings from high-pay knowledge-based industries than from manufacturing.

There are a few exceptions to these patterns:

- Three of the four states that are exceptions to pattern 1 (Connecticut, Minnesota, and Illinois) are part of pattern 2. They have employment earnings shares above the national average from both manufacturing and high-pay knowledge-based industries. This suggests that what matters most to achieving higher per capita income is a high concentration in high-pay knowledge-based industries.

- New Hampshire is the fourth state with an employment earnings share from manufacturing greater than the national average and 2001 per capita income above the national average. It also has an employment earnings share from high- pay knowledge-based industries below the national average. It seems to be an exception to both pattern1 and pattern 2. As we noted earlier, per capita income is based upon the state of residence, while employment earnings is based upon the location of the place of work. We believe that New Hampshire's exception to pattern 2 reflects the commuting of high-wage, high-skill service industry workers to jobs in Massachusetts, rather than a lack of residents who work in high-pay knowledge-based industries.
- In addition to New Hampshire, Alaska and Maryland are the other states with 2001 per capita income above the national average and an employment earnings share from high-pay knowledge-based industries below the national average.
- Maryland's status as a high-income state with a high-pay knowledge-based industries concentration below the national average, like New Hampshire's, likely reflects the fact that many of its high-wage residents commute to high-pay knowledge-based jobs in the District of Columbia.
- Alaska, of course, has an economy unique from the rest of the nation in that it is so dependent on natural-resource-based industries. (It too may be paying a price for having such a low share of employment earnings shares from high-pay knowledge-based industries: its per capita income compared with the nation fell more than any other state from 1969 to 2001.)
- Georgia is the only state with 2001 per capita income below the national average and with employment earnings shares from high-pay knowledge-based industries greater than the national average—but it is just .15 percentage points above.

Taken together, these patterns strongly suggest that being concentrated in high-pay knowledge-based industries, rather than manufacturing, is now the most reliable pathway to prosperity for states.

III. Comparing Michigan with the More Successful States

In this section we compare Michigan with the eight states and the District of Columbia that have 2001 per capita income and per capita income growth from 1969 to 2001 above the national average.

In Table 4 (page 16), we repeat the data from Table 3 for these eight states and the District of Columbia, and add a column showing the proportion of 25- to 34-year-olds with a bachelor’s degree or more. We wanted to see if there is any evidence that a concentration of people in that category is associated with prosperity.

Governor Granholm has established preparing, retaining, and attracting young knowledge workers as a state economic development priority. She is not alone in this; a number of communities across the country have begun programs to attract college- educated young adults.

There is a growing belief that where young professionals choose to locate helps drive the economy, for two reasons: (1) high-pay knowledge-based industries are more likely to locate in communities with lots of knowledge workers; and (2) young professionals are starters of new businesses.

Table 4
States with Above-Average Per Capita Income in 2001
and Above-Average Growth in Per Capita Income in 1969–2001

	Per Capita Income		Share of Earnings, 2001 NAICS Basis		Share of population 25–34 with bachelor's degree or more in 2000
	Level in 2001	Change 1969–2001 relative to U.S.	Manufacturing	High-pay knowledge-based industries	
United States	**$30,527**	**n.a.**	**13.80%**	**23.32%**	**27.5%**
Michigan	**$29,499**	**–11.79%**	**23.80%**	**19.80%**	**26.0%**
District of Columbia	$45,284	31.24%	0.53%	31.55%	50.6%
Massachusetts	$38,945	18.06%	13.25%	32.27%	41.4%
Colorado	$34,003	15.51%	9.01%	27.58%	34.8%
Connecticut	$42,550	13.37%	15.15%	32.24%	35.3%
Virginia	$32,328	13.25%	9.02%	27.79%	33.1%
New Hampshire	$33,771	13.23%	18.66%	19.44%	33.3%
New Jersey	$39,077	10.39%	11.60%	28.55%	34.7%
Minnesota	$32,722	8.99%	15.82%	24.04%	34.5%
Maryland	$35,355	6.43%	7.75%	22.23%	34.2%

Source: Bureau of Economic Analysis for earnings and income data; the 2000 Census for educational attainment.

In Table 5, we present the same data for the dominant metropolitan area in each of the more successful states, as well as for the Grand Rapids and Detroit regions. The list includes:

- The New York City region as the dominant region for Connecticut and New Jersey as well as for the state of New York
- The Washington, D.C., region for the District of Columbia, Maryland, and Virginia
- The Boston region for Massachusetts and New Hampshire

We use the new 2004 definitions of the regions. The Detroit-Warren-Flint CSA includes Genesee, Lapeer, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne Counties. The Grand Rapids-Wyoming-Holland CSA includes Allegan, Barry, Ionia, Kent, Muskegon, Newaygo, and Ottawa Counties.

Table 5
Per Capita Income and Share of Activity in Manufacturing and Selected Services,
Consolidated Statistical Areas

	Per Capita Income		Share of Earnings, 2001 NAICS Basis		Share of population 25–34 with bachelor's degree or more in 2000
	Level in 2001	Change 1969–2001 relative to U.S.	Manufacturing	High-pay knowledge-based industries	
United States	**$30,527**	**n.a.**	**13.80%**	**23.32%**	**27.5%**
Detroit-Warren-Flint	**$33,151**	**-9.52%**	**18.53%**	**23.72%**	**28.8%**
Grand Rapids-Wyoming-Holland	**$27,372**	**-7.70%**	**31.53%**	**13.45%**	**27.2%**
Boston-Worcester-Manchester	$40,457	20.90%	13.50%	33.52%	43.2%
Denver-Aurora-Boulder	$38,859	20.54%	8.11%	33.05%	38.1%
Minneapolis-St. Paul-St. Cloud	$36,355	7.88%	15.12%	27.81%	39.9%
New York-Newark-Bridgeport	$40,840	5.92%	7.37%	39.96%	36.4%
Washington-Baltimore-Northern Va.	$39,298	13.64%	4.38%	30.12%	40.9%

Source: Bureau of Economic Analysis and 2000 Census. The share of the population with a bachelor's degree or more is based on the 1990s metro area definitions, whereas the other data is based on the 2004 area definitions.

The state data in Table 4 clearly shows the differences between Michigan and the more successful states. On the prosperity side, Michigan's per capita income is significantly lower. Perhaps most worrisome is the difference in per capita income growth rates compared with the nation. Michigan's employment earnings mix is also quite different: more in manufacturing, less in high-pay knowledge-based industries.

The data on the proportion of 25- to 34-year-olds with a bachelor's degree or more show another dramatic contrast between Michigan and the more successful states. Michigan is below the national average; all the more successful states are substantially above. The gap between Michigan's and the other states ranges from more than 7 percentage points below Virginia to more than 15 percentage points below Massachusetts.

When we look at the data by region in Table 5, we see the evidence, in the data for the Boston and Washington regions, showing why it is likely that citizens of both New Hampshire and Maryland may earn more from high-pay knowledge-based industries than is accounted for in Table 3.

The regional data in Table 5 also demonstrate, even more clearly, the patterns we have identified. High concentrations in high-pay knowledge-based industries and a higher proportion of 25- to 34-year-olds with a bachelor's degree or more are associated with the high and rapidly growing per capita income of the dominant regions of the more successful states. These regions are also characterized by small concentrations in manufacturing. These are post-industrial economies.

By contrast, Michigan's two largest regions have substantially lower per capita income with far slower growth rates. Consistent with the patterns we have identified in this report, they are more concentrated in manufacturing, less concentrated in high-pay knowledge-based industries, and lower in the proportion of 25- to 34-year-olds with a bachelor's degree or more.

The contrast is particularly stark in the Grand Rapids metropolitan area. Of all the regions we look at, its economy is the most industrial and the least post-industrial. Its share of employment earnings from manufacturing ranges from 13 percentage points greater than even the Detroit region to nearly 27 percentage points greater than the Washington region. On the flip side, its share of employment earnings from high-pay knowledge-based industries ranges from 10 percentage points less than metro Detroit to 26 percentage points less than metropolitan New York.

Consistent with the patterns we have identified, the Grand Rapids region's high concentration of manufacturing and low concentration of high-pay knowledge-based industries is associated with lower per capita income. The region's per capita income ranges from nearly $6,000 less than the Detroit region to more than $13,000less than metro New York.

The regional data from Table 5 offer the strongest evidence that being concentrated in high-pay knowledge-based industries, rather than manufacturing, is now the most reliable pathway to prosperity.

IV. Conclusion

The evidence presented in this report strongly suggests that knowledge-based industries are playing the same role in a post-industrial economy as manufacturing did in the industrial economy. Knowledge-based industries are now the major source of employment growth, particularly of good-paying jobs. And they are the most powerful engine fueling overall economic growth.

Fears that the decline of manufacturing employment will lead to a substantial decline of middle-class jobs or an overall slowdown of the economy appear to be exaggerated, if not unwarranted.

The evidence also suggests that Michigan's sub-par longer-term economic performance is due, in large part, to the slower growth of its knowledge-based industries compared with the nation. During the last economic cycle, Michigan lost manufacturing jobs at a slower rate than the nation, and it remains one of the leading states in share of employment earnings from manufacturing.

This paper is not designed to provide policy recommendations, but we do think it raises some questions that should be considered by both the public and policy makers:

1. Can Michigan, in any substantial way, affect the long-term trend of the loss of manufacturing employment? The forces of trade and technology that are driving the decline of American manufacturing are quite powerful. It is hard to imagine any lever available to state policy makers that can counterbalance these forces.

2. Should Michigan make the preservation of manufacturing jobs its economic priority? One thing that Michigan policy makers—in both political parties—seem to agree on is that saving manufacturing jobs is the state's top economic priority. The evidence in this report suggests that this may not be the best use of state resources. If the state is going to target industries to provide special supports, the evidence in this report suggests that manufacturing may not be the best choice.

3. How can Michigan both attract and grow knowledge-based industries and prepare, retain, and attract young professionals? The evidence in this report strongly suggests that knowledge-based industries and young professionals will be the most important drivers of future economic growth. Communities with high concentrations of both are quite likely to be more prosperous. It seems that the best use of policy makers' time and attention with respect to the economy might come from developing a new agenda on how best to grow a knowledge-based economy in Michigan.