

Michigan's Economic Transition: Toward a Knowledge Economy

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Summary

This report examines evidence of Michigan's continuing economic transition and considers the state's capacity to reinvent itself by replacing its 20th century industrial economy with a 21st century knowledge economy.

There is no question that Michigan's economy today is suffering, due largely to the loss of market share among the Big 3 U.S. automotive companies and the ripple effects of that downturn, as well as the loss of manufacturing jobs in general. There has been a full and nearly constant supply of bad economic news in Michigan since 2001, filling newspaper headlines and leading to a public sense of economic devastation. A recent report on similar problems in the wider Great Lakes region argues that "attitudes influence success" and that "for too long, this Great Lakes Region has accepted and even amplified its own down-at-the-heels image. Short-term economic stories of chaos, loss, and grim statistics have been given pride-of-place in the media, in divisive political squabbles, and in antagonisms between labor and management. So often repeated is the pessimism that it is taken for granted as the 'real' story ..." (Plante & Moran 2007, p2). The report notes that "voices attempting to point out real advantages to the region have been swallowed up and muffled beneath drum beats of doom" (Plante & Moran 2007, p2).

Whereas the overwhelmingly negative portrayal of Michigan's economy over the last half-decade has resulted in a public sense of gloom and self-doubt, this report presents evidence of numerous positive developments occurring in the state economy, and argues that Michigan has significant capacity to continue making positive steps toward establishing a knowledge economy. While there are certainly long term struggles yet to come, there are also signs that Michigan is navigating a historic transformation between economic models, as its former industrial foundation gives way to the nascent growth of a post-industrial knowledge economy.

Many promising policy recommendations designed to foster economic growth and the transition to a knowledge economy have been proposed recently by others (Michigan Future, Inc. 2006; Hollins et. al. 2006; Bartik et al. 2006; Drake 2006). Rather than repeating those recommendations, the intent of this report is to promote a better understanding of the economic transition underway in Michigan, by examining the positive outcomes occurring now, as well as the state's capacity to continue the transition toward a knowledge economy. The recent one-sided focus on only the negative aspects of the state's economy has been counterproductive. It is time now to look not just at the state's job losses, but also at its areas of growth.

Note: This 2nd version of the report uses Census Bureau firm and establishment data through 2002 rather than 2004, as in the original version



Introduction

Michigan is in a period of historic economic transformation. Once a world economic leader based on a manufacturing and industrial foundation, Michigan is now being ravaged by its own legacy costs, globalization and increased competition. Where manufacturing once drove the state's economic expansion and growing prosperity through much of the 20th century, it has since become a brake on the state's economy, with massive job losses beginning around June 2000. Due primarily to the loss of market share among the Big 3 domestic auto-makers (Bartik et al. 2006; Drake 2006; Johnson 2006) and other manufacturing losses, hundreds of thousands of low-skill high-paying factory jobs have since been shed, leaving a sense of economic collapse which has been highlighted repeatedly across the state's media outlets.

Years of bad economic news – a slow-motion economic train wreck unfolding before the citizens' eyes – have dominated the headlines and framed the political and policy debates surrounding questions of economic development strategy. Although previous recessions (especially that of the early 1980's) hit the state hard, for much of the last century Michigan had been an economic power, bringing a sense of economic might and supremacy. Michigan's recent economic troubles have replaced that view in many quarters with a self-image of Michigan as a rust-belt economic wasteland. Terms like "economic meltdown" (Schmid 2006) have highlighted the media coverage and reinforced the widespread sense of gloom.

Meanwhile, two new points of consensus have emerged among leading analysts: first, Michigan's 20th century economic model is no longer viable and the only hope for a prosperous future is one based on a knowledge economy in place of

yesterday's industrial economy; and second, a critical component in establishing a sustainable and successful knowledge economy is human capital, a critical mass of individual talent based in a cultural context that promotes education and life-long learning, entrepreneurialism, innovation, risk-taking, and commitment to diversity (Hollins III et. al. 2006; Michigan Future, Inc. 2006).

Unfortunately, many analysts argue that Michigan's previously functional economic culture has long since evolved into a dysfunctional entitlement mentality, where workers expect to have high-paying secure jobs without the need for higher education. Michigan's battered economic culture appears at first ill-suited for success in a 21st century knowledge economy, which requires a motivated and educated workforce suffused with a spirit of entrepreneurialism, a sense of personal responsibility for one's own economic future, a penchant for risk-taking, a love of life-long learning, and an openness to other cultures. The culture required for the new economy is one of optimism and hope. Unfortunately Michigan seems mired in a counterproductive culture of negativism, driven on by a constant focus on the forces of economic destruction in the manufacturing sector.

The question now is whether the state can move forward given today's environment of gloom. Are there only forces of economic destruction at work in Michigan, or is a new economy already beginning to grow? Are there signs for hope in Michigan's future? Are there successes upon which to build? And does Michigan have the capacity to reinvent itself for success in a knowledge economy?

Despite the still unfolding train wreck that must be part of the transition away from the industrial economy of the past, there is in fact evidence of a new economy slowly taking root in the state, as presented below.

Growth Amidst Destruction

Like a forest that regenerates itself first with ground cover and saplings after a fire, the state economy is slowly, and somewhat haltingly, showing signs of emergent new growth amidst the losses in the manufacturing sector. Looking back to a period covering the last ten years, employment figures from the U.S. Bureau of Labor Statistics (BLS) show evidence of growth in the new economy sectors (generally identified as those requiring higher than average levels of education and offering higher levels of pay, such as the sectors of financial services and insurance, professional, scientific and technical services, educational and health services, and business support services). The BLS data presented below and summarized in Table 7 show Michigan employment growth in areas such as financial services, professional and business services, educational and health services, religious, grantmaking, civic, professional and similar organizations, as well as in other sectors. While Table 7 shows that this employment growth has lagged that of the nation at-large, nonetheless these figures show growth in new economy sectors during this period of manufacturing decline. In addition, using data from the U.S. Census Bureau's County Business Patterns survey, there is similar evidence of growth in the number of firms and establishments in Michigan between 1998 and 2002 across a number of these new economy sectors.

EMPLOYMENT FIGURES

MANUFACTURING

Job losses in the manufacturing sector provide the main story, and the headline fodder, in the drama of Michigan's economic transition. Since its recent



Table 1. Employment Percentage Changes in Michigan's Manufacturing Sector

Sector and Industry Descriptions	Overall										
	% change	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Manufacturing*	-26.85%	2.55	1.03	-0.34	-1.22	-11.37	-4.27	-5.88	-1.74	-3.29	-5.50
Motor Vehicle Manufacturing	-32.93%	15.86	-1.25	-5.71	9.43	-10.87	-4.83	-7.13	-6.64	-7.81	-16.19
Motor Vehicle Parts Manufacturing	-33.89%	-0.70	4.01	2.42	-2.15	-11.73	-2.79	-7.46	-5.98	-4.62	-10.31

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics series. Figures represent the percentage change in employment for the period from December of the previous year to December of the given year. Green figures indicate year-over-year growth, red figures indicate year-over-year decline. * indicates seasonally adjusted data, otherwise data is not seasonally adjusted.

employment peak in July 1999, the manufacturing sector has shed over 274,000 high paying jobs, many of which required little or no higher education. Dominating the headlines, these losses have overshadowed other economic news and helped drive the sense of economic despair in the state. These losses have occurred in almost all of the industries classified in the manufacturing sector, especially in Michigan's bedrock automotive industries as shown in Table 1.

As described by Dana Johnson, Chief Economist at Comerica Bank, direct job losses in the automotive industry also result in significant indirect job losses through a "multiplier" effect. According to Johnson: "Not only have the auto companies reduced their purchases of all sorts of goods and services throughout their extensive supply chains, but also autoworkers who have lost their jobs or seen their incomes slashed have had to reduce their spending. In this manner, the cutbacks in autos have rippled throughout the state economy" (Johnson 2006, p.1). Johnson uses a conservative multiplier effect of 3, meaning that for each auto

industry job lost an additional 3 other jobs would also be lost in other sectors (other manufacturing, retail, restaurants, construction, etc.). And inversely, it could be expected that absent these enormous manufacturing job losses, the state's other sectors would be growing at a faster clip than they have been. According to Johnson, if "... employment in the auto sector had held steady over the past 12 months, employment in Michigan would have risen by 66,000 instead of fallen by 27,000. That would have resulted in a 1.5 percent increase in Michigan payrolls, which would have matched the national rate of increase ..." (Johnson 2006, p. 1).

FINANCIAL ACTIVITIES

Meanwhile, against that massive tide of manufacturing job losses BLS employment figures show long-term positive job growth in a number of the new economy sectors (although usually at rates below the national average, due at least in part to the negative manufacturing losses multiplier effect outlined above). For instance, Michigan's Financial Activities sector has had employment growth in 7

of the last 10 years (see Table 2), resulting in approximately 12,000 new jobs (Table 7). Although the 10-year cumulative employment growth rate in this sector is only 5.9 percent (compared to 19.6 percent for the nation at-large, as shown in Table 7) it is nonetheless positive growth in an important new economy sector.

When looking in more detail at industries classified within the Financial Activities sector, a similar pattern is found for the Finance and Insurance industry subset of the Financial Activities sector: employment gains in 8 of the last 10 years with overall growth of 7.2 percent between December 1996 and December 2006. Drilling down further into the data, similar patterns of uneven, yet overall growth, are found in the industry sub-classifications of Credit Intermediation and Related Activities (gains in 4 of the last 5 years, overall growth of 3.9 percent), and Insurance Carriers and Related Activities (gains in 5 of the last 10 years with overall growth of 5.5 percent).

While the uneven nature of this growth is evident, with gains followed by losses and then more gains, the data still

Table 2. Employment Percentage Changes in Michigan's Financial Activities Sector

Sector and Industry Descriptions	Overall										
	% change	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Financial Activities Sector*	5.91%	1.08	1.56	-1.10	2.18	0.76	1.98	0.51	0.18	-0.28	-1.06
Finance & Insurance	7.25%	1.06	1.91	-1.94	1.97	1.29	2.68	0.12	0.43	0.06	-0.49
Insurance Carriers & Related	5.54%	1.90	4.41	-2.76	-0.84	4.55	2.10	-1.42	-1.92	-0.98	0.66
Credit Intermediation & Related	3.89%	-	-	-	-	-	3.28	1.18	0.70	0.58	-1.84

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics series. Figures represent the percentage change in employment for the period from December of the previous year to December of the given year. Green figures indicate year-over-year growth, red figures indicate year-over-year decline, dashes indicate unavailable data. * indicates seasonally adjusted data, otherwise data is not seasonally adjusted.



Table 3. Employment Percentage Changes in Michigan's Professional and Business Services Sector

Sector and Industry Descriptions	Overall										
	% change	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Professional & Business Services Sector*	7.09%	3.68	6.28	3.46	-0.43	-6.58	1.96	-3.09	1.22	0.75	0.22
Accounting, Tax Prep., Bookkeeping & Payroll	5.75%	1.08	-2.14	16.36	0.31	-2.80	6.09	-12.08	-0.34	1.03	0.34
Management, Scientific & Technical Consulting	27.27%	6.49	20.12	15.74	10.96	-4.35	-6.61	-17.26	0.00	5.88	-1.01
Admin. & Support & Waste Mgmt. Services	19.14%	9.89	8.96	2.28	-1.68	-9.92	6.79	-2.40	3.65	1.65	0.04
Employment Services	17.28%	14.88	13.54	3.23	-4.46	-16.53	11.62	-4.58	5.45	-0.37	-2.38
Scientific Research & Development Services	3.79%	-	-	-	-	-	5.06	-0.40	-3.63	-0.42	3.36
Other Prof., Scientific, & Technical Services	8.72%	-	-	-	-	-	3.36	0.00	2.60	0.63	1.89
Business Support Services	43.38%	-	-	-	-	-	19.12	10.49	7.26	2.60	-1.02

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics series. Figures represent the percentage change in employment for the period from December of the previous year to December of the given year. Green figures indicate year-over-year growth, red figures indicate year-over-year decline, dashes indicate unavailable data. * indicates seasonally adjusted data, otherwise data is not seasonally adjusted.

point to overall patterns of modest job growth in this new economy sector over the last 10 years. The fact that these gains are happening at all during this period of enormous contraction in the state's bedrock automotive manufacturing sector is noteworthy.

PROFESSIONAL AND BUSINESS SERVICES

Looking at other new economy sectors, employment figures for the Professional and Business Services sector show job gains in 7 of the last 10 years, including 3 straight years of gains since December 2003 (see Table 3). Although employment in this sector was lower at the end of 2006 than in 2000, the 10 year period ending in 2006 still shows overall

job gains of 7 percent over the decade, resulting in approximately 39,300 additional jobs (Table 7). When looking in more detail, the industry of Accounting, Tax Preparation, Bookkeeping and Payroll Services has experienced job gains in 6 of the last 10 years, with overall gains of 5.7 percent since December 1996. Management, Scientific and Technical Consulting Services has shown employment increases in 5 of the last 10 years (plus 1 year of neither gains nor losses), with overall growth of 27.3 percent between December 1996 and December 2006. And the industry classified as Scientific Research and Development Services has had substantial growth in 2 of the last 5 years, with overall employment levels up

3.8 percent in the last half-decade. Other industries with long-term growth patterns include Other Professional, Scientific and Technical Services (growth in 4 of the last 5 years and overall gains of 8.7 percent), Administrative and Support and Waste Management and Remediation Services (growth in 7 of the last 10 years; overall gains of 19.1 percent), Employment Services (growth in 5 of the last 10 years; overall gains of 17.3 percent), and Business Support Services (growth in 4 of the last 5 years; overall gains of 43.4 percent).

EDUCATIONAL AND HEALTH SERVICES

Employment has increased in the last 8 straight years in the sector of Educa-

Table 4. Employment Percentage Changes in Michigan's Educational and Health Services Sector

Sector and Industry Descriptions	Overall										
	% change	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Education and Health Services Sector*	20.69%	0.20	-0.47	1.48	2.40	3.12	3.27	2.04	2.30	3.17	1.55
Educational Services	64.76%	7.13	0.00	3.04	3.14	11.09	9.66	7.05	6.72	1.67	2.28
Elementary and Secondary Schools	45.26%	0.53	6.81	4.41	-17.84	12.57	5.58	12.02	7.73	6.37	3.37
Colleges, Universities and Professional Schools	71.50%	7.25	-0.90	-0.91	33.49	-1.72	17.83	1.78	5.83	-1.65	-0.56
Health Care and Social Assistance	16.15%	-0.99	-0.50	1.35	2.42	2.27	2.59	1.49	1.84	3.52	1.18
Offices of Dentists	13.12%	1.77	2.09	1.02	2.36	1.32	2.61	0.32	0.63	0.63	-0.31
Ambulatory Health Care Services	15.86%	-	-	-	-	-	3.83	2.23	2.93	3.63	2.34
Offices of Physicians	18.39%	-	-	-	-	-	3.34	4.37	2.64	4.83	2.02
Offices of Other Health Practitioners	19.64%	-	-	-	-	-	7.74	4.42	2.12	2.59	1.52
Home Health Care Services	26.60%	-	-	-	-	-	6.88	1.29	5.93	2.40	7.81
Hospitals	7.29%	-	-	-	-	-	3.30	1.06	-0.17	2.61	0.32
Outpatient Care Centers	9.16%	-	-	-	-	-	-	-	3.05	2.96	2.88

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics series. Figures represent the percentage change in employment for the period from December of the previous year to December of the given year. Green figures indicate year-over-year growth, red figures indicate year-over-year decline, dashes indicate unavailable data. * indicates seasonally adjusted data, otherwise data is not seasonally adjusted.



Table 5. Employment Percentage Changes in Michigan's Leisure and Hospitality Sector

Sector and Industry Descriptions	Overall										
	% change	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Leisure and Hospitality Sector*	7.80%	0.29	-0.95	5.09	1.70	-2.17	1.81	0.53	-0.07	0.77	0.72
Arts, Entertainment and Recreation	27.94%	5.54	3.94	10.53	12.38	-9.66	4.13	1.26	-3.20	2.02	-0.18
Other Amusement and Recreation	14.48%	1.72	5.08	3.55	1.25	-0.31	5.86	-0.58	-2.64	4.82	-4.60
Full-service Restaurants	25.76%	1.14	3.01	5.66	2.68	2.27	1.73	3.64	0.78	1.01	1.38
Accommodation	9.12%	-	-	-	-	-	4.89	0.62	1.23	0.00	2.13

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics series. Figures represent the percentage change in employment for the period from December of the previous year to December of the given year. Green figures indicate year-over-year growth, red figures indicate year-over-year decline, dashes indicate unavailable data. * indicates seasonally adjusted data, otherwise data is not seasonally adjusted.

tional and Health Services (see Table 4). The overall growth of 20.7 percent since December 1996 has resulted in approximately 101,300 new jobs (Table 7). Given the central role of education in growing a knowledge economy, this seems a particularly good sign. And when looking at this sector's sub-classifications by industry, the Educational Services industry overall has had job growth in 9 of the last 10 years, with 64.8 percent overall growth since December 1996. Drilling down further, Elementary and Secondary Schools have experienced growth in 9 of the last 10 years, with an overall increase of 45.3 percent, while Colleges, Universities and Professional Schools have had growth in 5 of the last 10 years, with an impressive overall growth rate of 71.5 percent in that period.

In the industry classified as Health Care and Social Assistance, overall employment has increased in 8 of the last 10 years, with cumulative growth of 16.1 percent since December 1996. Again drilling further down into the data, the following industry sub-classifications have also experienced growth: Ambulatory Health Care Services (5 straight years of growth; overall 15.9 percent increase since December 2001); Offices of Physicians (5 straight years of growth; 18.4 percent increase since December 2001); Offices of Dentists (growth in 9 of the last 10 years; 13.1 percent increase since December 1996); Offices of Other Health Practitioners (5 straight years of job gains; 19.6

percent increase since December 2001); Outpatient Care Centers (3 straight years of growth; overall increase of 9.1 percent since December 2003); Home Health Care Services (5 straight years of gains; 26.6 percent increase since December 2001), and Hospitals (growth in 4 of the last 5 years; overall increase of 7.3 percent since December 2001).

LEISURE AND HOSPITALITY

The Leisure and Hospitality sector, with 29,500 new jobs since 1996 (see Table 7), has experienced employment gains in 7 of the last 10 years, with overall growth of 7.8 percent since December 1996 (Table 5). Although some of the jobs within this sector may not be considered new economy jobs in terms of skills required and wages paid, nonetheless services provided by this sector such as dining, entertainment and recreation can be important factors in creating the context required to attract the talent for a knowledge economy labor force. Quality of life, including entertainment and recreation opportunities, is critical to attracting a highly educated workforce. Industries experiencing growth in this sector include Arts, Entertainment, and Recreation (job gains in 7 of the last 10 years; overall growth of 27.9 percent); Other Amusement and Recreation Industries (growth in 6 of the last 10 years; overall gains of 14.5 percent); Accommodation (gains in 4 of the last 5 years; 9.1 percent overall growth); and Full-Service

Restaurants (10 straight years of growth providing job gains of 25.7 percent).

OTHER MISCELLANEOUS INDUSTRIES AND SECTORS

As shown in Table 6, the industry classified as Religious, Grantmaking, Civic, Professional, and Similar Organizations has experienced job growth in each of the last 10 years, with overall growth of 21.2 percent between December 1996 and December 2006. Approximately 17,300 new jobs were created in this industry. Meanwhile, in the Government sector, industries with long term growth include State Government Educational Services (employment growth in 8 of the last 10 years; overall gains of 9.7 percent); Local Government Junior Colleges (gains in 7 of the last 10 years; overall growth of 11.8 percent), and Government Hospitals (job growth in 7 of the last 10 years; overall gains of 21.2 percent). For the Government sector as a whole, approximately 15,100 new jobs were created between 1996 and 2006 (see Table 7).

INFORMATION SECTOR DECLINE

In the midst of these numerous categories of growth, one particular new economy industry stands out for its cumulative job losses over the last 10 years: the Information sector (see Table 6). At the national level, Information sector employment peaked in 2000 and fell each subsequent year until beginning to recover in 2006. This group of industries (includ-



Table 6. Employment Percentage Changes in Miscellaneous Other Sectors in Michigan

Sector and Industry Descriptions	Overall										
	% change	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Religious, Grantmaking, Civic, Professional	21.27%	3.94	1.78	1.16	2.87	2.46	1.85	0.86	0.74	2.95	0.92
State Government Educational Services	9.73%	3.31	0.90	-0.30	1.69	1.57	2.80	-4.97	2.86	0.19	1.53
Local Government Junior Colleges	11.82%	1.97	0.97	0.96	1.42	-1.40	7.11	-0.88	-3.13	3.23	1.34
Government Hospitals	21.25%	2.36	-0.77	3.10	-6.77	9.68	0.00	0.74	5.11	1.39	5.48
Information Sector Overall*	-5.63%	1.55	3.47	0.00	2.28	-1.18	-4.91	-3.63	-1.30	-2.64	0.90

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics series. Figures represent the percentage change in employment for the period from December of the previous year to December of the given year. Green figures indicate year-over-year growth, red figures indicate year-over-year decline. * indicates seasonally adjusted data, otherwise data is not seasonally adjusted.

ing publishing, telecommunications and wired telecommunications carriers) grew overall only 2.5% nationally between 1996 and 2006, while the experience in Michigan included job losses in 5 of the last 10 years, with an overall employment decline of 5.6 percent, resulting in about 4,000 fewer jobs (Table 7).

A MORE BALANCED EMPLOYMENT BASE

Declines in manufacturing employment accompanied by increases in the new economy sectors have resulted in a more balanced and diversified employment base for the state, as shown in Table 7. According to the BLS data, in 1996 manufacturing employment accounted for 19.6 percent of Michigan's total

nonfarm employment base. By 2006 that portion had fallen to only 14.6 percent, a decline of more than 25.6 percent from the 1996 figure. Other sectors experiencing relative declines in their portions of the total nonfarm employment base include: Natural Resources and Mining (down 18.1 percent), Trade, Transportation and Utilities (down 3.5 percent), and Information as noted above (down 4.1 percent). Meanwhile, sectors whose shares of the employment base increased over the last ten years include: Financial Activities (up by 7.6 percent from 1996), Professional and Business Services (up 8.8 percent), Educational and health services (up 22.6 percent), Leisure and Hospitality (up 9.6 percent), Other Services (up 7.6

percent), Government (up 4 percent), and Construction (up 2.6 percent).

Overall, the number of nonfarm jobs in Michigan fell by about 71,000 over the period from December 1996 to December 2006 (see last 3 columns of Table 7). Gains in the growing sectors (about 209,000 new jobs) didn't quite offset the losses in manufacturing, natural resources and mining, trade, transportation and utilities, and information (losses of about 280,000 jobs). By the end of 2006, although resulting from a period of overall employment decline, Michigan's employment base was significantly less reliant on the old economy sector of manufacturing.

FIRMS AND ESTABLISHMENTS

Another view of Michigan's economic transformation considers changes in the number of firms and establishments over time, to round out the data on employment presented above. Firm and establishment data come from the U.S. Census Bureau.

Using data from the Bureau's Statistics of U.S. Businesses series (from 1998, the oldest comparable data available, to 2002, the most recent comparable data available), there are encouraging signs of new growth in the number of Michigan firms and establishments for several of the new economy sectors, as described below and shown in Table 8. In the following sections, an establishment is defined by the Census Bureau as a single

Table 7. Michigan and U.S. Nonfarm Employment by Sector, 1996 - 2006

Sector	Percentage of Mi. Employment			Mi. Employment in Thousands			Total U.S.
	1996	2006	% change	1996	2006	% change	% change
Manufacturing	19.62%	14.59%	-25.65%	862.5	630.9	-26.85%	-18.25%
Natural Resources and Mining	0.22%	0.18%	-18.06%	9.8	7.9	-19.39%	10.33%
Information	1.61%	1.55%	-4.08%	71.0	67.0	-5.63%	2.50%
Trade, Transportation and Utilities	19.01%	18.34%	-3.50%	835.6	793.3	-5.06%	7.62%
Construction	3.97%	4.07%	2.57%	174.6	176.2	1.00%	35.40%
Government	14.76%	15.36%	4.01%	649.1	664.2	2.32%	12.99%
Other Services	3.85%	4.14%	7.65%	169.2	179.2	5.91%	14.88%
Financial Activities	4.62%	4.97%	7.65%	203.1	215.1	5.91%	19.65%
Professional and Business Services	12.60%	13.72%	8.85%	554.0	593.3	7.09%	28.97%
Leisure and Hospitality	8.60%	9.42%	9.57%	378.1	407.6	7.80%	22.68%
Educational and Health Services	11.13%	13.66%	22.68%	489.4	590.7	20.69%	30.28%
Total	100.0%	100.0%		4,396.4	4,324.4	-1.64%	13.36%

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics series. Figures in 1st and 2nd data columns represent each sector's share of the total Michigan nonfarm employment in December of the given year, while figures in 3rd data column represent the percentage change from 1996 to 2006 for each sector. Figures in 4th and 5th data columns represent actual Michigan employment in thousands by sector for December of the given year, while figures in the 6th data column represent the percentage change from 1996 to 2006 for employment in each sector. Figures in the final column represent the change from 1996 to 2006 in total U.S. employment by sector. Green figures indicate growth, red figures indicate decline. All data are seasonally adjusted.



Table 8. Percentage Changes in Mi. Firms and Establishments, 1998 to 2002, by Employment Size of Enterprise

Sector	Organization Category	Overall % change	Number of Employees in the Enterprise Overall						
			0	1-4	5-9	10-19	20-99	100-499	500+
Finance and Insurance	Firms	9.58%	32.87	7.18	13.26	1.63	9.80	16.44	-8.90
	Establishments	10.14%	33.05	7.10	13.26	0.91	11.41	-3.65	12.55
Prof., Scientific, & Tech. Svcs	Firms	5.28%	12.16	1.61	5.85	8.22	9.38	25.25	12.00
	Establishments	7.33%	12.16	1.58	5.50	8.06	11.04	17.27	58.98
Educational Services	Firms	6.48%	-2.30	4.06	14.01	-1.43	12.46	19.70	15.79
	Establishments	7.80%	-2.30	4.24	14.01	-3.21	5.40	21.05	61.11
Arts, Entertainment, & Rec.	Firms	3.13%	15.03	3.47	2.30	-7.67	-8.51	24.53	6.06
	Establishments	3.44%	15.03	3.47	2.71	-8.31	-8.23	23.29	14.43
Information	Firms	2.84%	-5.66	12.77	-2.31	-2.44	-10.38	2.20	10.18
	Establishments	11.72%	-5.66	12.77	-3.26	-3.49	0.00	-0.94	25.03
Management of Companies	Firms	5.05%	3.70	18.64	40.00	55.17	-0.01	10.90	-2.41
	Establishments	10.70%	3.70	18.64	40.00	62.07	0.00	11.54	10.62
Manufacturing	Firms	-7.56%	-10.44	2.44	-4.69	-10.25	-16.42	-14.52	-7.56
	Establishments	-7.06%	-10.12	2.46	-4.39	-9.86	-15.73	-12.75	-4.14

Source: U.S. Census Bureau, Statistics of U.S. Businesses series. Figures represent the percentage change in firms and establishments by size of enterprise, between 1998 and 2002. Green figures indicate growth, red figures indicate decline.

business location, while a firm can consist of one or more locations for a single business. Firms and establishments are categorized here by the number of employees for the overall enterprise (not necessarily the specific location/establishment) as follows: 0 employees (that is, 0 employees reported during the official mid-March counting period, but some employees at other times of the year); 1-4 employees; 5-9; 10-19; 20-99; 100-499; and 500 or more employees. Excluded from the more detailed descriptions below are reports of units with 0 employees, although the Census data do show growth in this category of firms and establishments across the sectors of Finance and Insurance (9.58 percent growth in these firms from 1998 to 2002), Professional, Scientific and Technical Services (5.28 percent growth), Educational Services (6.48 percent growth), Management of Companies (5.05 percent growth), and Arts, Entertainment and Recreation (3.13 percent growth).

The Census data show encouraging signs for small enterprise creation across several of the new economy sectors, providing a glimpse of entrepreneurial activ-

ity in the state, as well as a hint of possible job growth in the future.

Michigan may be witnessing aspects of “creative destruction” as described by economist Joseph Schumpeter, in which older established firms eventually lose their competitive advantages to newer innovative firms (Schumpeter 1975). This evolution in the marketplace is marked by churning of jobs and firms with the simultaneous destruction of older established firms and creation of new small and often innovative firms. Entrepreneurs bring new energy, ideas, technologies and processes that help convert startups into growing firms with additional job growth (Barth et al. 2006). As a sign of hope for the future, according to a recent Milken Institute report, “over the last decade, small firms [i.e., firms with fewer than 500 employees] have provided 60 percent to 80 percent of the net new jobs in the economy” (Barth et al., p.1, 2006). In this light, the new firms entering the Michigan marketplace not only point the way for additional entrepreneurs to join their ranks, but also hold the hope for significant future job growth.

FINANCE AND INSURANCE

Positive growth is evident in the number of Finance and Insurance sector firms and establishments across all but the largest of the enterprise size categories described in the Census data. Towards the lower end of the spectrum, for enterprises employing 1 to 4 workers, there was growth of just over 7 percent in the number of firms and establishments between 1998 and 2002. For enterprises with 5 to 9 workers, there was 13.26 percent growth in the number of both firms and establishments between 1998 and 2002. And even at the upper end of the spectrum, there was 9.8 percent growth in the number of firms and 11.4 percent growth in establishments for companies employing 20 to 99 workers, 16.4 percent growth in firms employing 100 to 499 workers, and 12.5 percent growth in establishments for companies employing more than 500 workers. The only categories in this sector that shrank over time were the number of firms employing more than 500 workers, which fell by 8.9 percent, and the number of establishments in the 100-499 category, which fell by 3.6 percent.



PROFESSIONAL, SCIENTIFIC AND TECHNICAL SERVICES

Although growth in the Professional, Scientific and Technical Services sector was generally not as significant at the lower end of the spectrum as was the case in the Finance and Insurance sector, there were large increases at the upper end. For enterprises employing 100 to 499 workers, the number of firms grew by 25.2 percent while the number of establishments grew by 17.3 percent between 1998 and 2002. And for those companies with more than 500 workers, the number of firms increased by 12 percent while the number of establishments increased by 59 percent.

EDUCATIONAL SERVICES

For the Educational Services sector, growth was found in all segments except for companies employing 0 workers in the March reporting period, and those employing 10 to 19 workers. For companies employing 5 to 9 workers, firms and establishments increased by 14 percent between 1998 and 2002. At the same time, the number of firms employing 20 to 99 workers grew 12.5 percent while establishments grew by 5.4 percent. And at the top of the spectrum, for those companies employing more than 500 workers, the number of firms grew by 15.8 percent while establishments grew by 61 percent.

ARTS, ENTERTAINMENT, AND RECREATION

The number of firms and establishments in the Arts, Entertainment and Recreation sector showed growth across all size categories except for companies employing from 10 to 19 workers and those employing from 20 to 99 workers. Otherwise growth was widespread. For companies employing 1 to 4 workers, the number of firms and establishments both grew by 3.5 percent between 1998 and 2002. For companies employing 100 to 499 workers, the number of firms

increased by 24.5 percent while establishments increased by 23.3 percent. And for those organizations employing more than 500 workers, firms increased by 6.1 percent while establishments grew by 14.4 percent. Again, while this sector may not provide core knowledge economy employment, entertainment, recreational and cultural attractions are important factors in providing the quality of life desired by highly educated knowledge workers.

MANAGEMENT OF COMPANIES

The number of firms employing more than 500 workers fell by 2.4 percent between 1998 and 2002 for enterprises in the Management of Companies sector. Otherwise, growth was robust for enterprises employing from 1 to 4 workers, with 18.6 percent growth in firms and establishments, and for those employing from 5 to 9 workers, where firms and establishments both grew by 40 percent. Growth was largest in this sector for enterprises employing 10 to 19 workers, where firms increased by 55 percent and establishments increased by 62 percent.

DECLINING SECTORS

Losses in firms and establishments between 1998 and 2002 were more widespread across the Information sector and were especially widespread in Manufacturing. Similar to the drop in employment figures described above in the Information sector, there were decreases in the number of firms and establishments across most of the Information sector size categories, although there were a few bright spots. For instance, for companies employing 1 to 4 workers, the number of firms and establishments increased by 12.7 percent between 1998 and 2002. In addition, for companies employing more than 500 workers, the number of firms grew by 10.2 percent while establishments increased by 25 percent.

Finally, almost all portions of the Manufacturing sector suffered cumulative losses,

as shown by the red figures in the bottom two rows of Table 8.

SUMMARY OF EMPLOYMENT, FIRMS AND ESTABLISHMENTS FINDINGS

The findings presented above paint a general picture of nascent economic growth in terms of both employment and businesses in the sectors generally described as part of the new economy, even during a period of overall economic decline driven by massive losses in Michigan's previously dominant manufacturing sector. Although the new economy growth at times has been anemic and halting, with increases followed sometimes by declines, there has been relatively widespread overall growth during the last 10 years.

This picture of growth in new economy sectors despite the huge manufacturing losses should provide a sense of hope and spur confidence that Michigan is not in a state of total economic meltdown or implosion. Rather, Michigan appears to be in the midst of a wrenching economic transformation, moving from an industrial model, in which great and sustained success led eventually to bloated bureaucracies and expectations, toward a new model of a knowledge economy that requires significantly different foundations and support structures.

Michigan's Capacity to Reinvent Itself for a 21st Century Economy and Culture

Given the evidence above that Michigan's economy is transforming and diversifying itself, we turn next to the question of Michigan's capacity to continue this transformation and to establish a successful new 21st century knowledge economy.

There is no question that Michigan lags the rest of the country in economic



Table 9. Michigan's National Rankings on NSF Science & Engineering Indicators

Indicator Description	Rank
Employment in high-tech establishments as a share of total state employment	2
Advanced science and engineering (S&E) degrees as a share of all S&E degrees conferred	8
Patents awarded per 1000 individuals in S&E occupations	9
Number of engineers as a share of the state workforce	10
Academic patents awarded per 1000 S&E doctorate holders in academia	11
8th grade science proficiency	11
8th grade science performance	11
4th grade science proficiency	11
Number of S&E employees as a share of the state workforce	13
Number of bachelor's degrees in S&E conferred per 1000 18-24 year olds	15
Number of S&E graduate students per 1000 24-34 year olds	16
4th grade science performance	17

Source: National Science Foundation, "Science and Engineering Indicators, 2006."

growth. Countless statistics, reports and media articles have described Michigan in a "one state recession" (despite the growth in the new economy sectors). Here the relevant question is whether Michigan has the capacity to pick itself up by its bootstraps and reestablish robust and sustainable economic growth based on the requirements for success in a knowledge economy.

Leading analysts have concluded that a primary resource required to successfully create a sustainable knowledge economy is a well educated workforce, or human capital, summed up with the word "talent." According to Michigan Future, Inc.'s report *A New Agenda for a New Michigan*, talent is defined as "a combination of knowledge, creativity, and entrepreneurship" (Michigan Future, Inc., p. iii). According to this increasingly dominant line of economic thought, locations "without concentrations of talent will have great difficulty retaining or attracting knowledge-based enterprises, nor are they likely to be the place where new knowledge-based enterprises are created" (Michigan Future, Inc., p. iii).

How does Michigan fare on this front? Is there cause for hope? Although Michigan clearly suffers in some areas, there is indeed reason for hope and optimism

about Michigan's capacity to reinvent itself economically, as described below.

HUMAN CAPITAL

With its history of readily available low-skill manufacturing employment and a below-average rate of adults with college degrees, Michigan certainly has deficits in human capital. Compared to the 27 percent of the U.S. adult population aged 25 or older with at least a bachelor's degree in 2004, only 24.6 percent of Michiganders aged 25 or more had graduated from college (Michigan Future, Inc. 2006, p. 13). And at least some analysts have argued that Michiganders don't value education enough, citing the 2005 public opinion survey "Culture of Education" conducted by EPIC-MRA, in which only 54 percent of Michiganders surveyed agreed with the statement "everybody should get a college education" while only 63 percent agreed that "people who have a college education are usually better off than people who don't" (EPIC-MRA Your Child Survey 2005).

On the other hand, it seems possible that those respondents do value education in general, while the responses quoted above might reveal beliefs that not all people will succeed in college, or that some people would rather not pursue

higher education because they are simply better suited to low skill/low pay jobs. There is evidence in the same survey to support this view. For instance, 71 percent of Michiganders *disagreed* with the statement that "you can make a decent living with just a high school education." And 80 percent of respondents *disagreed* with the statement that "education is useful up to a point, but it's possible to have too much" (EPIC-MRA Your Child Survey 2005). Furthermore, the EPIC-MRA study was repeated in 2007, at which time 59 percent of parents agreed that everyone should get a college education, up from 54 percent in 2005 (Mrozowski and Wilkinson 2007). In addition, the most recent U.S. Census data show that more Michiganders are graduating from high school and college than in the past. By 2006, 89.7 percent of Michiganders aged 25 or older had graduated from high school, compared to 88.6 percent a year earlier, while 26.1 percent had graduated from college, compared to 24.6 percent in the previous year (Gongwer Michigan Report, March 16, 2007). These statistics seem to belie the argument that Michiganders do not value education, and at a minimum, the data show that Michiganders are moving in the right direction.

Beyond that mixed evidence, Michigan shows strengths in a number of labor force areas, including its science and engineering sector which is a critical component in helping establish high-paying high-tech industries that can form the core of a knowledge economy (see Table 9). According to the National Science Foundation (NSF) report *Science and Engineering Indicators 2006*, Michigan ranked 10th in the nation in the number of engineers as a percentage of the state workforce in 2003 (NSF 2006). In terms of individuals in science and engineering occupations as a percentage of the workforce, Michigan ranked 13th in 2003. And the performance levels of these workers was impressive:



Michigan ranked 11th in academic patents awarded per 1000 science and engineering doctorate holders in academia, and 9th in patents awarded per 1000 individuals in science and engineering occupations. These impressive patent statistics point to a workforce that performs well on innovation activities, a key component of a knowledge economy.

On another dimension, Michigan ranked 2nd in the nation in terms of employment in high-tech establishments as a percentage of total state employment. High-tech industries were defined as: “those in which the proportion of employees both in research and development and in all technology occupations is at least twice the average proportion for all industries” (NSF 2006, p. 8-83). That NSF report argues that states with a high proportion of high-tech employment “... are probably well positioned to take advantage of new technological developments because they have a relatively larger pool of experienced high-technology workers” (NSF 2006, p. 8-82). Thus, Michigan appears well positioned to be able to take advantage of future technological developments in a high-tech knowledge economy.

As for future generations of employees, it must be noted that the U.S. overall is falling dangerously behind other nations in producing scientists, engineers and mathematicians (Friedman 2005). Still, there are promising signs regarding Michigan’s capacity to produce high-skill employees, compared to the nation at large. According to the NSF report, Michigan performs well compared to other states on the following measures: the number of advanced science and engineering (S&E) degrees as a share of all S&E degrees conferred in 2003 (Michigan ranks 8th on this measure); the number of bachelor’s degrees in natural sciences and engineering conferred per 1,000 individuals 18-24 years old (Michigan ranks 15th); and the number of S&E graduate students per

1,000 25-34 year olds (Michigan ranks 16th).

Michigan’s current primary students also demonstrate strengths compared to the nation at large, according to the NSF statistics which show that Michigan ranks 11th of the 38 states assessed on both 8th grade science proficiency (measuring the ability to undertake high school science) and 8th grade science performance (the level of knowledge of the subject matter) using data from 2000. In addition, Michigan’s 4th graders ranked 11th on science proficiency and 17th on science performance. Other metrics on which Michigan performed above the national average include 4th grade mathematics proficiency and performance, the share of public high school students taking advanced placement exams, the share of public high school students scoring 3 or higher on at least one advanced placement exam, and the number of bachelor’s degrees conferred per 1,000 18 – 24 year olds (NSF 2006).

Although Michigan does not lead the nation in any of these rankings, these data provide reason to believe in the capacity of Michigan’s youth compared to their counterparts around the country. Employers looking at these data would see a base of math, science and engineering talent that compares favorably to other states around the nation.

INNOVATION, RESEARCH AND DEVELOPMENT

Beyond looking at tomorrow’s workers, there are also positive signs based on the current status of innovation, research and development activity in the state. Michigan today has a strong foundation of research and development (R&D) activity, a promising indicator of the state’s capacity to reinvent itself and move toward a knowledge economy. For instance, even as the state’s manufacturing capacity has withered, at the same time Michigan has

Table 10. Michigan’s Rankings on the Development Report Card for the States

Indicator	Rank
Privately funded R&D activities	4
Gross license income per worker	9
Patents per million residents	12
Innovation assets	18

Source: Corporation for Enterprise Development, “2007 Development Report Card for the States.”

become the “world center of automotive research and design” (Drake 2006, p. 11).

The Corporation for Enterprise Development (CFED) produces an annual report entitled the *Development Report Card for the States*, assessing business performance, business vitality, and development capacity (the capacity for future economic development). According to the CFED report, Michigan ranks 18th in terms of “innovation assets” which includes factors such as the number of scientists and engineers employed and in school, internet accessibility, research and development expenditures, Small Business Innovation Research Grants, patents issued, and businesses created via technology transfer from universities. When looking in more detail at the report indicators, Michigan ranks 4th in the nation in the amount of privately funded R&D expenditures, generally associated with larger corporate activities. Other promising signs from the CFED report show Michigan ranked 9th in terms of royalties and licenses in gross license income per worker for 2003, a measure of university-based research ac-

Table 11. Michigan’s Rankings on Micro- and Nanotechnology Industry Indices

Indicator	Rank
Innovation activity	4
Venture capital	6
Industry density	6
Research activity	8

Source: Smalltimes Magazine.



Table 12. Michigan's Rankings on Research and Development Activities and Expenditures

Indicator	Rank
Industry performed R&D as a share of private industry output	1
Total R&D expenditures from all funding sources	2
R&D intensity (R&D expenditures as a share of gross state product)	4
R&D performed by universities and colleges	9

Source: National Science Foundation, "Science and Engineering Indicators, 2006."

tivity, and 12th in terms of patents issued per 1 million residents in 2005, a measure of a state's innovation capacity (CFED 2007). Each of these indicators provides a glimpse into the culture and the economic context defining Michigan's capacity for establishing a knowledge economy, where factors like education and innovation are critical.

In the micro- and nanotechnology industries, among the most innovative and promising fronts for developing breakthrough technologies, Michigan scores particularly well compared to other states, as seen in Table 11. According to *Small-times*, a leading trade publication for the micro- and nanotechnology industries, Michigan ranks 8th in research activity, 6th in industry density, 6th in venture capital, and 4th in terms of innovation activity (Forman 2007). With future applications in numerous core areas of the knowledge economy, from medicine to national security to energy and advanced manufacturing, nanotechnology holds

Table 13. Michigan's Rankings on the 2007 State New Economy Indices

Indicator Description	Rank
E-government services	1
Immigration of knowledge workers	6
Foreign direct investment	10
Managerial, professional and technical jobs	11
Innovation capacity	16
Knowledge jobs	17
Overall score, New Economy Index	19

Source: Information Technology and Innovation Foundation, "The 2007 State New Economy Index."

the promise of providing enormous economic impact. Michigan is well positioned to ride that future wave to success in a new economy.

The NSF data also confirm Michigan's strengths in R&D activities, displayed in Table 12. According to NSF's 2006 report,

Michigan ranks number 1 in terms of industry performed R&D as a percentage of private-industry output for 2003, number 2 in terms of total R&D expenditures from all funding sources, and number 9 for R&D performed by universities and colleges. In order to get a more standardized state comparison that controls for factors like population size, geographic size, natural resources, etc., NSF also calculates a measure of "R&D intensity" by dividing total R&D expenditures by gross state product. For 2003, Michigan ranked 4th in the nation in terms of R&D intensity (NSF 2006).

As shown in Table 13, Michigan also scores well on a number of metrics in a new report from the Information Technology and Innovation Foundation (ITIF) (Atkinson and Correa 2007) entitled *The 2007 State New Economy Index*. Michigan's state government leads the way, ranking number 1 in online e-government services. According to the ITIF report, "State governments that fully embrace the potential of networked information technologies will not only increase the quality and cut the costs of government services, but also help to foster broader use of information technologies among residents and businesses." (Atkinson and Correa 2007, p. 42). In terms of overall innovation capacity, measuring things like high-tech industries, science and engineering employment, patents, R&D activity and venture capital, Michigan ranks 16th, well above the national aver-

age. Michigan scores particularly well in the *trend* regarding high-tech jobs as a percentage of all jobs, where the state has moved up from a rank of 35th in 2002 to 20th in 2007, the second highest rate of positive change in the nation. Other metrics on which the state scores above the national average include knowledge jobs (Michigan ranks 17th), managerial, professional and technical jobs (11th), foreign direct investment (10th) and immigration of knowledge workers (6th) (Atkinson and Correa 2007).

For the overall summary score on the new economy index, Michigan ranks 19th. Importantly, this 2007 score shows a significant positive trend, with Michigan moving up from a rank of 34th in 1999 and 22nd in 2002 (Atkinson and Correa 2007). In terms of growing a new economy, the ITIF assessment shows Michigan on a positive path with forward momentum, despite the enormous losses in the automotive and manufacturing sectors. Again, these indicators point to economic transformation, not economic implosion.

ENTREPRENEURIALISM

Michigan is not yet an entrepreneurial state, as the ITIF report shows by ranking the state 40th on overall entrepreneurial activity (ITIF 2007). There are signs, however, of movement in the right direction.

Michigan ranks 1st in jobs created by startup businesses during 2002-2003

The Corporation for Enterprise Development (CFED) surprisingly ranks Michigan first out of the 50 states in job creation by startup businesses for the period 2002-2003 (CFED 2007). According to the report, this particular indicator "... gives a picture of the influence of local entrepreneurs on a state economy through the creation of new jobs" (CFED 2007).



For its overall entrepreneurial index score, CFED ranks Michigan 24th, significantly better than the ITIF report. In addition, and confirming the data reported above regarding positive growth in the number of small firms, a related CFED indicator measures the percentage change in the number of new companies created per 100 workers over a 5 year period of time, to gauge trends in entrepreneurial activity. Using this data from the period 2000 through 2005, the CFED report ranks Michigan number 13 in terms of these new business startups. This is clearly evidence of improving entrepreneurial activity, refuting the accepted view of Michigan as a lethargic and hulking economic has-been.

Summary

This report is not intended to argue that Michigan's economy is in good shape or that it will be in good shape soon. There is no question that the direct and indirect job losses resulting from the Big 3's decreased automotive market share have devastated Michigan's economy. Nor is there a question that these problems will persist for years to come. Policymakers and the public will continue grappling with the effects of additional manufacturing job losses over the coming years.

In addition, there are numerous other problems facing the state, including too little venture capital, too many young talented citizens moving away, and dysfunctional state government that has taken far too long to enact reforms or taxes for investing in the state's future, thereby contributing to the sense of economic crises in communities throughout the state. Numerous recent reports have offered policy recommendations for many of these problems, and so this report is not intended to repeat those prescriptions.

The intent of this report is to argue that descriptions of Michigan's economy as imploding are inaccurate and counter-

productive. In place of those one-sided descriptions of an economic meltdown, this report presents evidence that Michigan's economy is in a period of historic transformation, with nascent growth of a new economy occurring alongside the enormous losses from the decay of the old system. Michigan is undergoing economic diversification during a period of transition from a dying economic model to an emerging one.

If the way forward to a new economy requires talent, entrepreneurialism, innovation, risk-taking, and a more educated workforce, then focusing only on negative news will hinder the state's ability to take the positive steps required to reach that brighter future. The sense of gloom has to be overcome. The self-image of a rust-belt wasteland has to be replaced by a more complete view of a state in transition. The new economy requires vision, optimism and hope. If Michiganians are to move the state forward, we must find a way to motivate and inspire ourselves. This report is intended to provide a step on that path, by highlighting the new economy growth that is already occurring, as well as the state's capacity to continue and expand that growth.

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